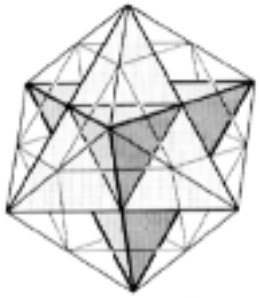

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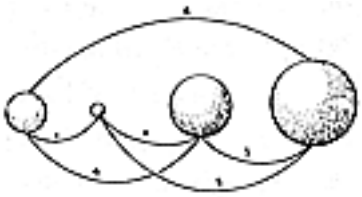

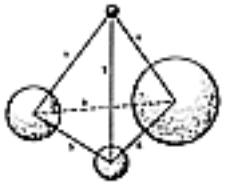

# 900.00 **MODELABILITY**

900.01 Definition: Modelability

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900.10 **Modelability**

900.11 Modelability is topologically conceptual in generalized principle independent of size and time: ergo, conceptual modelability is metaphysical.

900.12 Conceptual formulation is inherently empirical and as such is always special case sizing and always discloses all the physical characteristics of existence in time.

900.20 **Synergetics**

900.21 Synergetics is a book about models: humanly conceptual models; lucidly conceptual models; primitively simple models; rationally intertransforming models; and the primitively simple numbers uniquely and holistically identifying those models and their intertransformative, generalized and special case, number-value accountings.

900.30 **Model vs Form**

900.31 Model is generalization; form is special case.

900.32 The brain in its coordination of the sensing of each special case experience apprehends forms. Forms are special case. Models are generalizations of interrelationships. Models are inherently systemic. Forms are special case systems. Mind can conceptualize models. Brains can apprehend forms.

900.33 Forms have size. Models are sizeless, representing conceptuality independent of size.

901.00 **Basic Disequilibrium LCD Triangle**

901.01 **Definition**

901.02 The Basic Disequilibrium 120 LCD Spherical Triangle of synergetics is derived from the 15-great-circle, symmetric, three-way grid of the spherical icosahedron. It is the lowest common denominator of a sphere's surface, being precisely 1/120th of that surface as described by the icosahedron's 15 great circles. The trigonometric data for the Basic Disequilibrium LCD Triangle includes the data for the entire sphere and is the basis of all geodesic dome calculations. (See Sec.612.00.)

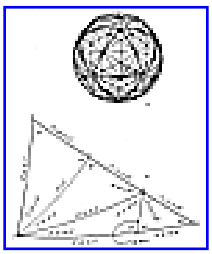

Fig. 901.03

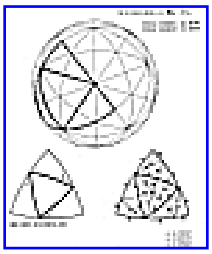

Fig. 901.03

901.03 As seen in Sec. 610.20 there are only three basic structural systems in Universe: the tetrahedron, octahedron, and icosahedron. The largest number of equilateral triangles in a sphere is 20: the spherical icosahedron. Each of those 20 equiangular spherical triangles may be subdivided equally into six right triangles by the perpendicular bisectors of those equiangular triangles. The utmost number of geometrically similar subdivisions is 120 triangles, because further spherical-triangular subdivisions are no longer similar. The largest number of similar triangles in a sphere that spheric unity will accommodate is 120: 60 positive and 60 negative. Being spherical, they are positive and negative, having only common arc edges which, being curved, cannot hinge with one another; when their corresponding angle-and-edge patterns are vertex-mated, one bellies away from the other: concave or convex. When one is concave, the other is convex. (See Illus. 901.03 and drawings section.)

901.04 We cannot further subdivide the spherical icosahedron's equiangular triangles into similar, half-size, equiangular triangles, but we can in the planar icosahedron. When the sides of the triangle in the planar icosahedron are bisected, four similar half-size triangles result, and the process can be continued indefinitely. But in the spherical icosahedron, the smaller the triangle, the less the spherical excess; so the series of triangles will not be similar. Each corner of the icosahedron's equiangular triangles is 72 degrees; whereas the corners of its mid-edge-connecting triangle are each approximately 63 degrees.

901.10 **Geodesic Dome Calculations**

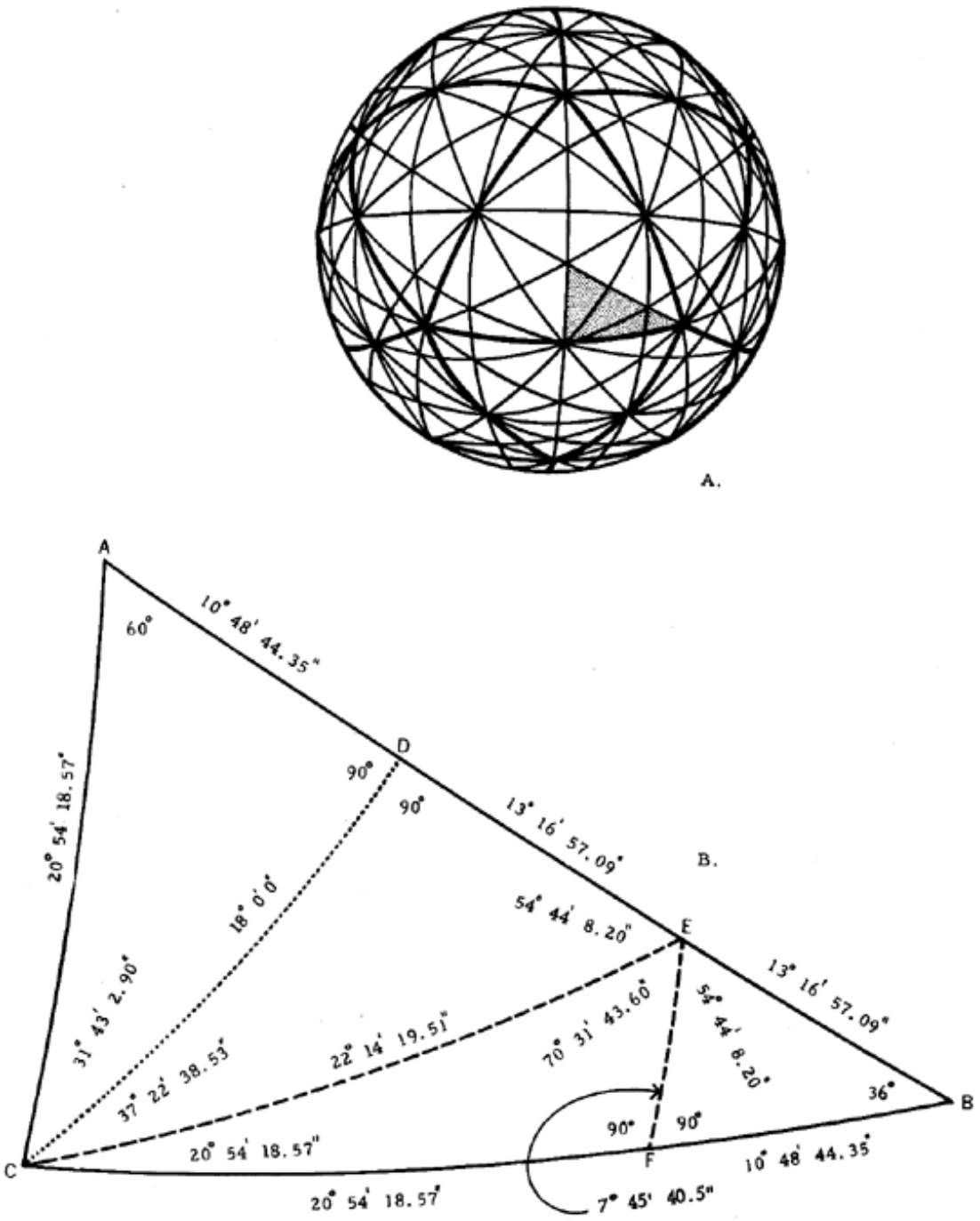


Fig. 901.03 Basic Right Triangle of Geodesic Sphere: Shown here is the basic data for the 31 great circles of the spherical icosahedron, which is the basis for all geodesic dome calculations. The basic right triangle as the lowest common denominator of a sphere's surface includes all the data for the entire sphere. It is precisely 1/120th of the sphere's surface and is shown as shaded on the 31-great-circle- sphere (A). An enlarged view of the same triangle is shown (B) with all of the basic data denoted. There are three different external edges and three different internal edges for a total of six different edges. There are six different internal angles other than $60^{\circ}$ or $90^{\circ}$. Note that all data given is spherical data, i.e. edges are given as central angles and face angles are for spherical triangles. No chord factors are shown. Those not already indicated elsewhere are given by the equation 2 sin(theta/2), where theta is the central angle. Solid lines denote the set of 15 great circles. Dashed lines denote the set of 10 great circles. Dotted lines denote the set of 6 great circles.

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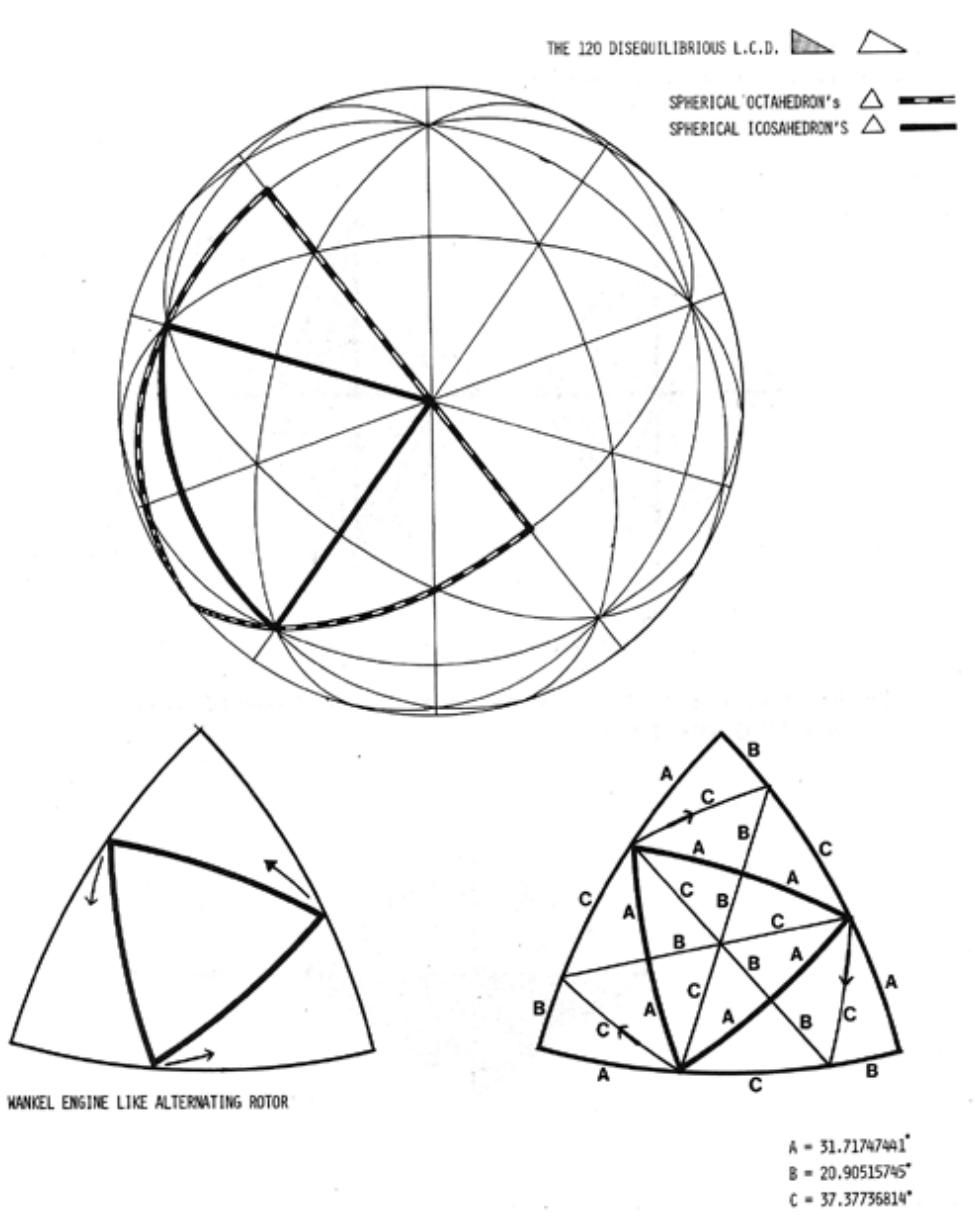


Fig. 901.03 The Basic Disequilibrium 120 LCD Triangle:

| | |
|---|---|
| 12 vertexes surrounded by 10 converging angles | 12×10=120 |
| 20 vertexes surrounded by 6 converging angles | 20×6=120 |
| 30 vertexes surrounded by 4 converging angles | 30×4=120 |
| | --- |
| | 360 converging angles |

The 360 convergent angles must share the 720° reduction from absolute sphere to chorded sphere: 720/360 = 2° per each corner; 6° per each triangle.

All of the spherical excess 6° has been massaged by the irreducibility of the 90° and 60° corners into the littlest corner. .: 30 → 36.

In reducing 120 spherical triangles described by the 15 great circles to planar faceted polyhedra, the spherical excess 6° would be shared proportionately by the 90°-60°-30° flat relationship = 3:2:1.

The above tells us that freezing 60-degree center of the icosa triangle and sharing the 6-degree spherical excess find A Quanta Module angles exactly congruent with the icosa's 120 interior angles.

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901.11 When two great-circle geodesic lines cross, they form two sets of similar angles, any one of which, paired with the other, will always add to 180°. (This we also learned in plane geometry.) When any one great circle enters into—or exits from—a spherical triangle, it will form the two sets of similar angles as it crosses the enclosing great-circle-edge-lines of that triangle.

901.12 As in billiards or in electromagnetics, when a ball or a photon caroms off a wall it bounces off at an angle similar to that at which it impinged.

901.13 If a great-circle-describing, inexhaustibly re-energized, satellite ball that was sufficiently resilient to remain corporeally integral, were suddenly to encounter a vertical, great-circle wall just newly mounted from its parent planet's sphere, it would bounce inwardly off that wall at the same angle that it would have traversed the same great-circle line had the wall not been there. And had two other great-circle walls forming a right spherical triangle with the first wall been erected just as the resilient ball satellite was hitting the first great-circle wall, then the satellite ball would be trapped inside the spherical-triangle-walled enclosure, and it would bounce angularly off the successively encountered walls in the similar-triangle manner unless it became aimed either at a corner vertex of the triangular wall trap, or exactly perpendicularly to the wall, in either of which cases it would be able to escape into the next spherical area Lying 180° ahead outside the first triangle's walls.

901.14 If, before the satellite bouncingly earned either a vertexial or perpendicular exit from the first-described spherical triangle (which happened to be dimensioned as one of the 120 LCD right triangles of the spherical icosahedron) great-circle walls representing the icosahedron's 15 complete great circles, were erect—thus constructing a uniform, spherical, wall patterning of 120 (60 positive, 60 negative) similar spherical, right triangles—we would find the satellite sphere bouncing around within one such spherical triangle at exactly the same interior or exiting angles as those at which it would have crossed, entered into, and exited, each of those great-circle boundaries of those 120 triangles had the wall not been so suddenly erected.

901.15 For this reason the great-circle interior mapping of the symmetrically superimposed other sets of 10 and 6 great circles, each of which—together with the 15 original great circles of the icosahedron—produces the 31 great circles of the spherical icosahedron's total number of symmetrical *spinnabilities* in respect to its 30 mid-edge, 20 mid-face, and 12 vertexial poles of half-as-many-each axes of spin. (See Sec. 457 .) These symmetrically superimposed, 10- and 6-great-circles subdivide each of the disequilibrious 120 LCD triangles into four lesser right spherical triangles. The exact trigonometric patterning of any other great circles orbiting the 120-LCD-triangled sphere may thus be exactly plotted within any one of these triangles.

901.16 It was for this reason, plus the discovery of the fact that the icosahedron—among all the three-and-only prime structural systems of Universe (see Sec. 610.20) —required the least energetic, vectorial, structural investment per volume of enclosed local Universe, that led to the development of the Basic Disequilibrium 120 LCD Spherical Triangle and its multifrequenced triangular subdivisioning as the basis for calculating all highfrequency, triangulated, spherical structures and structural subportions of spheres; for within only one disequilibrious LCD triangle were to be found all the spherical chord-factor constants for any desired radius of omnisubtriangulated spherical structure.

901.17 In the same way it was discovered that local, chord-compression struts could be islanded from one another, and could be only tensionally and non-inter-shearingly connected to produce stable and predictably efficient enclosures for any local energetic environment valving uses whatsoever by virtue of the approximately unlimited range of frequency-and-angle, subtriangle-structuring modulatability.

901.18 Because the 120 basic disequilibrious LCD triangles of the icosahedron have 2 l/2 times less spherical excess than do the 48 basic equilibrious LCD triangles of the vector equilibrium, and because all physical realizations are always disequilibrious, the Basic Disequilibrium 120 LCD Spherical Triangles become most realizably basic of all general systems' mathematical control matrixes.

901.19 **Omnirational Control Matrix:** *Commensurability of Vector Equilibrium and Icosahedron* The great-circle subdivisioning of the 48 basic equilibrious LCD triangles of the vector equilibrium may be representationally drawn within the 120 basic disequilibrious LCD triangles of the icosahedron, thus defining all the aberrations—and their magnitudes—existing between the equilibrious and disequilibrious states, and providing an omnirational control matrix for all topological, trigonometric, physical, and chemical accounting.

902.00 **Properties of Basic Triangle**

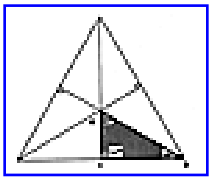

Fig. 902.01

902.01 **Subdivision of Equilateral Triangle:** Both the spherical and planar equilateral triangles may be subdivided into six equal and congruent parts by describing perpendiculars from each vertex of the opposite face. This is demonstrated in Fig. 902.01, where one of the six equal triangles is labeled to correspond with the Basic Triangle in the planar condition.

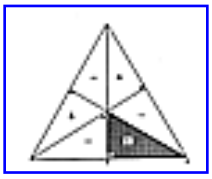

Fig. 902.10

902.10 **Positive and Negative Alternation:** The six equal subdivision triangles of the planar equilateral triangle are hingeable on all of their adjacent lines and foldable into congruent overlays. Although they are all the same, their dispositions alternate in a positive and negative manner, either clockwise or counterclockwise.

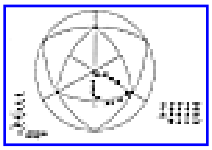

Fig. 902.20

902.20 **Spherical Right Triangles:** The edges of all spherical triangles are arcs of great circles of a sphere, and those arc edges are measured in terms of their central angles (i.e., from the center of the sphere). But plane surface triangles have no inherent central angles, and their edges are measured in relative lengths of one of themselves or in special- case linear increments. Spherical triangles have three surface (corner) angles and three central (edge) angles. The basic data for the central angles provided below are accurate to 1/1,000 of a second of arc. On Earth

| | |
|---|---|
| 1 nautical mile | = 1 minute of arc |
| 1 nautical mile | = approximately 6,000 feet |
| 1 second of arc | = approximately 100 feet |
| 1/l,000 second of arc | = approximately 1/10 foot |
| 1/1,000 second of arc | = approximately 1 inch |

These calculations are therefore accurate to one inch of Earth's arc.

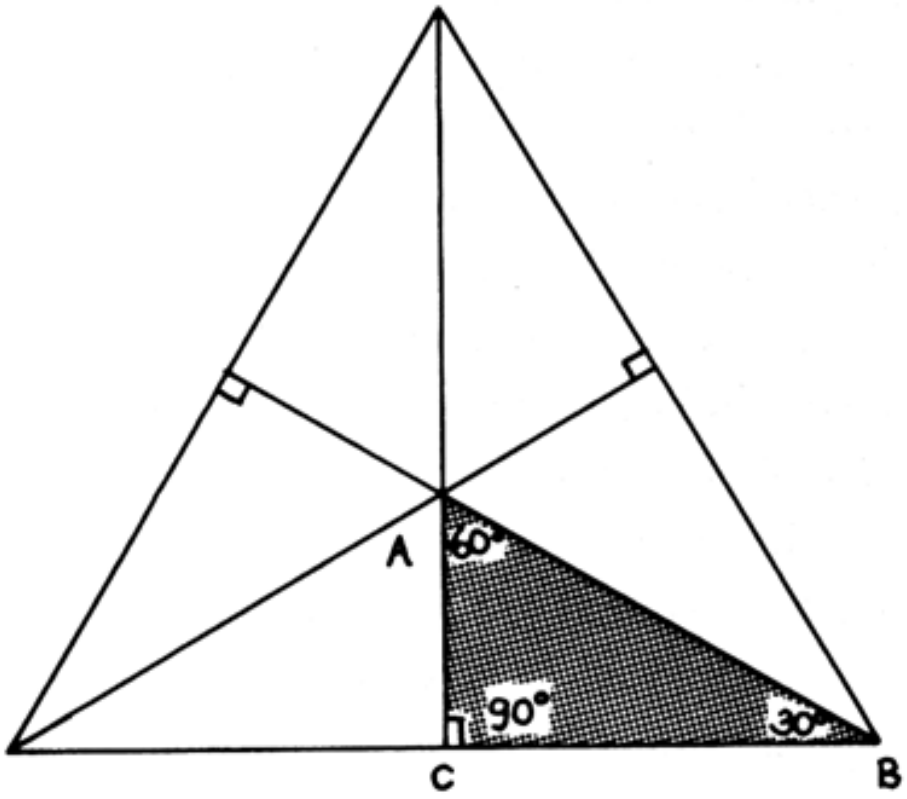


Fig. 902.01.

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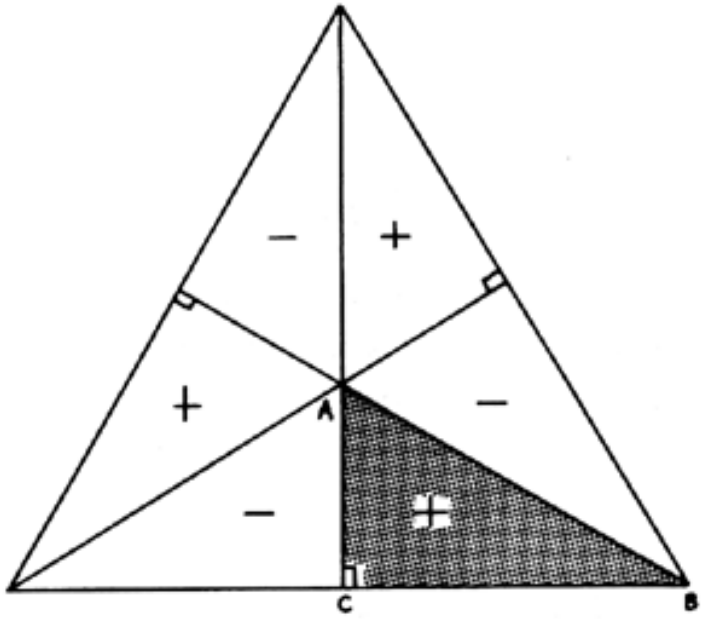


Fig. 902.10.

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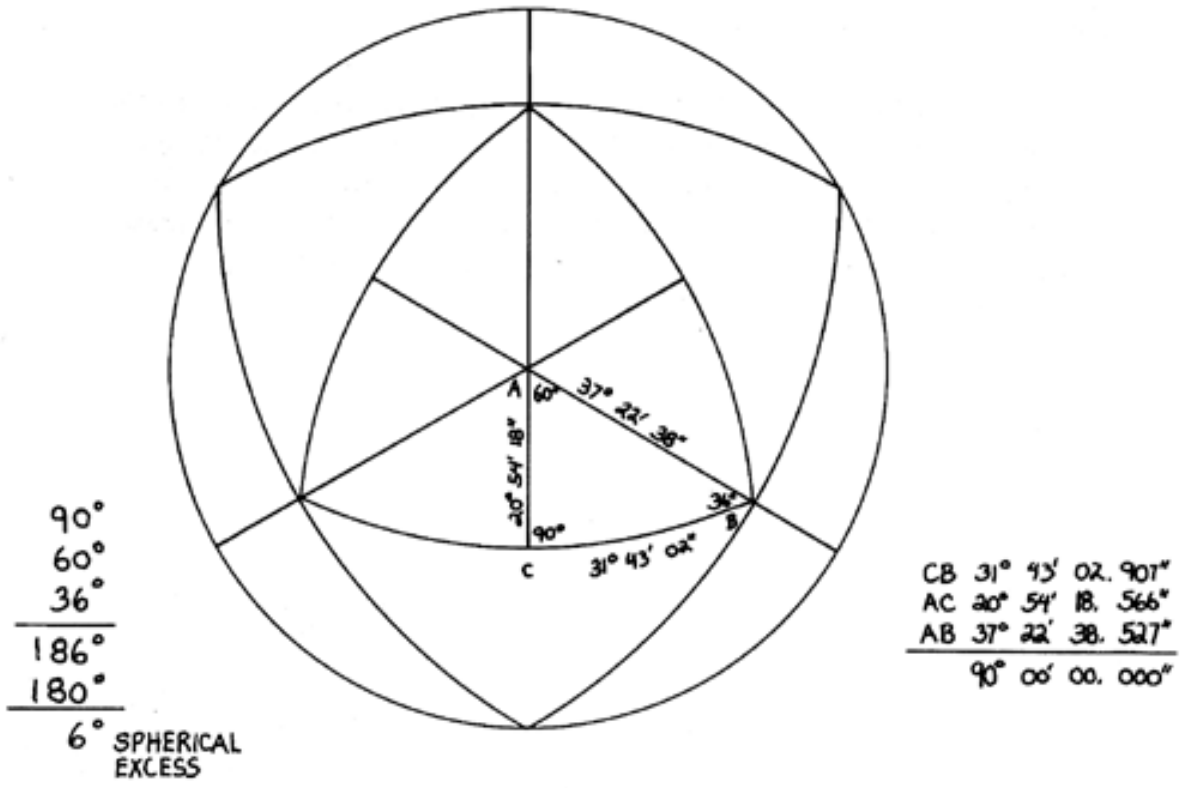


Fig. 902.20.

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902.21 The arc edges of the Basic Disequilibrium 120 LCD Triangle as measured by their central angles add up to 90° as do also three internal surface angles of the triangle's ACB corner:

BCE = 20° 54' 18.57" = ECF

ECD = 37° 22' 38.53" = DCE

DCA = 31° 43' 02.9" = ACD

---

90° 00' 00"

902.22 The spherical surface angle BCE is exactly equal to two of the arc edges of the Basic Disequilibrium 120 LCD Triangle measured by their central angle. BCE = arc AC = arc CF = 20° 54' 18.57".

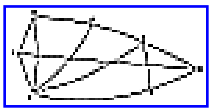

Fig. 902.30

902.30 **Surface Angles and Central Angles:** The Basic Triangle ACB can be folded on the lines CD and CE and EF. We may then bring AC to coincide with CF and fold BEF down to close the tetrahedron, with B congruent with D because the arc DE = arc EB and arc BF = arc AD. Then the tetrahedron's corner C will fit exactly down into the central angles AOC, COB, and AOB. (See Illus. 901.03 and 902.30.)

902.31 As you go from one sphere-foldable great-circle set to another in the hierarchy of spinnable symmetries (the 3-, 4-, 6-, 12-sets of the vector equilibrium's 25- great-circle group and the 6-, 10-, 15-sets of the icosahedron's 31-great-circle group), the central angles of one often become the surface angles of the next-higher-numbered, more complex, great-circle set while simultaneously some (but not all) of the surface angles become the respective next sphere's central angles. A triangle on the surface of the icosahedron folds itself up, becomes a tetrahedron, and plunges deeply down into the congruent central angles' void of the icosahedron (see Sec. 905.47 ).

902.32 There is only one noncongruence- the last would-be hinge, EF is an external arc and cannot fold as a straight line; and the spherical surface angle EBF is 36 degrees whereas a planar 30 degrees is called for if the surface is cast off or the arc subsides chordally to fit the 90-60-30 right plane triangle.

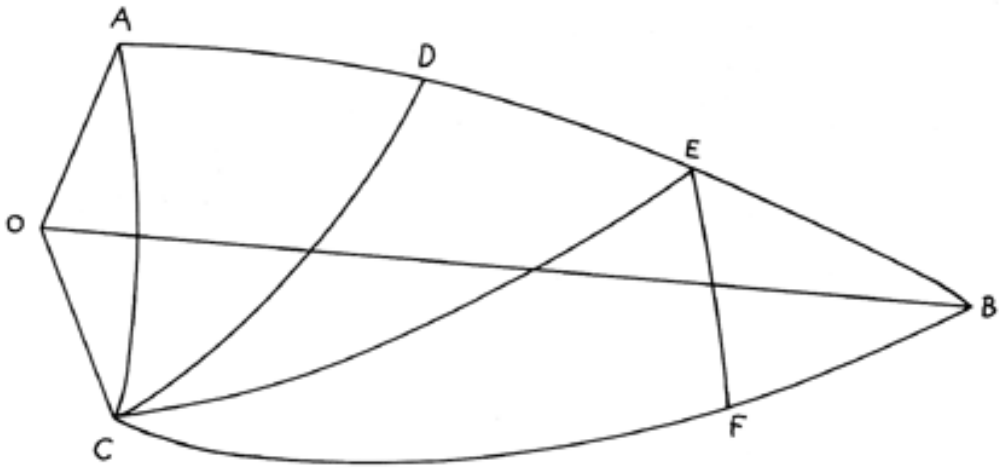


Fig. 902.30.

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902.33 The 6 degrees of spherical excess is a beautiful whole, rational number excess. The 90-degree and 60-degree corners seem to force all the excess into one corner, which is not the way spherical triangles subside. All the angles lose excess in proportion to their interfunctional values. This particular condition means that the 90 degrees would shrink and the 60 degrees would shrink. I converted all the three corners into seconds and began a proportional decrease study, and it was there that I began to encounter a ratio that seemed rational and had the number 31 in one corner. This seemed valid as all the conditions were adding up to 180 degrees or 90 degrees as rational wholes even in both spherical and planar conditions despite certain complementary transformations. This led to the intuitive identification of the Basic Disequilibrium 120 LCD Triangle's foldability (and its fall-in-ability into its own tetra-void) with the A Quanta Module, as discussed in Sec. 910 which follows.

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Next Section: 905.00

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## 905.00 **Equilibrium and Disequilibrium Modelability**

905.01 **Tetrahedron as Model:** Synergetics is the geometry of thinking. How we think is epistemology, and epistemology is modelable; which is to say that knowledge organizes itself geometrically, i.e., with models.

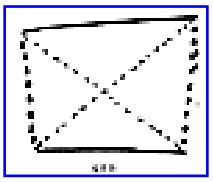


Fig. 905.02

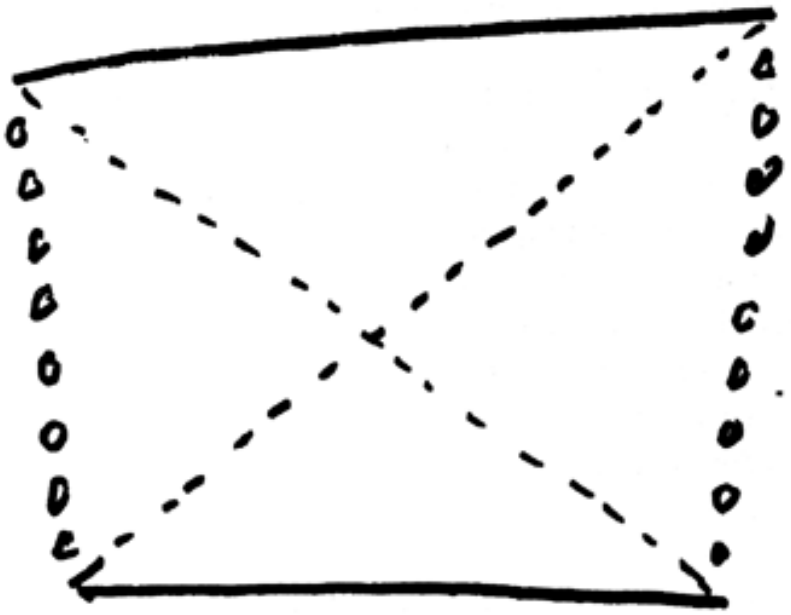
905.02 Unity as two is inherent in life and the resulting model is tetrahedral, the conceptuality of which derives as follows:

- life's inherent unity is two;
- no otherness = no awareness;
- life's awareness begins with otherness;
- otherness is twoness;
- *this* moment's awareness is different from previous awareness;
- differentiations of time are observed directionally;
- directions introduce vectors (lines);
- two time lines demonstrate the observer and the observed;
- the interconnection of two lines results in a tetrahedron;
- sixfold interrelatedness is conceptual:

905.10 **Doubleness of Unity**

905.11 The prime number twoness of the octahedron always occurs in structuring doubled together as four—i.e., $2^2$ —a fourness which is also doubleness of unity. Unity is plural and, at minimum, is two. The unity volume 1 of the tetrahedron is, in structural verity, two, being both the outwardly displayed convex tetrahedron and the inwardly contained concave tetrahedron. (See Chart 223.64 , columns 2, 12, and 15)

905.12 The three-great-circle model of the spherical octahedron only "seems" to be three; it is in fact "double"; it is only foldably produceable in unbroken (whole) great-circle sheets by edge-combining *six* hemicircularly folded whole great circles (see Sec. 840 ). Thus it is seen that the octahedron—as in Iceland spar crystals—occurs only doubly, i.e., omnicongruent with itself, which is "quadrivalent."



Q.E.D.

Fig. 905.02.

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905.13 Among the three possible omnisymmetrical prime structural systems—the tetrahedron, octahedron, and icosahedron—only the tetrahedron has each of its vertexes diametrically opposite a triangular opening. (See Illus. 610.2.) In the octahedron and icosahedron, each vertex is opposite another vertex; and each of their vertexes is diametrically blocked against articulating a self-inside-outing transformation. In both the octahedron and the icosahedron, each of the vertexes is tense-vector-restrained from escaping *outwardly* by the convergent vectorial strength of the system's other immediately surrounding—at minimum three—vertexial event neighbors. But contrariwise, each of the octahedron's and icosahedron's vertex events are constrainingly impulsed *inwardly* in an exact central-system direction and thence impelled toward diametric exit and inside-outing transformation; and their vertex events would do so were it not for their diametrically opposed vertexes, which are surroundingly tense-vector-restrained from permitting such outward egress.

905.14 As a consequence of its uniquely unopposed diametric vertexing—ergo permitted—diametric exit, only the tetrahedron among all the symmetric polyhedra can turn itself pulsatingly inside-out, and can do so in eight different ways (see Sec. 624 ); and in each instance, as it does so, one-half of its combined concave-convex unity "twoness" is always inherently invisible.

905.15 The octahedron, however, restrainingly vector-blocked as described, can only infold itself pulsatingly to a condition of hemispherical congruence like a deflated basketball. Thus the octahedron's concave-convex, unity-twoness state remains plurally obvious. You can see the concave infolded hemisphere nested into the as-yet outfolded convex hemisphere. Verifying the octahedron's *fourness* as being an evolutionary transformation of the tetrahedron's unity-twoness, we may take the four triangles of the tetrahedron which were edge-hinged together (bivalently) and reassemble them univalently (that is, corner-to-corner) and produce the octahedron, four of whose faces are triangular (ergo structurally stable) voids. This, incidentally, introduces the structural stability of the *triangle* as a visualizable yet physical nothingness.

905.16 The triangle is structure. Structure is spontaneous pattern stabilization of a complex of six individual events. Structure is an integral of six events. Structure is a pattern integrity. Pattern integrity is conceptual relationship independent of size. The integrity of the nuclear structuring of the atoms is conceptually thinkable, as are the associability and disassociability proclivities of chemistry, virology, biology, and all nonbiological structuring and mechanics.

905.17 Any and all of the icosahedron's vertexes pulsate individually and independently from the convex to concave state only in the form of local dimpling, because each only-from-outward-motion-restrained vertex—being free to articulate inwardly toward its system center, and having done so—becomes abruptly five-vector- restrained by its immediate neighboring vertexial event convergences; and the abrupt halting of its inward travel occurs before it reaches the system center. This means that one vertex cannot pulse inwardly more deeply than a local dimple similar to the popping in of a derby hat. (See Sec. 618.30 .)

905.18 Both the coexisting concave and convex aspects of the icosahedron—like those of the octahedron, but unlike those of the unique case of the tetrahedron—are always visually obvious on the inside and outside of the only locally dimpled-in, or nested- in, vertex. In both the octahedron and the icosahedron, the concave-convex, only inwardly pulsative self-transforming always produces visually asymmetrical transforming; whereas the tetrahedron's permitted inside-outing pulsatively results only in a visible symmetry, the quasiasymmetry being invisibly polarized with the remainder of Universe outside the tetrahedron, which, being omniradially outward, is inferentially—but not visually—symmetrical; the only asymmetrical consideration of the tetrahedron's inside- outing being that of an initial direction of vertexial exiting. Once exited, the visible remaining symmetrical tetrahedron is in verity the inside-outness of its previously visible aspects. (See Sec. 232.01 .)

905.19 In either of the two sets of four each as alternatively described, one of the polar states is always visible and the other complementarily invisible. This is a dynamic relationship. Dynamically, all four of each of the two sets of the tetrahedral potential are co-occurrently permitted and are required by omni-action-reaction-resultant synergetics. The seeming significance of the separately considered asymmetries are cancelled by the omnidirectional symmetry.

905.20 The vertexes are the unique, individual, ergo in-time events; and the nonvertex voids are the outdividual, ergo out, timeless, sizeless nonevents. The both outwardly and inwardly escaping nonevents complement the embryo, local-in-time, special-case, convergent-event, systemic pattern fixation of individual intercomplementary event identities. (See Sec. 524 .)

905.21 *In* is unidirectional, pointable. *Out* is omnidirectional, unpointable—go out, to-go-out, or go-in-to-go-out on the other side. Any direction from *here* is out; only one direction from *here* is in. Go either temporarily in to go diametrically out on the other side of the individually identical local *in,* or go anydirectionally out . . . to the complete, eternal, unidentifiable, nonness, noneness of the a priori mysterious, integrally regenerative, inherently complex Universe.

905.22 So-called edges and vectors are inherently only convergent or divergent interrelationships between multiply-identifiable, point-to-able, vertex fixes.

905.23 Because each tetrahedron has both four vertexes and four subtending nonvertex voids, we can identify those four diametrically complementary sets of all minimal cosmic structural systems as the four visible vertexes and the four nonvisible nonvertexes, i.e., the triangularly symmetrical, peripheral voids. The tetrahedron thus introduces experientially the cosmic principle of the visible and invisible pairs or couples; with the nonvisible vertex as the inside-out vertex, which nonvertex is a nonconvergence of events; whereas the vertexes are visible event convergences.

905.30 **Hierarchy of Pulsating Tetrahedral Arrays**

905.31 Among the exclusively, three and only, prime cosmic structural systems—the tetra, octa, and icosa—only the tetrahedron's pulsative transforming does not alter its overall, visually witnessable symmetry, as in the case of the "cheese tetrahedron" (see Sec. 623.00). It is important to comprehend that any one of the two sets of four each potential vertexial inside-outing pulsatabilities of the tetrahedron—considered only by themselves—constitutes polarized, but only invisible, asymmetry. In one of the two sets of four each potential inside-outings we have three-of-each-to-three-of-the-other (i.e., trivalent, triangular, base-to-base) vertexial bonding together of the visible and invisible, polarized pair of tetrahedra. In the other of the two sets of four each potential inside- outings we have one-vertex-to-one-vertex (i.e., univalent, apex-to-apex) interbonding of the visible and invisible polarized pair of tetrahedra.

905.32 Because each simplest, ergo prime, structural system tetrahedron has at minimum four vertexes (point-to-able, systemic, event-patterned fixes), and their four complementary system exit-outs, are symmetrically identified at mid-void equidistance between the three other convergent event identity vertexes; and because each of the two sets of these four half-visible/half-invisible, polar-paired tetrahedra have both three-vertex- to-three-vertex as well as single-vertex-to-single-vertex inside-out pulsatabilities; there are eight possible inside-outing pulsatabilities. We have learned (see Sec. 440 ) that the vector equilibrium is the nuclear-embracing phase of all eight "empty state" tetrahedra, all with common, central, single-vertex-to-single-vertex congruency, as well as with their mutual outward-radius-ends' vertexial congruency; ergo the vector equilibrium is bivalent.

905.33 The same vector equilibrium's eight, nuclear-embracing, bivalent tetrahedra's eight nuclear congruent vertexes may be simultaneously outwardly pulsed through their radially-opposite, outward, triangular exits to form eight externally pointing tetrahedra, which thus become only univalently, i.e., only-single-vertex interlinked, and altogether symmetrically arrayed around the vector equilibrium's eight outward "faces." The thus formed, eight-pointed star system consisting of the vector equilibrium's volume of 20 (tetrahedral unity), plus the eight star-point-arrayed tetrahedra, total volumetrically to 28. This number, 28, introduces the prime number *seven* factored exclusively with the prime number *two,* as already discovered in the unity-twoness of the tetrahedron's always and only, co-occurring, concave-convex inherently disparate, behavioral duality. This phenomenon may be compared with the 28-ness in the Coupler accounting (see Sec. 954.72).

905.34 We have also learned in the vector equilibrium jitterbugging that the vector equilibrium contracts symmetrically into the octahedral state, and we thus witness in the octahedron the eight tetrahedra—three-vertex-to-three-vertex (face-to-face, trivalent, triple-interbonded)—which condition elucidates the octahedron's having a volumetric *four* in respect to the tetrahedron's dual unity. Whereas the octahedron's prime number is *two* in respect to the tetrahedron's prime number one, it is experientially evidenced that the octahedron always occurs as both the double phase and the fourfold phase of the tetrahedron; i.e., as (a) the tetrahedral invisible/visible, (No-Yes), concave/convex; as well as (b) the octahedral visible/visible, (Yes-Yes), concave/convex: two different twoness manifestations. The tetrahedron has a unity-two duality in both its generalized dynamic potential and kinetic states, having always both the cosmic macro-tetrahedron and the

cosmic micro-tetrahedron, both embracingly and inclusively defined by the four convergent event fixes of the minimum structural system of Universe. There is also the fundamental twoness of the tetrahedron's three sets of two-each, opposed, 90-degree- oriented edgevectors whose respective four ends are always most economically omni- interconnected by the four other vectors of the tetrahedron's total of six edge-vectors.

905.35 The jitterbug shows that the bivalent vector equilibrium contracts to the octahedral trivalent phase, going from a twentyness of volume to a fourness of volume, 20 → 4, i.e., a 5:1 contraction, which introduces the prime number *five* into the exclusively tetrahedrally evolved prime structural system intertransformabilities. We also witness that the octahedron state of the jitterbug transforms contractively even further with the 60- degree rotation of one of its triangular faces in respect to its nonrotating opposite triangular face—wherewith the octahedron collapses into one, flattened-out, two-vector- length, equiedged triangle, which in turn consists of four one-vector-edged, equiangled triangles, each of which in turn consists of two congruent, one-vector-long, equiedged triangles. All eight triangles lie together as two congruent sets of four small, one-vector- long, equiedged triangles. This centrally congruent axial force in turn plunges the two centrally congruent triangles through the inertia of the three sets of two congruent, edge- hinged triangles on the three sides of the congruent pair of central triangles which fold the big triangle's corners around the central triangle in the manner of the three petals folding into edge congruence with one another to produce a tetrahedrally shaped flower bud. Thus is produced one tetrahedron consisting of four quadrivalently congruent tetrahedra, with each of its six edges consisting of four congruent vectors. The tetrahedron thus formed, pulsatively reacts by turning itself inside-out to produce, in turn, another quadrivalent, four-tetrahedra congruence; which visible-to-visible, quadrivalent tetrahedral inside-outing/outside-inning is pulsatively regenerative. (See Illus. 461.08.)

905.36 Herewith we witness both visible and heretofore invisible phases of each of the single tetrahedra thus pulsatively involved. The univalent, apex-to-apex-bonded, four tetrahedra and the three-point-to-three-point, trivalent, base-bonded, four tetrahedra are both now made visible, because what was visible to the point-to-point four was invisible to the three-point-to-three-point four, and vice versa.

905.37 In the two extreme limit cases of jitterbug contraction—both the positive-negative and the negative-positive phases—the two cases become alternately visible, which results in the invisible phase of either case becoming congruent with the other's invisible phase: ergo rendering both states *visible.*

905.38 This pulsating congruence of both the alternately quadrivalent visible phases of the limit case contractions of the vector equilibrium results in an octavalent tetrahedron; i.e., with all the tetrahedron's eight pulsative intertransformabilities simultaneously realized and congruently oriented.

905.39 This hierarchy of events represents a 28-fold volumetric contraction from the extreme limit of univalently coherent expandability of the ever-integrally-unit system of the eight potential pulsative phases of self-intertransformability of the tetrahedron as the minimum structural system of all Universe. In summary we have:

—the 28-volume univalent;

—the 20-volume bivalent;

—the 8-volume quadrivalent;

—the two sets of 1-volume quadrivalent; and finally,

—the complex limit congruence of the 1-volume octavalent tetrahedron.

905.40 As we jitterbuggingly transform contractively and symmetrically from the 20-volume bivalent vector equilibrium phase to the 8-volume quadrivalent octahedral phase, we pass through the icosahedral phase, which is nonselfstabilizing and may be stabilized only by the insertion of six additional external vector connectors between the 12 external vertexes of the vector equilibrium travelling toward convergence as the six vertexes of the trivalent 4-volume octahedron. These six vectors represent the edge- vectors of one tetrahedron.

905.41 The 28-volume, univalent, nucleus-embracing, tetrahedral array extends its outer vertexes beyond the bounds of the nucleus-embracing, closest-packed, omnisymmetrical domain of the 24-volume cube formed by superimposing eight Eighth- Octahedra, asymmetrical, equiangle-based, three-convergent-90-degree-angle-apexed tetrahedra upon the eight outward equiangular triangle facets of the vector equilibrium. We find that the 28-ness of free-space expandability of the univalent, octahedral, nucleus embracement must lose a volume of 4 (i.e., four tetrahedra) when subjected to omniclosest-packing conditions. This means that the dynamic potential of omniinterconnected tetrahedral pulsation system's volumetric embracement capability of 28, upon being subjected to closest-packed domain conditions, will release an elsewhere- structurally-investable volume of 4. Ergo, under closest-packed conditions, each nuclear array of tetrahedra (each of which is identifiable energetically with one energy quantum) may lend out four quanta of energy for whatever tasks may employ them.

905.42 The dynamic vs. kinetic difference is the same difference as that of the generalized, sizeless, metaphysically abstract, eternal, constant sixness-of-edge, foumess- of-vertex, and fourness-of-void of the only-by-mind-conceptual tetrahedron vs. the only- in-time-sized, special-case, brain-sensed tetrahedron. This generalized quality of being dynamic, as being one of a plurality of inherent systemic conditions and potentials, parts of a whole set of eternally co-occurring, complex interaccommodations in pure, weightless, mathematical principle spontaneously producing the minimum structural systems, is indeed the prime governing epistemology of wave quantum physics.

905.43 In consideration of the tetrahedron's quantum intertransformabilities, we have thus far observed only the expandable-contractable, variable-bonding-permitted consequences. We will now consider other dynamical potentials, such as, for instance, the axial rotatabilities of the respective tetras, octas, and icosas.

905.44 By internally interconnecting its six vertexes with three polar axes: X, Y, and Z, and rotating the octahedron successively upon those three axes, three planes are internally generated that symmetrically subdivide the octahedron into eight uniformly equal, equiangle-triangle-based, asymmetrical tetrahedra, with three convergent, 90- degree-angle-surrounded apexes, each of whose volume is one-eighth of the volume of one octahedron: this is called the Eighth-Octahedron. (See also Sec. 912.) The octahedron, having a volume of four tetrahedra, allows each Eighth-Octahedron to have a volume of one-half of one tetrahedron. If we apply the equiangled-triangular base of one each of these eight Eighth-Octahedra to each of the vector equilibrium's eight equiangle- triangle facets, with the Eighth-Octahedra's three-90-degree-angle-surrounded vertexes pointing outwardly, they will exactly and symmetrically produce the 24-volume, nucleus- embracing cube symmetrically surrounding the 20-volume vector equilibrium; thus with $8 \times 1/2 = 4$ being added to the 20-volume vector equilibrium producing a 24-volume total.

905.45 A non-nucleus-embracing 3-volume cube may be produced by applying four of the Eighth-Octahedra to the four equiangled triangular facets of the tetrahedron. (See Illus. 950.30.) Thus we find the tetrahedral evolvement of the prime number three as identified with the cube. Ergo all the prime numbers—1, 2, 3, 5, 7—of the octave wave enumeration system, with its zero-nineness, are now clearly demonstrated as evolutionarily consequent upon tetrahedral intertransformabilities.

905.46 Since the tetrahedron becomes systematically subdivided into 24 uniformly dimensioned A Quanta Modules (one half of which are positive and the other half of which are negatively inside-out of the other); and since both the positive and negative A Quanta Modules may be folded from one whole triangle; and since, as will be shown in Sec. 905.62 the flattened-out triangle of the A Quanta Module corresponds with each of the 120 disequilibrious LCD triangles, it is evidenced that five tetrahedra of 24 A Quanta Modules each, may have their sum-total of 120 A Modules all unfolded, and that they may be edge-bonded to produce an icosahedral spherical array; and that 2 1/2 tetrahedra's 60 A Quanta Modules could be unfolded and univalently (single-bondedly) arrayed to produce the same spheric icosahedral polyhedron with 60 visible triangles and 60 invisible triangular voids of identical dimension.

905.47 Conversely, 60 positive and 60 negative A Quanta Modules could be folded from the 120 A Module triangles and, with their "sharpest" point pointed inward, could be admitted radially into the 60-positive-60-negative tetrahedral voids of the icosahedron. Thus we discover that the icosahedron, consisting of 120 A Quanta Modules (each of which is 1/24th of a tetrahedron) has a volume of 120/24 = 5 The icosahedron volume is 5 when the tetrahedron is 1; the octahedron $2^2$ ; the cube 3; and the star-pointed, univalent, eight-tetrahedra nuclear embracement is 28, which is 4 × 7; 28 also being the maximum number of interrelationships of eight entities:

$$\frac{N^2 - N}{2} = \frac{8^2 - 8}{2} = 28$$

905.48 The three surrounding angles of the interior sharpest point of the A Quanta Module tetrahedron are each a fraction less than the three corresponding central angles of the icosahedron: being approximately one-half of a degree in the first case; one whole degree in the second case; and one and three-quarters of a degree in the third case. This loose-fit, volumetric-debit differential of the A Quanta Module volume is offset by its being slightly longer in radius than that of the icosahedron, the A Module's radial depth being that of the vector equilibrium's, which is greater than that of the icosahedron, as caused by the reduction in the radius of the 12 balls closest-packed around one nuclear ball of the vector equilibrium (which is eliminated from within the same closest-radially-packed 12 balls to reduce them to closest surface-packing, as well as by eliminating the nuclear ball and thereby mildly reducing the system radius). The plus volume of the fractionally protruded portion of the A Quanta Module beyond the icosahedron's surface may exactly equal the interior minus volume difference. The balancing out of the small plus and minus volumes is suggested as a possibility in view of the exact congruence of 15 of the 120 spherical icosahedra triangles with each of the spherical octahedron's eight spherical equiangle faces, as well as by the exact congruence of the octahedron and the vector equilibrium themselves. As the icosahedron's radius shortens, the central angles become enlarged.

905.49 This completes the polyhedral progression of the omni-phase-bond-integrated hierarchies of—1-2-3-4, 8—symmetrically expanded and symmetrically subdivided tetrahedra; from the 1/24th-tetrahedron (12 positive and 12 negative A Quanta Modules); through its octavalent 8-in-1 superficial volume-1; expanded progressively through the quadrivalent tetrahedron; to the quadrivalent octahedron; to the bivalent vector equilibrium; to the univalent, 28-volume, radiant, symmetrical, nucleus-embracing stage; and thence exploded through the volumeless, flatout-outfolded, double-bonded (edge-bonded), 120-A-Quanta-Module-triangular array remotely and symmetrically surrounding the nuclear volumetric group; to final dichotomizing into two such flatout half (positive triangular) film and half (negative triangular) void arrays, single-bonded (corner-bonded), icosahedrally shaped, symmetrically nuclear-surrounding systems.

905.50 **Rotatability and Split Personality of Tetrahedron**

905.51 Having completed the expansive-contractive, could-be, quantum jumps, we will now consider the rotatability of the tetrahedron's six-edge axes generation of both the two spherical tetrahedra and the spherical cube whose "split personality's" four-triangle- defining edges also perpendicularly bisect all of both of the spherical tetrahedron's four equiangled, equiedged triangles in a three-way grid, which converts each of the four equiangled triangles into six right-angle spherical triangles—for a total of 24, which are split again by the spherical octahedron's three great circles to produce 48 spherical triangles, which constitute the 48 equilibrious LCD Basic Triangles of omniequilibrious eventless eternity (see Sec. 453).

905.52 The spherical octahedron's eight faces become skew-subdivided by the icosahedron's 15 great circles' self-splitting of its 20 equiangular faces into six-each, right spherical triangles, for an LCD spherical triangle total of 120, of which 15 such right triangles occupy each of the spherical octahedron's eight equiangular faces—for a total of 120—which are the same 120 as the icosahedron's 15 great circles.

905.53 The disequilibrious 120 LCD triangle = the equilibrious 48 LCD triangle × 2½. This 2½ + 2½ = 5; which represents the icosahedron's basic *fiveness* as split-generated into 2½ by their perpendicular, mid-edge-bisecting 15 great circles. Recalling the six edge vectors of the tetrahedron as one quantum, we note that 6 + 6 + 6/2 is 1 + 1 + 1/2 = 2½ ; and that 2½ × 6 = 15 great circles. (This half-positive and half negative dichotomization of systems is discussed further at Sec. 1053.30ff.)

905.54 We find that the split personality of the icosahedron's 15-great-circle splittings of its own 20 triangles into 120, discloses a basic asymmetry caused by the incompleteness of the 2½, where it is to be seen in the superimposition of the spherical icosahedron upon the spherical vector equilibrium. In this arrangement the fundamental prime *number fiveness* of the icosahedron is always split two ways: 2½ positive phase and 2½ negative phase. This half-fiving induces an alternate combining of the half quantum on one side or the other: going to first *three* on one side and *two* on the other, and vice versa.

905.55 This half-one-side/half-on-the-other induces an oscillatory alternating 120- degree-arc, partial rotation of eight of the spherical tetrahedron's 20 equiangled triangles within the spherical octahedron's eight triangles: 8 × 2½ = 20. We also recall that the vector equilibrium has 24 internal radii (doubled together as 12 radii by the congruence of the four-great-circle's hexagonal radii) and 24 separate internal vector chords. These 24 external vector chords represent four quanta of six vectors each. When the vector equilibrium jitterbuggingly contracts toward the octahedral edge-vector doubling stage, it passes through the unstable icosahedral stage, which is unstable because it requires six more edge-vectors to hold fixed the short diagonal of the six diamond-shaped openings between the eight triangles. These six equilength vectors necessary to stabilize the icosahedron constitute one additional quantum which, when provided, adds 1 to the 4 of the vector equilibrium to equal 5, the basic quantum number of the icosahedron.

905.60 **The Disequilibrium 120 LCD Triangle**

905.61 The icosahedral spherical great-circle system displays:
12 vertexes surrounded by 10 converging angles;
20 vertexes surrounded by 6 converging angles;
30 vertexes surrounded by 4 converging angles

12 × 10 = 120
20 × 6 = 120
30 × 4 = 120
---
360 converging angle sinuses.

905.62 According to the Principle of Angular Topology (see Sec. 224 ), the 360 converging angle sinuses must share a 720-degree reduction from an absolute sphere to a chorded sphere: 720°/360° = 2°. An average of 2 degrees angular reduction for each comer means a 6 degrees angular reduction for each triangle. Therefore, as we see in each of the icosahedron's disequilibrious 120 LCD triangles, the well-known architects and engineers' 30°-60°-90° triangle has been spherically *opened* to 36°-60°-90° —a "spherical excess," as the Geodetic Survey calls it, of 6 degrees. All this spherical excess of 6 degrees has been massaged by the irreducibility of the 90-degree and 60-degree corners into the littlest corner. Therefore, 30 → 36 in each of the spherical icosahedron's 120 surface triangles.

905.63 In subsiding the 120 spherical triangles generated by the 15 great circles of the icosahedron from an omnispherical condition to a neospheric 120-planar-faceted polyhedron, we produce a condition where all the vertexes are equidistant from the same center and all of the edges are chords of the same spherical triangle, each edge having been shrunk from its previous arc length to the chord lengths without changing the central angles. In this condition the spherical excess of 6 degrees could be shared proportionately by the 90°, 60°, 30° flat triangle relationship which factors exactly to 3:2:1. Since 6° = 1/30 of 180° , the 30 quanta of six each in flatout triangles or in the 120 LCD spherical triangles' 186 degrees, means one additional quantum crowded in, producing 31 quanta.

905.64 Alternatively, the spherical excess of 6 degrees (one quantum) may be apportioned totally to the biggest and littlest corners of the triangle, leaving the 60-degree, vector equilibrium, neutral corner undisturbed. As we have discovered in the isotropic vector matrix nature coordinates crystallographically in 60 degrees and not in 90 degrees. Sixty degrees is the vector equilibrium neutral angle relative to which life-in-time aberrates.

| Flatout A Quanta *Module Triangle*[1] | | Basic Draftsman's *Triangle (Flat)* |
|---|---|---|
| 35° 16' | (minus 5° 16') = | 30° 00' |
| 60° 00' | (unchanged) = | 60° 00' |
| 84° 44' | (plus 5° 16') = | 90° 00' |
| 180° 00' | | 180° 00' |

Table 905.65

905.65 By freezing the 60-degree center of the icosahedral triangle, and by sharing the 6-degree, spherical-planar, excess reduction between the 36-degree and 90-degree corners, we will find that the A Quanta Modules are exactly congruent with the 120 internal angles of the icosahedron. The minus 5° 16' closely approximates the one quantum 6 + of spherical excess apparent at the surface, with a comparable nuclear deficiency of 5° 16'. (See Table 905.65.)

905.66 The Earth crust-fault angles, steel plate fractionation angles, and ship's bow waves all are roughly the same, reading approximately 70-degree and 110-degree complementation.

Dihedral angle of octahedron = 109° 28'= 2 × 54° 44'

Dihedral angle of tetrahedron = 70° 32'
---
180° 00'

| | | | |
|---|---|---|---|
| 54° 44' | 60° 00' | 5° 16' | 70° 32' |
| + 54° 44' | - 54° 44' | × 2 | - 60° 00' |
| --- | --- | --- | --- |
| 109° 28' | 5° 16' | 10° 32' | 10° 32' |

— If 5° 16' = unity; 54° 44' = 60°-1 quantum; and 70° 32' = 60° + 2 quanta.

— Obviously, the 70° 32' and 109° 28' relate to the "twinkle angle" differential from 60° (cosmic neutral) and to the 109° 28' central angle of the spherical tetrahedron. (See also Sec. 1051.20.)

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Table 905.65

| Decimal Magnitudes of VE 10-ness (Equil.)+Icosa 5-ness (Disequil.) | Angles around Sharp Vertex of A Quanta Module Tetrahedron | | Differential | | Central Angles of the Spherical Icosahedron's Disequilibrium 120 LCD Triangles | Differential | Decimal Magnitudes of VE 10-ness (Equil.)+Icosa 5-ness (Disequil.) |
|---|---|---|---|---|---|---|---|
| 20° | 19° 28' | | 26' 18.5" | | 20° 54' 18.57" | -00° 54' 18.57" | 20° |
| 30° | 30° | | 1° 43' 02.9" | | 31° 43' 02.9" | - 1° 43' 02.9" | 30° |
| | | | | | | ---------- | |
| | | | | | | -2° 37' 21.47" | |
| 40° | 35° 16' | | 1° 06' 38.53" | | 37° 22' 38.53" | + 2° 37' 21.47" | 40° |
| --- | --------- | | ---------- | | ---------- | ---------- | -------- |
| 90° | 84° 44' | + | 5° 16' | = | 90° 00' 00.00" | 5° 14' 43.34" | 90° |
| | | | This 5° 16' is one whole quantum-44' | | | This 2° 37' 21.47" is one quantum split in two | |

(There is a basic difference between 5° 16' and approx. 5° 15'. It is obviously the same "twinkle angle" with residual calculation error of trigonometric irrational inexactitude.)

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905.70 **Summary: Wave Propagation Model**

905.71 Both in the spherical vector equilibrium and in the disequilibrious icosahedral spherical system, the prime number five is produced by the fundamental allspace-filling complementarity of the l-volume tetrahedron and the 4-volume octahedron.

__ Symmetrical: 1 + 4 = 5

__ Asymmetrical: 4 + 1 = 5

The effect is *symmetrical* when the tetrahedron's four vertexes simultaneously pulse outwardly through their opposite void triangles to produce the "star tetrahedron," one outwardly-pointing tetrahedron superimposed on each of the four faces of a nuclear tetrahedron: i.e., 1 + 4 = 5. The effect is *asymmetrical* when one outwardly-pointing tetrahedron is superimposed on one face of one octahedron: i.e., 4 + 1 = 5.

905.72 We now understand how the equilibrious 48 basic triangles transform into the 120 disequilibrious basic triangles. The 120 (60 positive and 60 negative) LCD spherical triangles' central (or nuclear) angles are unaltered as we transform their eternal systemic patterning symmetry from (a) the octahedral form of l20/8=15 A Quanta Modules per each octa triangle; to (b) the icosahedron's 120/20 = 6 A Quanta Modules per each icosa triangle; to (c) the dodecahedron's l20/l2 = 10 A Quanta Modules per each pentagon. This transformational progression demonstrates the experientially witnessable, wave-producing surface-askewing caused by the 120-degree, alternating rotation of the icosahedron's triangles inside of the octahedron's triangles. Concomitant with this alternating rotation we witness the shuttling of the spherical vector equilibrium's 12 vertexial positions in a successive shifting-back-and-forth between the spherical icosahedron's 12 vertexial positions; as well as the wave-propagating symmetrical, polyhedral alterations of the inward-outward pulsations which generate surface undulations consequent to the radial contractions, at any one time, of only a fractional number of all the exterior vertexes, while a symmetrical set of vertexes remains unaltered.

905.73 This elucidates the fundamental, electromagnetic, inward-outward, and complex great-circling-around type of wave propagation, as does also the model of spheres becoming voids and all the voids becoming spheres, and their omniradiant wave propagation (see Sec. 1032).

905.74 There are also the approximately unlimited ranges of frequency modulatabilities occasioned by the symmetrical subdivisioning of all the prime, equiangled, surface triangles of the tetrahedron, octahedron, and icosahedron. This additionally permitted wave undulation of surface pattern shifting is directly identified with the appearance of photons as spherically clustered and radiantly emittable tetrahedra (see Sec. 541.30).

## 910.00 **A and B Quanta Modules**

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910.01 All omni-closest-packed, complex, structural phenomena are omnisymmetrically componented only by tetrahedra and octahedra. Icosahedra, though symmetrical in themselves, will not close-pack with one another or with any other symmetrical polyhedra; icosahedra will, however, face-bond together to form open- network octahedra.

910.02 In an isotropic vector matrix, it will be discovered that there are only two omnisymmetrical polyhedra universally described by the configuration of the interacting vector lines: these two polyhedra are the regular tetrahedron and the regular octahedron.

### 910.10 **Rational Fraction Elements**

910.11 All other regular, omnisymmetric, uniform-edged, -angled, and -faceted, as well as several semisymmetric, and all other asymmetric polyhedra other than the icosahedron and the pentagonal dodecahedron, are described repetitiously by compounding rational fraction elements of the tetrahedron and octahedron. These elements are known in synergetics as the A and B Quanta Modules. They each have a volume of l/24th of a tetrahedron.

### 911.00 **Division of Tetrahedron**

911.01 The regular tetrahedron may be divided volumetrically into four identical Quarter-Tetrahedra, with all their respective apexes at the center of volume of the regular unit tetrahedron. (See Illus. 913.01.) The Quarter-Tetrahedra are irregular pyramids formed upon each of the four triangular faces of the original unit tetrahedra, with their four interior apexes congruent at the regular tetrahedron's volumetric center; and they each have a volume of one quarter of the regular tetrahedron's volume-1.

911.02 Any of the Quarter-Tetrahedra may be further uniformly subdivided into six identical irregular tetrahedra by describing lines that are perpendicular bisectors from each vertex to their opposite edge of the Quarter-Tetrahedron. The three perpendicular bisectors cut each Quarter-Tetrahedron into six similar tetrahedral pieces of pie. Each one of the six uniformly symmetrical components must be l/6th of One Quarter, which is l/24th of a regular tetrahedron, which is the volume and description of the A Quanta Module. (See Illus. 913.01B.)

912.00 **Division of Octahedron**

912.01 The regular octahedron has a volume equivalent to that of four unit tetrahedra. The octahedron may be subdivided symmetrically into eight equal parts, as Eighth-Octahedra, by planes going through the three axes connecting its six vertexes. (See Illus. 916.01.)

912.02 The Quarter-Tetrahedron and the Eighth-Octahedron each have an equilateral triangular base, and each of the base edges is identical in length. With their equiangular-triangle bases congruent we can superimpose the Eighth-Octahedron over the Quarter-Tetrahedron because the volume of the Eighth-Octahedron is l/2 and the volume of the Quarter-Tetrahedron is 1/4. The volume of the Eighth-Octahedron is twice that of the Quarter-Tetrahedron; therefore, the Eighth-Octahedron must have twice the altitude because it has the same base and its volume is twice as great.

913.00 **A Quanta Module**

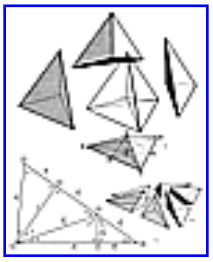

Fig. 913.01

913.01 The A Quanta Module is l/6th of a Quarter-Tetrahedron. The six asymmetrical components of the Quarter-Tetrahedron each have a volume of l/24th of the unit tetrahedron. They are identical in volume and dimension, but three of them are positive and three of them are negative. (See Illus. 913.01.)

913.10 **Positive and Negative:** The positive and negative A Quanta Modules (the + and the -) will not nest in one another congruently despite identical angles, edges, and faces. The pluses are inside-out minuses, which can be shown by opening three of their six edges and folding the three triangles' hinged edges in the opposite direction until their edges come together again.

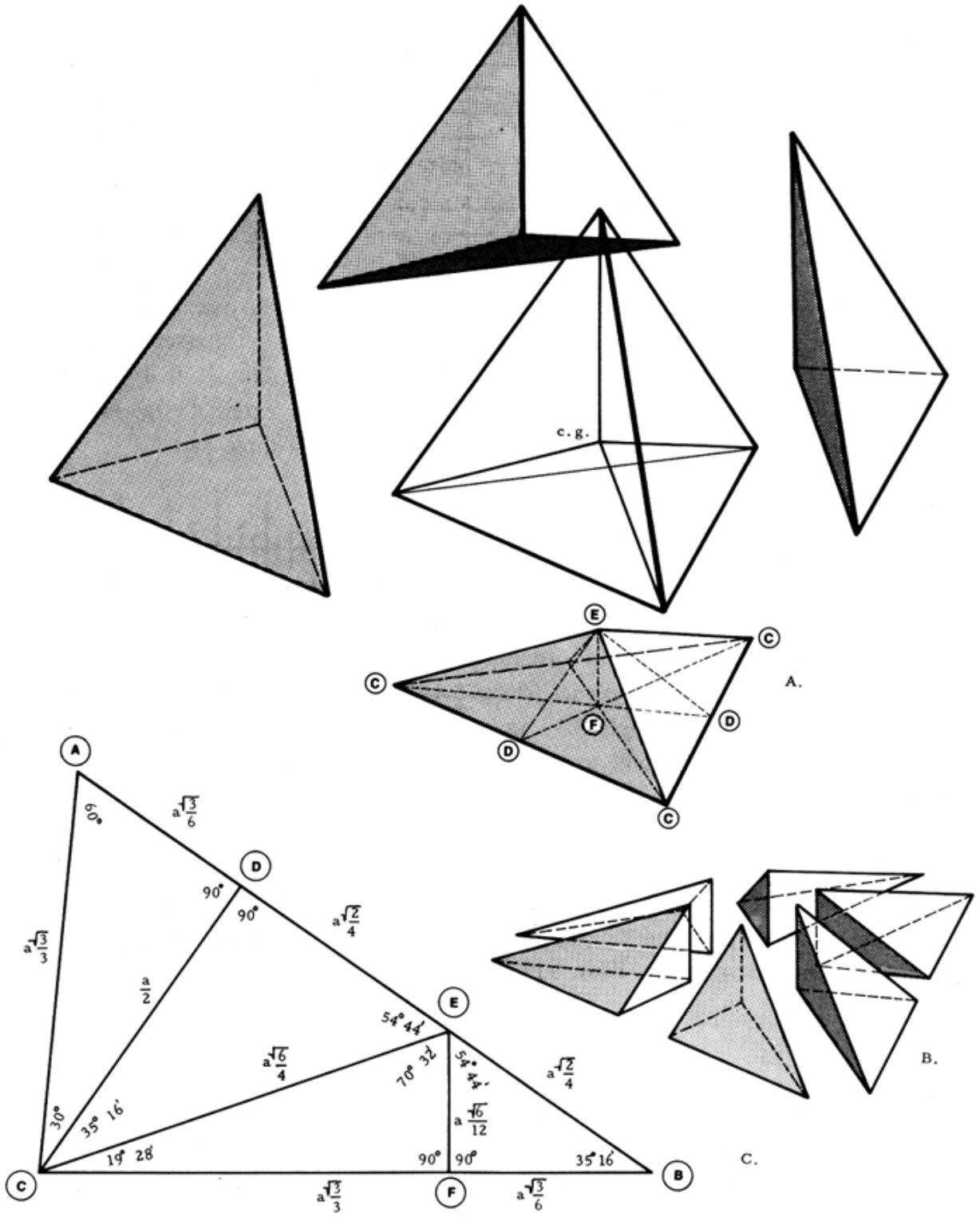


Fig. 913.01 Division of the Quarter-Tetrahedron into Six Parts: A Quanta Module:

A. The regular tetrahedron is divided volumetrically into four identical quarters.
B. The quarter-tetrahedron is divided into six identical irregular tetrahedra, which appear as three right-hand and three left-hand volumetric units each equal in volume to 1/24th of the original tetrahedron. This unit is called the A Module.
C. The plane net which will fold into either left or right A modules is shown. Vertex C is at the vertex of the regular tetrahedron. Vertex E is at the center of gravity of the tetrahedron. Vertex D is at the mid-edge of the tetrahedron. Vertex F is at the center of the tetrahedron face. Note that AD = FB, DE = EB, and AC = CF.

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913.11 The A Quanta Module triangle is possibly a unique scalene in that neither of its two perpendiculars bisect the edges that they intersect. It has three internal foldables and no "internally contained" triangle. It drops its perpendiculars in such a manner that there are only three external edge increments, which divide the perimeter into six increments of three pairs.

914.00 **A Quanta Module: Foldability**

914.01 The A Quanta Module can be unfolded into a planar triangle, an asymmetrical triangle with three different edge sizes, yet with the rare property of folding up into a whole irregular tetrahedron.

914.02 An equilateral planar triangle AAA may be bisected in each edge by points BBB. The triangle AAA may be folded on lines BB, BB, BB, and points A, A, A will coincide to form the regular tetrahedron. This is very well known.

914.10 **Four Right Angles:** In respect to the A Quanta Module flatout triangle or infolded to form the irregular tetrahedron, we find by the method of the module's construction (by perpendicular planes carving apart) that there are four right angles (see Illus. 913.01C):

EFB EDC

EFC ADC

914.20 **Unfolding into a Flat Triangle:** If we go to the vertex at E and break open the edges ED and AD, we can hinge open triangle EBF on hinge line EF. We can then break open the edge AC and fold triangle ADC, as well as folding out the two triangles DEC and CEF, which are connected by the hinge EC, *so* that now the whole asymmetric A Quanta Module is stretched out flat as a triangle.

914.21 The A Quanta Module unfolds into a scalene triangle; that is, all of its non- degree angles are different, and all are less than 90 degrees. Two of the folds are perpendicular to the triangle's sides, thus producing the four right angles. The A Quanta Module triangle may be the only triangle fulfilling all the above stated conditions.

914.30 **Spiral Foldability:** The foldability of the A Quanta Module planar triangle differs from the inter-mid-edge foldability of the equilateral or isosceles triangle. All the mid-edge-foldable equilateral or isosceles triangles can all form tetrahedra, regular or irregular. In the case of the folded equilateral or isosceles triangle, the three triangle corners meet together at one vertex: like petals of a flower. In the case of the inter-mid- edge-folding scalene triangle, the three corners fail to meet at one vertex to form a tetrahedron.

915.00 **Twinkle Angle**

915.01 The faces of an A Quanta Module unfold to form a triangle with 84° 44' (30° 00' + 35° 16' + 19° 28') as its largest angle. This is 5° 16' less than a right angle, and is known as the *twinkle angle* in synergetics (see Illus. 913.01C).

915.02 There is a unique 5° 16'-ness relationship of the A Quanta Module to the symmetry of the tetrahedron-octahedron allspace-filling complementation and other aspects of the vector equilibrium that is seemingly out of gear with the disequilibrious icosahedron. It has a plus-or-minus incrementation quality in relation to the angular laws common to the vector equilibrium.

915.10 **A Quanta Module Triangle and Basic Disequilibrium 120 LCD Triangle:** The angles of fold of the A Quanta Module triangle correspond in patterning to the angles of fold of the Basic Disequilibrium 120 LCD Triangle, the 1/120th of a sphere whose fundamental great circles of basic symmetry subdivide it in the same way. The angles are the same proportionally when the spherical excess subsides proportionally in all three corners. For instance, the angle ACB in Illus. 913.01C is not 90 degrees, but a little less.

915.11 It is probable that these two closely akin triangles and their respective folded tetrahedra, whose A Module Quantum phase is a rational subdivider function of all the hierarchy of atomic triangulated substructuring, the 120 Basic Disequilibrium LCD triangles and the A Module triangles, are the *same quanta* reoccurrent in their most powerful wave-angle oscillating, intertransformable extremes.

915.20 **Probability of Equimagnitude Phases:** The 6° spherical excess of the Basic Disequilibrium 120 LCD Triangle, the 5° 16' "twinkle angle" of the A Quanta Module triangle, and the 7° 20' "unzipping angle" of birth, as in the DNA tetrahelix, together may in time disclose many equimagnitude phases occurring between complementary intertransforming structures.

916.00 **B Quanta Module**

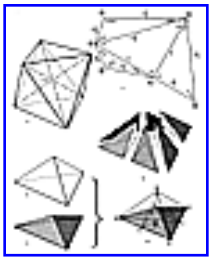

Fig. 916.01

916.01 The B Quanta Module is 1/6th of the fractional unit described by subtracting a Quarter-Tetrahedron from an Eighth-Octahedron. The six asymmetrical components of the fractional unit so described each have a volume of 1/24th of the unit tetrahedron. They are identical in volume and dimensioning, but three of them are positive and three of them are negative. (See Illus. 916.01.)

916.02 When the Eighth-Octahedron is superimposed on the Quarter-Tetrahedron, the top half of the Eighth-Octahedron is a fractional unit, like a concave lid, with a volume and weight equal to that of the Quarter-Tetrahedron below it. We can slice the fractional unit by three planes perpendicular to its equilateral triangular base and passing through the apex of the Quarter-Tetrahedron, through the vertexes of the triangular base, and through the mid-points of their respective opposite edges, separating it into six equidimensional, equivolume parts. These are B Quanta Modules.

916.03 B Quanta Modules are identical irregular tetrahedra that appear as three positive (outside-out) and three negative (outside-in) units. Each of the B Quanta Modules can be unfolded into a planar, multitriangled polygon. (See Illus. 916.01F.)

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Next Section: 920.00

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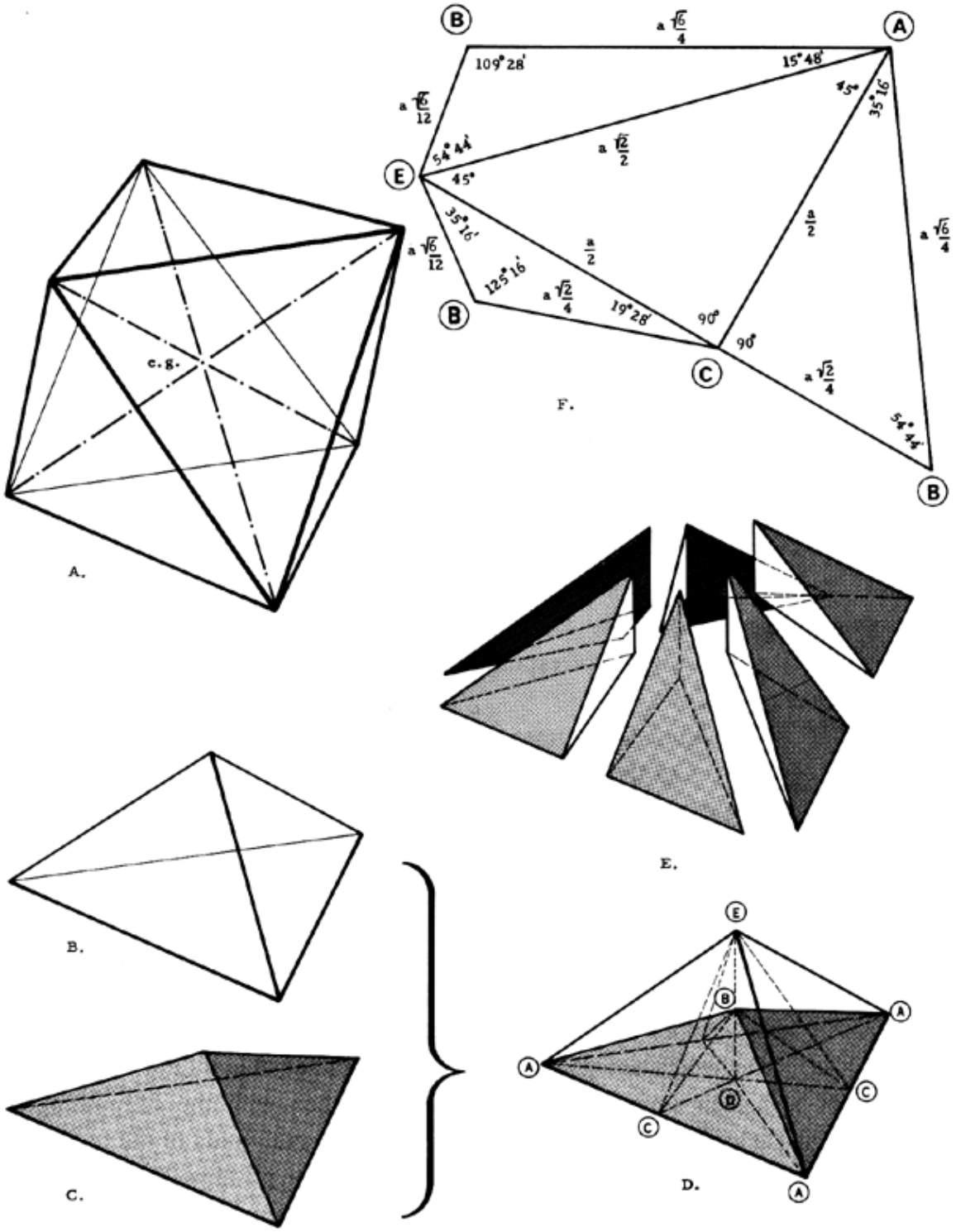


Fig. 916.01 Division of Eighth-Octahedron into Six Parts: B Quanta Module: The regular octahedron (A) is divided into eight identical units (B) equaling 1/8 of the volume of the octahedron. The quarter tetrahedron as defined by six A Modules (C) is subtracted from the 1/8-octahedron (D). This fractional unit is then subdivided into six identical irregular tetrahedra that appear as three right-hand and three left-hand units and are referred to as B Modules. They are equal in volume to the A Modules and are consequently also 1/24th of the regular tetrahedron. In (F) is shown the plane net which will fold into either the right or left B Module. Vertex A is at the vertex of the octahedron. Vertex C is at the mid-edge of the octahedron. Vertex E is at the center of gravity of the octahedron.

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## 920.00 **Functions of A and B Modules**

920.01 The A and B Quanta Modules may possibly quantize our total experience. It is a phenomenal matter to discover asymmetrical polyhedral units of geometry that are reorientably compositable to occupy one asymmetrical polyhedral space; it is equally unique that, despite disparate asymmetric polyhedral form, both have the same volume; and both associate in different kinds of simplex and complex, symmetrical and asymmetrical, coherent systems. While they consist, in their positive and negative aspects, of four different asymmetrical shapes, their unit volume and energy quanta values provide a geometry elucidating both fundamental structuring and fundamental and complex intertransformings, both gravitational and radiational.

## 921.00 **Energy Deployment in A and B Quanta Modules**

921.01 By virtue of their properties as described in Secs. 920, 921.20 , and 921.30 , the centers of energy in the A and B Quanta Modules can be locally reoriented within the same space without disturbing contiguously surrounding configurations of closest-packed geometry; these local reorientations can either concentrate and hold or deploy and distribute the energies of the respective A and B Quanta Modules, in the first case concentrating the centers of energy inwardly, and in the second case deploying the centers of energy outwardly.

921.02 In X-ray diffraction, you can see just such alternate energy concentrations of omnideployed patterns in successive heat treatments of metals. You can hit a piece of metal and you will find by X-ray diffraction that a previously concentrated array of centers of energy have been elegantly deployed. When you take the temper out of the metal, the energy centers will again change their positions. The metal's coherence strength is lessened as the energy centers are outwardly deployed into diffused remoteness from one another. When the centers of energy are arranged closer to one another, they either attract or repulse one another at the exponentially increasing rates of gravitational and radiational law. When we heat-treat or anneal metals and alloys, they transform in correspondence with the reorientabilities of the A and B Quanta Modules.

921.03 The identical volumes and the uniquely different energy-transforming capabilities of the A and B Quanta Modules and their mathematically describable behaviors ($10F^2 + 2$) hint at correspondence with the behaviors of neutrons and protons. They are not mirror images of one another, yet, like the proton and neutron, they are energetically intertransformable and, due to difference of interpatternability, they have difference in mass relationship. Whether they tend to conserve or dissipate energy might impose a behavioral difference in the processes of measuring their respective masses. A behavioral proclivity must impose effects upon the measuring process.

921.04 The exact energy-volume relationship of the A and B Quanta Modules and their probable volumetric equivalence with the only meager dimensional transformations of the 120 LCD tetrahedral voids of the icosahedron (see Sec. 905.60) may prove to have important physical behavior kinships.

921.10 **Energy Behavior in Tetrahedra:** A tetrahedron that can be folded out of a single foldable triangle has the strange property of holding energy in varying degrees. Energy will bounce around inside the tetrahedron's four internal triangles as we described its bouncing within one triangle (see Sec. 901). Many bounce patterns are cyclically accomplished without tendency to bounce out of tetrahedrons, whether regular or irregular, symmetrical or asymmetrical.

921.11 The equiangled, omni-sixty-degreed, regular tetrahedron can be opened along any three edges converging at any one of its vertexes with its edge-separated vertexial group of three triangles appearing as a three-petaled flower bud about to open. By deliberately opening the three triangular petals, by rotating them outward from one another around their three unsevered base-edge hinges, all three may be laid out flat around the central base triangle to appear as a two-frequency, edge-moduled, equiangular triangle consisting of four internal triangles. Energy tends by geodesical economy and angular law to be bounce-confined by the tetrahedron.

921.12 The irregular, asymmetrical, tetrahedral A Quanta Module's four triangular facets unfold spirally into one asymmetrical triangle.

921.13 But the triangular facets of the B Quanta Module unfold inherently into four mutually dissimilar but interhinged 90-degree triangles.

921.14 All the interior edges of the triangles, like the edges of a triangular billiard table, will provide unique internal, bouncing, comer-pocket-seeking patterns. An equilateral, equiangled triangle will hold the bouncing with the least tendency to exit at the pocketed comers. The more asymmetrical the triangular billiard table, the more swiftly the angular progression to exit it at a comer pocket. The various bounce patterns prior to exit induce time-differentiated lags in the rate of energy release from one tetrahedron into the other tetrahedron.

921.15 Energy bounces around in triangles working toward the narrowest vertex, where the impossibility of more than one line going through any one point at any one time imposes a twist vertex exit at the comers of all polyhedra. Therefore, all triangles and tetrahedra "leak" energy, but when doing so between two similar corresponding vertexes- interconnected tetrahedra, the leaks from one become the filling of the other.

921.20 **Energy Characteristics of A Quanta Module:** The A Quanta Modules can hold energy and tend to conserve it. They do so by combining with one another in three unique ways, each of which combine as one regular tetrahedron; the regular tetrahedron being a fundamental energy-holding form-the energy being held bounce-describing the internal octahedron of every tetrahedron.

921.21 The A Quanta Modules can also combine with the B Quanta Modules in seven ways, each of which result in single whole tetrahedra, which, as noted, hold their energy within their inherent octahedral centers.

921.30 **Energy Characteristics of B Quanta Module:** The B Quanta Modules can vertex-combinedly hold energy but tend to release it.

921.31 While all the single triangles will hold swift-motion energies only for relatively short periods of time, the four very asymmetrical and dissimilar triangles of the B Quanta Module will release energy four times faster than any one of their asymmetrical tetrahedral kin.

921.32 The B Quanta Modules do not retain energy, and they cannot combine with one another to form a single tetrahedron with energy-introverting and -conserving proclivities.

921.40 **Summary:** Though of equal energy potential or latent content, the As and the Bs are two different systems of unique energy-behavior containment. One is circumferentially embracing, energy-impounding, integratively finite, and nucleation- conserving. The other is definitively disintegrative and nuclearly exportive. A is outside- inwardly introvertive. B is outside-outwardly extrovertive. (See Illus. 924.20.)

922.00 **Conceptual Description and Contrast**

922.01 The A Quanta Module is all of the nonconsidered, nonconceptual, finite, equilibrious, not-now-tuned-in Universe.

922.02 The B Quanta Module is the only momentarily extant considered subdivision of disequilibrious Universe, i.e., the attention-preoccupying, special-case local system. The B Quanta Module is always the real live "baby"; it is most asymmetrical.

923.00 **Constant Volume**

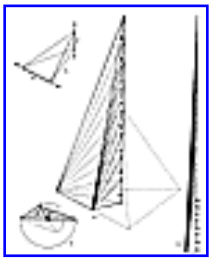
Fig. 923.10

923.10 **Precession of Two Module Edges:** There are six edges of a tetrahedron, and each edge precesses the opposite edge toward a 90-degrees-maximum of attitudinal difference of orientation. Any two discrete, opposite edges can be represented by two aluminum tubes, X and Y (see Illus. 923.10D), which can move longitudinally anywhere along their respective axes while the volume of the irregular tetrahedra remains constant. They may shuttle along on these lines and produce all kinds of asymmetrical tetrahedra, whose volumes will always remain unit by virtue of their developed tetrahedra's constant base areas and identical altitudes. The two tubes' four ends produce the other four interconnecting edges of the tetrahedron, which vary as required without altering the constantly uniform volume.

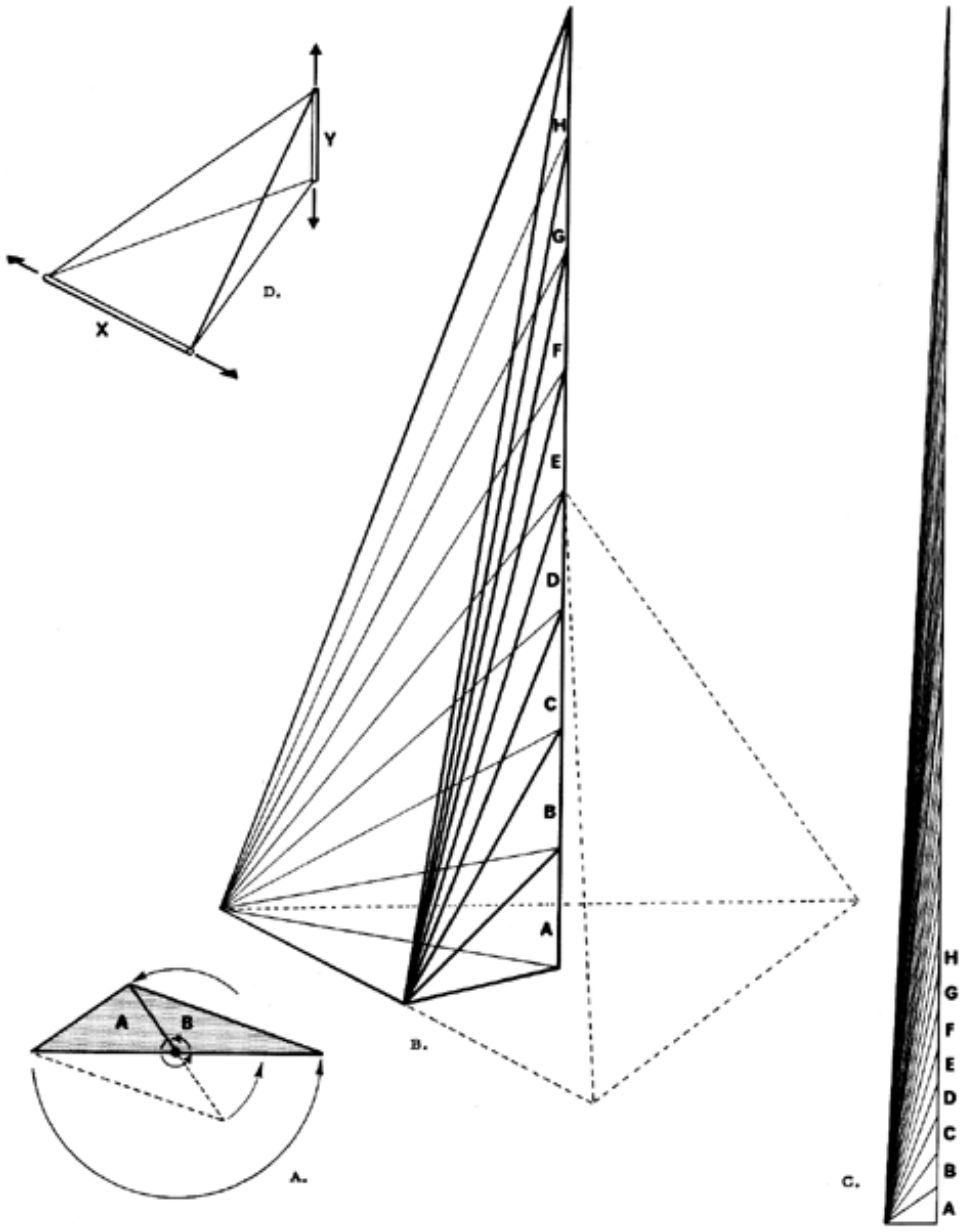


Fig. 923.10 Constant Volume of A and B Quanta Modules:

A. A comparison of the end views of the A and B Quanta Modules shows that they have equal volumes by virtue of the fact that they have equal base areas and identical altitudes.
B. It follows from this that if a line, originating at the center of area of the triangular base of a regular tetrahedron, is projected through the apex of the tetrahedron to infinity, is subdivided into equal Increments, it will give rise to additional Modules to infinity. Each additional Module will have the same volume as the original A or B Module, and as the incremental line approaches infinity the Modules will tend to become lines, but lines still having the same volume as the original A or B Module
C. End view shows Modules beyond the H Module shown in (B).
D. The two discrete members X and Y can move anywhere along their respective axes and the volume of the irregular tetrahedron remains constant. The other four edges vary as required.

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923.15 **One Tetra Edge Constant:** Using a constant-volume, vectorially edged tetrahedron ABCD with six edges AB, AC, AD, BC, BD, and CD, and with only one of those six edge lengths holding a constant length AB, all five of the tetrahedron's other edge lengths may covary as the tetrahedron rotates around the fixed edge length AB, which acts as an axis of rotation. While the axis AB is precessionally tilted within its celestial theater, it is experientially demonstrable that—without changing the tetrahedron's volume or its constant-length vector AB—its two other corners C and D may interconnect the AB-fixed-length-axis points with any other two points in Universe no matter how remote from one another. This is the reason why electromagnetic waves can interlink any points in Universe in response to a given constant wavelength AB. (Compare Secs. 426.40, 530.11 , 960.08 , and 961.10-40.)

923.20 **Constant Volume:** A comparison of the end views of the A and B Quanta Modules shows that they have equal volumes as a result of their equal base areas and identical altitudes. (See Sec. 621.)

923.21 A line can be projected from its origin at the center of area of the triangular base of a regular tetrahedron, outward through the opposite apex of the tetrahedron to any desired distance. When subdivided into increments equal to the distance between its triangular-base center and its apex, and when each of these equilinear increments outward beyond the apex is interconnected by three lines leading to each of the three comers of the base triangle, then each of the successive volumetric additions will be of identical volume to that of the original tetrahedra, and the overall form will be that of a tetrahedron which become progressively longer and sharp-pointed with each addition. (See Illus. 923.10 A, B, and C.) As the ever-sharpening and elongating tetrahedron approaches infinity, the three elongating edges tend to parallelism; i.e., toward what is known as parallax in astronomy. The modules will tend to congruence with the parallaxing lines. Each full-line- long length model of these congruent lines will have the same volume as the original module.

923.30 **Energy Accommodation:** The A and B Quanta Modules start with unit base and add unit altitude, C, D, E, F, and so forth, but as each additional altitude is superimposed, the volume remains the same: a volume of one. We find these linear incrementation assemblies getting longer, with their additional volumes always one. Suppose we think about this progression as forming an electric-wire conductor and divide its circular base into three 120-degree angles. Its progressive conic increments could grow and operate in the same manner as our constant-volume, tetrahedral modules.

923.31 We will inherently superimpose progressive base-to-apex attenuating sections. In the electric conductor wire, this means that whatever energy increment is fed into the first base module will tend to be conducted at various unit frequencies along the line. Each unique frequency introduced at the base will create its unique conic altitude incrementation. The outermost, line-long cone's energy quantum will always be the same as that of the initial base cone. Finally, the last and outermost cone is just as long as the wire itself-so there is an outside charge on the wire tending to fluoresce a precessional broadcasting of the initial inputs at 90 degrees; i.e., perpendicularly away from the wire. This may elucidate antenna behaviors as well as long-distance, high-voltage, electric energy conductions which tend to broadcast their conducted energy. (For further elaboration of the constant-volume, tetrahedral models, see Secs. 961.10, 961.20, 961.30 and 961.40.)

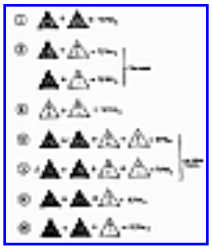
924.00 **Congruence of Centers**

924.10 **Congruence of A and B Quanta Module Centers:** Within either the A or B Quanta Modules the

centers of effort;
centers of energy;
centers of gravity;
centers of radiation;
centers of volume; and
centers of field

are congruent, i.e., identical. The same centers are involved. We will call their six congruent centers their synergetic centers.

924.11 But the A (+) and A (-), and B (+) and B (-) respective volumetric centers are never congruent. However, the positive or the negative AAB aggregates (these are the "Mites." See Sec. 953.10) have identical volumetric centers.



924.20 **Table of Tetrahedral Functions of A and B Quanta Modules**

Table 924.20

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Next Section: 930.00

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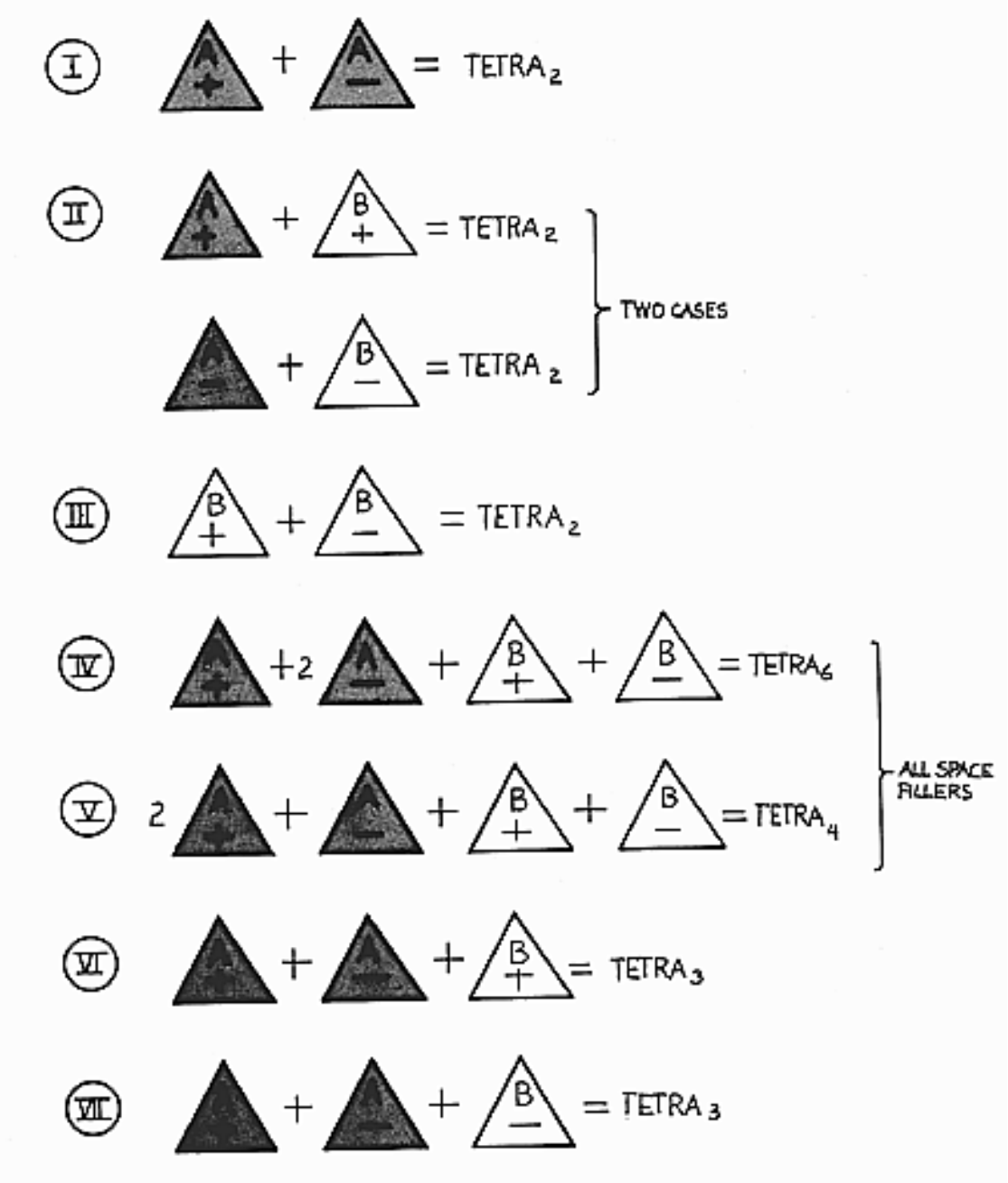


Table 924.20 Tetrahedral Functions of A and B Quanta Modules.

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## 930.00 **Tetrahelix: Unzipping Angle**

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### 930.10 **Continuous Pattern Strip: "Come and Go"**

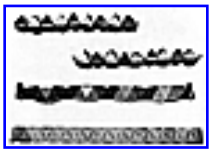

Fig. 930.11

930.11 Exploring the multiramifications of spontaneously regenerative reangulations and triangulations, we introduce upon a continuous ribbon a 60-degree-patterned, progressively alternating, angular bounce-off inwards from first one side and then the other side of the ribbon, which produces a wave pattern whose length is the interval along any one side between successive bounce-offs which, being at 60 degrees in this case, produces a series of equiangular triangles along the strip. As seen from one side, the equiangular triangles are alternately oriented as *peak away,* then *base away,* then *peak away* again, etc. This is the patterning of the only equilibrious, never realized, angular field state, in contradistinction to its sine-curve wave, periodic realizations of progressively accumulative, disequilibrious aberrations, whose peaks and valleys may also be patterned between the same length wave intervals along the sides of the ribbon as that of the equilibrious periodicity. (See Illus. 930.11.)

930.20 **Pattern Strips Aggregate Wrapabilities:** The equilibrious state's 60-degree rise-and-fall lines may also become successive cross-ribbon fold-lines, which, when successively partially folded, will produce alternatively a tetrahedral- or an octahedral- or an icosahedral-shaped spool or reel upon which to roll-mount itself repeatedly: the tetrahedral spool having four successive equiangular triangular facets around its equatorial girth, with no additional triangles at its polar extremities; while in the case of the octahedral reel, it wraps closed only six of the eight triangular facets of the octahedron, which six lie around the octahedron's equatorial girth with two additional triangles left unwrapped, one each triangularly surrounding each of its poles; while in the case of the icosahedron, the equiangle-triangulated and folded ribbon wraps up only 10 of the icosahedron's 20 triangles, those 10 being the 10 that lie around the icosahedron's equatorial girth, leaving five triangles uncovered around each of its polar vertexes. (See Illus. 930.20.)

930.21 The two uncovered triangles of the octahedron may be covered by wrapping only one more triangularly folded ribbon whose axis of wraparound is one of the XYZ symmetrical axes of the octahedron.

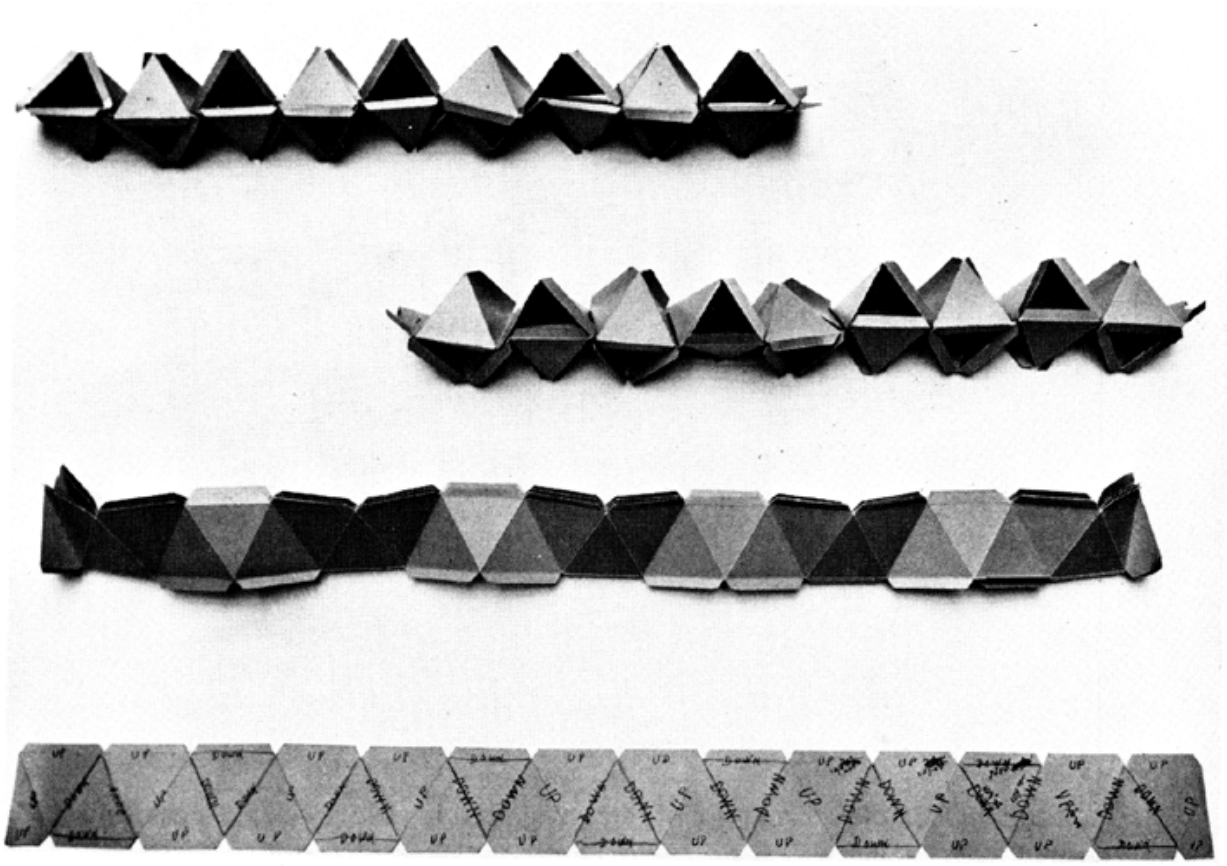


Fig. 930.11: This continuous triangulation pattern strip is a 60 , angular, "come and go" alternation of very-high-frequency energy events of unit wavelength. This strip folded back on itself becomes a series of octahedra. The octahedra strips then combine to form a space-filling array of octahedra and tetrahedra, with all lines or vectors being of identical length and all the triangles equilateral and all the vertexes being omnidirectionally evenly spaced from one another. This is the pattern of "closest packing" of spheres.

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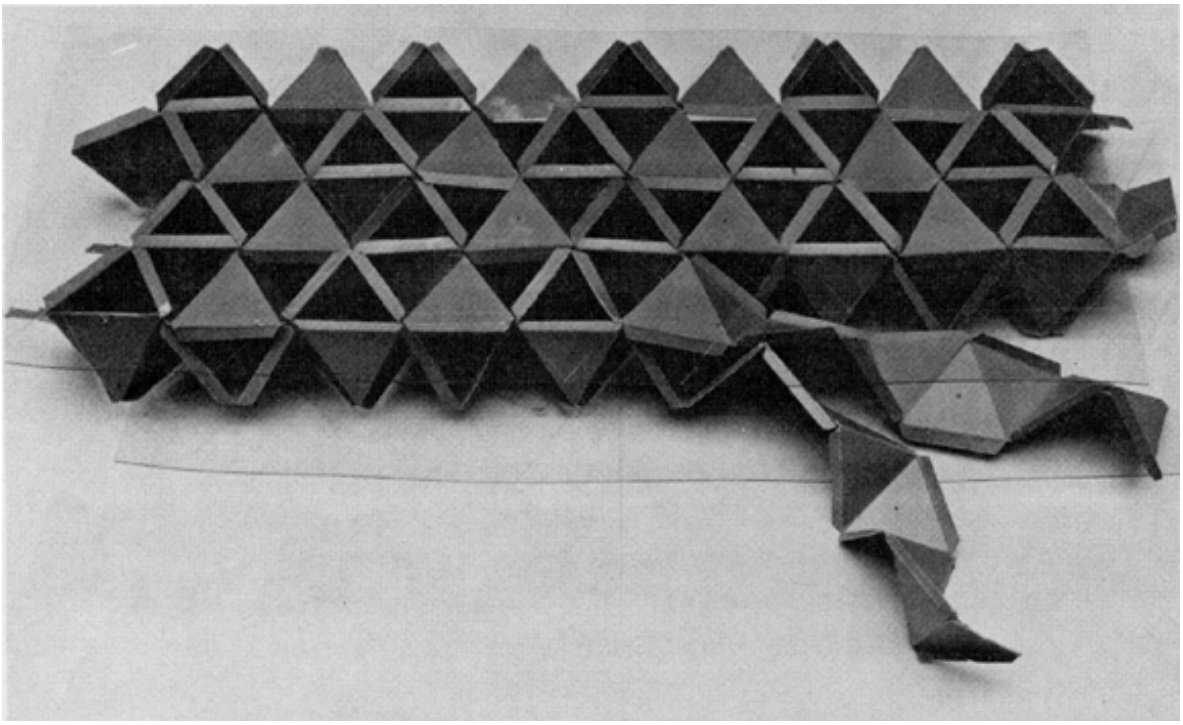

Fig. 930.11b

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930.22 Complete wrap-up of the two sets of five triangles occurring around each of the two polar zones of the icosahedron, after its equatorial zone triangles are completely enclosed by one ribbon-wrapping, can be accomplished by employing only two more such alternating, triangulated ribbon-wrappings .

930.23 The tetrahedron requires only *one* wrap-up ribbon; the octahedron *two*; and the icosahedron *three*, to cover all their respective numbers of triangular facets. Though all their faces are covered, there are, however, alternate and asymmetrically arrayed, open and closed edges of the tetra, octa, and icosa, to close all of which in an even-number of layers of ribbon coverage per each facet and per each edge of the three-and-only prime structural systems of Universe, requires *three*, triangulated, ribbon-strip wrappings for the tetrahedron; six for the octahedron; and *nine* for the icosahedron.

930.24 If each of the ribbon-strips used to wrap-up, completely and symmetrically, the tetra, octa, and icosa, consists of transparent tape; and those tapes have been divided by a set of equidistantly interspaced lines running parallel to the ribbon's edges; and three of these ribbons wrap the tetrahedron, six wrap the octahedron, and nine the icosahedron; then all the four equiangular triangular facets of the tetrahedron, eight of the octahedron, and 20 of the icosahedron, will be seen to be symmetrically subdivided into smaller equiangle triangles whose total number will be $N^2$, the second power of the number of spaces between the ribbon's parallel lines.

930.25 All of the vertexes of the intercrossings of the three-, six-, nine-ribbons' internal parallel lines and edges identify the centers of spheres closest-packed into tetrahedra, octahedra, and icosahedra of a frequency corresponding to the number of parallel intervals of the ribbons. These numbers (as we know from Sec. 223.21) are:

$2F^2 + 2$ for the tetrahedron;

$4F^2 + 2$ for the octahedron; and

$10F^2 + 2$ for the icosahedron (or vector equilibrium).

930.26 Thus we learn sum-totally how a ribbon (band) wave, a waveband, can self- interfere periodically to produce in-shuntingly all the three prime structures of Universe and a complex isotropic vector matrix of successively shuttle-woven tetrahedra and octahedra. It also illustrates how energy may be wave-shuntingly self-knotted or self- interfered with (see Sec. 506), and their energies impounded in local, high-frequency systems which we misidentify as only-seemingly-static matter.

931.00 **Chemical Bonds**

931.10 **Omnicongruence:** When two or more systems are joined vertex to vertex, edge to edge, or in omnicongruence-in single, double, triple, or quadruple bonding, then the topological accounting must take cognizance of the congruent vectorial build in growth. (See Illus. 931.10.)

931.20 **Single Bond:** In a single-bonded or univalent aggregate, all the tetrahedra are joined to one another by only one vertex. The connection is like an electromagnetic universal joint or like a structural engineering pin joint; it can rotate in any direction around the joint. The mutability of behavior of single bonds elucidates the compressible and load-distributing behavior of gases.

931.30 **Double Bond:** If two vertexes of the tetrahedra touch one another, it is called double-bonding. The systems are joined like an engineering *hinge;* it can rotate only perpendicularly about an axis. Double-bonding characterizes the load-distributing but noncompressible behavior of liquids. This is edge-bonding.

931.40 **Triple Bond:** When three vertexes come together, it is called a *fixed* bond, a three-point landing. It is like an engineering fixed joint; it is *rigid.* Triple-bonding elucidates both the formational and continuing behaviors of crystalline substances. This also is face-bonding.

931.50 **Quadruple Bond:** When four vertexes are congruent, we have quadruple-bonded *densification.* The relationship is quadrivalent. Quadri-bond and mid-edge coordinate tetrahedron systems demonstrate the super-strengths of substances such as diamonds and metals. This is the way carbon suddenly becomes very dense, as in a diamond. This is multiple self-congruence.

931.51 The behavioral hierarchy of bondings is integrated four-dimensionally with the synergies of mass-interattractions and precession.

931.60 **Quadrivalence of Energy Structures Closer-Than-Sphere Packing:** In 1885, van't Hoff showed that all organic chemical structuring is tetrahedrally configured and interaccounted in vertexial linkage. A constellation of tetrahedra linked together entirely by such single-bonded universal jointing uses lots of space, which is the openmost condition of flexibility and mutability characterizing the behavior of gases. The medium- packed condition of a double-bonded, hinged arrangement is still flexible, but sum-totally as an aggregate, allspace-filling complex is noncompressible—as are liquids. The closest- packing, triple-bonded, fixed-end arrangement corresponds with rigid-structure molecular compounds.

931.61 The closest-packing concept was developed in respect to spherical aggregates with the convex and concave octahedra and vector equilibria spaces between the spheres. Spherical closest packing overlooks a much closer packed condition of energy structures, which, however, had been comprehended by organic chemistry—that of quadrivalent and fourfold bonding, which corresponds to outright congruence of the octahedra or tetrahedra themselves. When carbon transforms from its soft, pressed-cake, carbon black powder (or charcoal) arrangement to its diamond arrangement, it converts from the so-called closest arrangement of triple bonding to quadrivalence. We call this self-congruence packing, as a single tetrahedron arrangement in contradistinction to closest packing as a neighboring-group arrangement of spheres.

931.62 Linus Pauling's X-ray diffraction analyses revealed that all metals are tetrahedrally organized in configurations interlinking the gravitational centers of the compounded atoms. It is characteristic of metals that an alloy is stronger when the different metals' unique, atomic, constellation symmetries have congruent centers of gravity, providing mid-edge, mid-face, and other coordinate, interspatial accommodation of the elements' various symmetric systems.

931.63 In omnitetrahedral structuring, a triple-bonded linear, tetrahedral array may coincide, probably significantly, with the DNA helix. The four unique quanta corners of the tetrahedron may explain DNA's unzipping dichotomy as well as—T-A; G- C—patterning control of all reproductions of all biological species.

932.00 **Viral Steerability**

932.01 The four chemical compounds guanine, cytosine, thymine, and adenine, whose first letters are GCTA, and of which DNA always consists in various paired code pattern sequences, such as GC, GC, CG, AT, TA, GC, in which A and T are always paired as are G and C. The pattern controls effected by DNA in all biological structures can be demonstrated by equivalent variations of the four individually unique spherical radii of two unique pairs of spheres which may be centered in any variation of series that will result in the viral steerability of the shaping of the DNA tetrahelix prototypes. (See Sec. 1050.00 et. seq.)

932.02 One of the main characteristics of DNA is that we have in its helix a structural patterning instruction, all four-dimensional patterning being controlled only by frequency and angle modulatability. The coding of the four principal chemical compounds, GCTA, contains all the instructions for the designing of all the patterns known to biological life. These four letters govern the coding of the life structures. With new life, there is a parent-child code controls unzipping. There is a dichotomy and the new life breaks off from the old with a perfect imprint and control, wherewith in turn to produce and design others.

933.00 **Tetrahelix**

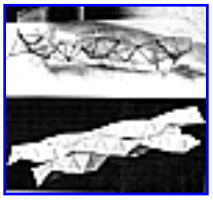
Fig. 933.01

933.01 The tetrahelix is a helical array of triple-bonded tetrahedra. (See Illus. 933.01) We have a column of tetrahedra with straight edges, but when face-bonded to one another, and the tetrahedra's edges are interconnected, they altogether form a hyperbolic-parabolic, helical column. The column spirals around to make the helix, and it takes just ten tetrahedra to complete one cycle of the helix.

933.02 This tetrahelix column can be equiangle-triangular, triple-ribbon-wave produced as in the methodology of Secs. 930.10 and 930.20 by taking a ribbon three- panels wide instead of one-panel wide as in Sec. 930.10. With this triple panel folded along both of its interior lines running parallel to the three-band-wide ribbon's outer edges, and with each of the three bands interiorly scribed and folded on the lines of the equiangle-triangular wave pattern, it will be found that what might at first seem to promise to be a straight, prismatic, three-edged, triangular-based column—upon matching the next-nearest above, wave interval, outer edges of the three panels together (and taping them together)—will form the same tetrahelix column as that which is produced by taking separate equiedged tetrahedra and face-bonding them together. There is no distinguishable difference, as shown in the illustration.

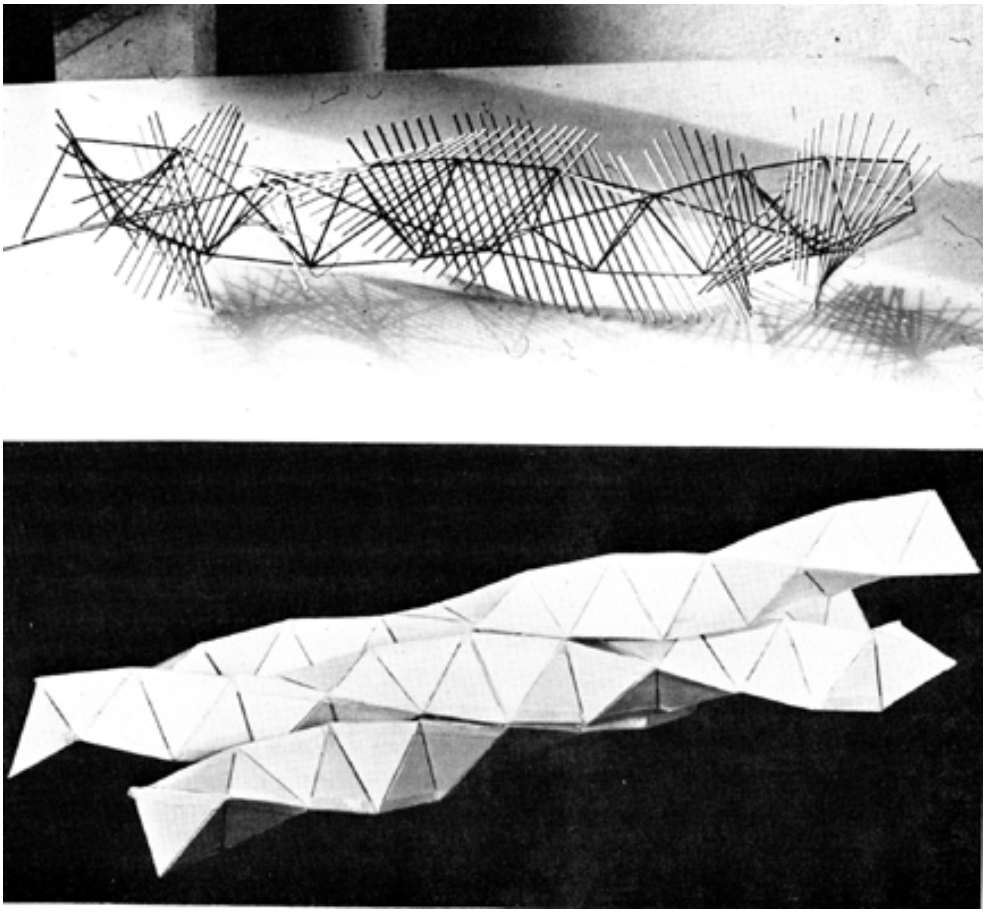

Fig. 933.01: These helical columns of tetrahedra, which we call the tetrahelix, explain the structuring of DNA models of the control of the fundamental patterning of nature's biological structuring as contained within the virus nucleus. It takes just 10 triple-bonded tetrahedra to make a helix cycle, which is a molecular compounding characteristic also of the Watson-Crick model of the DNA. When we address two or more positive (or two or more negative) tetrahelixes together, they nestle their angling forms into one another. When so nestled the tetrahedra are grouped in local clusters of five tetrahedra around a transverse axis in the tetrahelix nestling columns. Because the dihedral angles of five tetrahedra are 7° 20' short of 360°, this 7° 20' is sprung-closed by the helix structure's spring contraction. This backed-up spring tries constantly to unzip one nestling tetrahedron from the other, or others, of which it is a true replica. These are direct (theoretical) explanations of otherwise as yet unexplained behavior of the DNA.

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933.03 The tetrahelix column may be made positive (like the right-hand-threaded screw) or negative (like the left-hand-threaded screw) by matching the next-nearest-below wave interval of the triple-band, triangular wave's outer edges together, or by starting the triple-bonding of separate tetrahedra by bonding in the only alternate manner provided by the two possible triangular faces of the first tetrahedron furthest away from the starting edge; for such columns always start and end with a tetrahedron's edge and not with its face.

933.04 Such tetrahelical columns may be made with regular or irregular tetrahedral components because the sum of the angles of a tetrahedron's face will always be 720 degrees, whether regular or asymmetric. If we employed asymmetric tetrahedra they would have six different edge lengths, as would be the case if we had four different diametric balls—G, C, T, A—and we paired them tangentially, G with C, and T with A, and we then nested them together (as in Sec. 623.12), and by continuing the columns in any different combinations of these pairs we would be able to modulate the rate of angular changes to design approximately any form.

933.05 This synergetics' tetrahelix is capable of demonstrating the molecular-compounding characteristic of the Watson-Crick model of the DNA, that of the deoxyribonucleic acid. When Drs. Watson, Wilkins, and Crick made their famous model of the DNA, they made a chemist's reconstruct from the information they were receiving, but not as a microscopic photograph taken through a camera. It was simply a schematic reconstruction of the data they were receiving regarding the relevant chemical associating and the disassociating. They found that a helix was developing.

933.06 They found there were 36 rotational degrees of arc accomplished by each increment of the helix and the 36 degrees aggregated as 10 arc increments in every complete helical cycle of 360 degrees. Although there has been no identification of the tetrahelix column of synergetics with the Watson-Crick model, the numbers of the increments are the same. Other molecular biologists also have found a correspondence of the tetrahelix with the structure used by some of the humans' muscle fibers.

933.07 When we address two or more positive or two or more negative tetrahelixes together, the positives nestle their angling forms into one another, as the negatives nestle likewise into one another's forms.

933.08 **Closest Packing of Different-sized Balls:** It could be that the CCTA tetrahelix derives from the closest packing of different-sized balls. The Mites and Sytes (see Sec. 953) could be the tetrahedra of the GCTA because they are both positive- negative and allspace filling.

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Next Section: 934.00

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934.00 **Unzipping Angle**

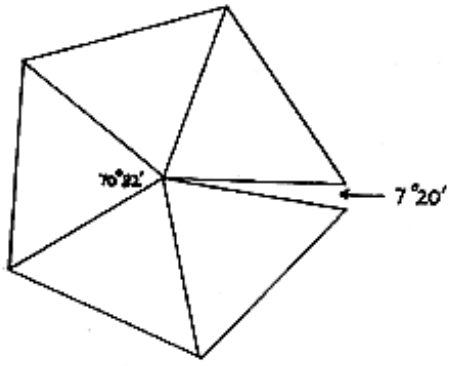
934.01 If we take three columns of tetrahelixes and nest them into one another, we see that they also apparently internest neatly as with a three-part rope twist; but upon pressing them together to close the last narrow gap between them we discover that they are stubbornly resisting the final closure because the core pattern they make is one in which five tetrahedra are triple-bonded around a common edge axis—which angular gap is impossible to close.

Fig. 934.02

934.02 Five tetrahedra triple-bonded to one another around a common edge axis leave an angular sinus[2] of 7° 20' as the *birth unzipping* angle of DNA-RNA behaviors. This gap could be shared 10 ways, i.e., by two faces each of the five circle-closing tetrahedra, and only 44 minutes of circular arc per each tetra face, each of whose two faces might be only alternatingly edge-bonded, or hinged, to the next, which almost- closed, face-toward-face, hinge condition would mechanically accommodate the spanned coherence of this humanly-invisible, 44-minutes-of-circular-arc, distance of interadherence. Making such a tetrahelix column could be exactly accomplished by only hinging one edge of each tetrahedron to the next, always making the next hinge with one of the two-out-of-three edges not employed in the previous hinge. Whatever the method of interlinkage, this birth dichotomy is apparently both *accommodated by* and *caused by* this invisible, molecular biologist's 1° 28' per tetra and 7° 20' per helical-cycle hinge opening.

(Footnote 2: Sinus means *hollow* or *without* in Latin.)

934.03 Unzipping occurs as the birth dichotomy and the new life breaks off from the old pattern with a perfect imprint and repeats the other's growth pattern. These helixes have the ability to nest by virtue of the hinge-spring linkage by which one is being imprinted on the other. Positive columns nest with and imprint only upon positive helix columns and negative helix columns nest with and imprint their code pattern only with and upon negative helix columns. Therefore, when a column comes off, i.e., unzips, it is a replica of the original column.




70° 32'
X5
352° 40'

360° 00'
−352° 40'
7° 20' Unzipping angle

Fig. 934.02.

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934.04 We know that the edge angle of a tetrahedron is 70° 32', and five times that is 352° 40', which is 7° 20' less than 360°. In other words, five tetrahedra around a common edge axis do not close up and make 360 degrees, because the dihedral angles are 7° 20' short. But when they are brought together in a helix—due to the fact that a hinged helix is a coil spring—the columns will twist enough to permit the progressive gaps to be closed. No matter how long the tetrahelix columns are, their sets of coil springs will contract enough to bring them together. The backed-up spring tries constantly to *unzip* one nesting tetrahedron from the others of which it is a true replica. These are only synergetical conjectures as to the theoretical explanations of otherwise as yet unexplained behaviors of the DNA.

## 935.00 **Octahedron as Conservation and Annihilation Model**

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[935.00-938.16 Annihilation Scenario]

### 935.10 **Energy Flow and Discontinuity**

935.11 Though classic science at the opening of the 18th century had achieved many remarkably accurate observations and calculations regarding the behaviors of light, individual scientists and their formal societies—with one notable exception-remained unaware that light (and radiation in general) has a speed. Ole Roemer (1644—1710), both Royal Astronomer and Royal Mathematician of Denmark, was that exception. Roemer's observations of the reflected light of the revolving moons of the planet Jupiter made him surmise that light has a speed. His calculations from the observed data very closely approximated the figure for that speed as meticulously measured in vacuo two centuries later, in the Michelson-Morley experiment of 1887. Though Roemer was well accredited by the scientists and scientific societies of Europe, this hypothesis of his seemed to escape their cosmological considerations. Being overlooked, the concept did not enter into any of the cosmological formulations (either academic or general) of humanity until the 20th century.

935.12 Until the 20th century scientists in general assumed the light of all the stars to be instantaneously and simultaneously extant. Universe was an instantaneous and simultaneous system. The mid-19th-century development of thermodynamics, and in particular its second law, introduced the concept that all systems always lose energy and do so in ever-increasingly disorderly and expansive ways. The academicians spontaneously interpreted the instantaneity and simultaneity of Universe as requiring that the Universe too must be categorized as a system; the academicians assumed that as a system Universe itself must be losing energy in increasingly expansive and disorderly ways. Any expenditure of energy by humans on Earth—to whom the stars in the heavens were just so much romantic scenery; no more, no less—would hasten the end of the Universe. This concept was the foundation of classical conservatism—economic, political, and philosophical. Those who "spent" energy were abhorred.

935.13 This viewpoint was fortified by the hundred-years-earlier concept of classical science's giant, Isaac Newton, who in his first law of motion stated that all bodies persist in a state of rest, or in a line of motion, except as affected by other bodies. This law posits a cosmic norm of *at rest:* change is abnormal. This viewpoint as yet persists in all the graphic-chart coordinates used by society today for plotting performance magnitudes against a time background wherein the baseline of "no change" is the norm. Change is taken spontaneously as being inherently abnormal and is as yet interpreted by many as being cause for fundamental social concern.

935.14 With the accurate measurement, in 1887, of the speed of light in vacuo, science had comprehensively new, experimentally redemonstrable challenges to its cosmogony and cosmology. Inspired by the combined discoveries of the Brownian movement, black body radiation, and the photon of light, Einstein, Planck, and others recognized that energy-as-radiation has a top speed—ergo, is finitely terminaled—but among them, Einstein seems to have convinced himself that his own cosmological deliberations should assume Boltzmann's concept to be valid—ergo, always to be included in his own exploratory thoughts. There being no experimental evidence of energy ever being created or lost, universal energy is apparently conserved. Wherefore Boltzmann had hypothesized that energy progressively and broadcastingly exported from various localities in Universe must be progressively imported and reassembled at other localities in Universe.

935.15 Boltzmann's concept was analogous to that upon which was developed the theory and practice of the 20th-century meteorological weather forecasting, which recognizes that our terrestrial atmosphere's plurality of high-pressure areas are being progressively exhausted at different rates by a plurality of neighboring low-pressure areas, which accumulate atmospheric molecules and energy until they in turn become new high- pressure areas, which are next to be progressively exhausted by other newly initiated low- pressure areas. The interpatterning of the various importing-exporting centers always changes kaleidoscopically because of varying speeds of moisture formation or precipitation, speeds and directions of travel, and local thermal conditions.

935.16 Though they did not say it that way, the 20th-century leaders of scientific thinking inferred that physical Universe is apparently eternally regenerative.

935.17 Einstein assumed hypothetically that energies given off omnidirectionally with the ever-increasing disorder of entropy by all the stars were being antientropically imported, sorted, and accumulated in various other elsewheres. He showed that when radiant energy interferes with itself, it can, and probably does, tie itself precessionally into local and orderly knots. Einstein must have noted that on Earth children do not disintegrate entropically but multiply their hydrocarbon molecules in an orderly fashion; little saplings grow in an orderly way to become big trees. Einstein assumed Earthian biology to be reverse entropy. (This account does not presume to recapitulate the actual thought processes of Einstein at any given point in the development of his philosophy; rather it attempts to illustrate some of the inevitable conclusions that derive from his premises.)

935.18 What made it difficult for scientists, cosmologists, and cosmogonists to comprehend about Boltzmann's concept—or Einstein's implicit espousal of it—was the inherent *discontinuity* of energy events implicit in the photon as a closed-system package of energy. What happened to the energy when it disappeared? For disappear it did. How could it reappear elsewhere in a discontinuous system?

935.20 **Precessional Transformation in Quantum Model**

935.21 One quantum of energy always consists of six energy vectors, each being a combined push-pull, positive-negative force. (See Secs. 600.02 through 612.01 and Fig. 620.06.) Twelve unique forces: six plus and six minus. Six vectors break into two sets of three each. Classical engineers assumed that each action had its equal and opposite reaction at 180 degrees; but since the discovery of the speed of light and the understanding of nonsimultaneity, we find that every action has not only a reaction but also a *resultant.* Neither the reaction nor the resultant are angularly "opposite" in 180- degree azimuth from the direction of action. The "equal and opposite" of classical engineering meant that both action and reaction occurred in opposite directions in the same straight line in the same geometrical plane. But since the recognition of nonsimultaneity and the speed of light, it has been seen that action, reaction, and resultant vectors react omnidirectionally and precessionally at angles other than 180 degrees. (See Fig. 511.20.)

935.22 As we enter the last quarter of the 20th century, it is recognized in quantum mechanics and astrophysics that there could never have existed the traditionally assumed, a priori universal chaos, a chaos from which it was also assumed that Universe had escaped only by the workings of chance and the long-odds-against mathematical probability of a sequence of myriad-illions of coincidences, which altogether produced a universal complex of orderly evolutionary events. This nonsense was forsaken by the astrophysicists only a score of years ago, and only because science has learned in the last few decades that both the proton and the neutron always and only coexist in a most orderly interrelationship. They do not have the same mass, and yet the one can be transformed into the other by employing both of their respective two energy side effects; i.e., those of both the proton and the neutron. Both the proton and the neutron have their respective and unique two-angle-forming patterns of three interlinked lines, each representing their action, reaction, and resultant vectors.

935.221 **Coming-Apart Phase: Coming-Apart Limit:** The astrophysicists say that no matter how far things come apart, fundamentally they never come farther apart than proton and neutron, which always and only coexist.

Fig. 935.23

935.23 The names of the players, the positions they play, and the identifying letters they wear on the three-vector teams of proton and neutron, respectively, are identified as follows. The proton's three-vector team consists of

1. the *action* vector, played by its captain, the *proton*, wearing the letters BD;
2. the *reaction* vector, played by the *electron*, wearing the letters AD; and
3. the *resultant* vector, played by the *antineutrino*, wearing the letters BC.

The neutron's three-vector team consists of

1. the *action* vector, played by its captain, the *neutron*, wearing the letters A C;
2. the *reaction* vector, played by the *positron*, wearing the letters CD; and
3. the *resultant* vector, played by the *neutrino*, wearing the letters AB.

Either one of these two teams of three-vector events is identified in quantum mechanics as being a half-quantum (or one-half spin or one-half Planck's constant). When two half- quanta associate, they produce one unit of quantum. (See Sec. 240.65.) These two sets of three vectors each combine to produce the six vector edges of the tetrahedron, which is the minimum structural system of Universe: one quantum of energy thus becomes structurally and systematically conceptual. (See Fig. 935.23.) One quantum of energy equals one tetrahedron. Humanist writers and broadcasters take notice that science has regained conceptuality. Science's intertransformabilities and intercomplementarities are modelably demonstrable. The century-long chasm that has separated science and the humanities has vanished.

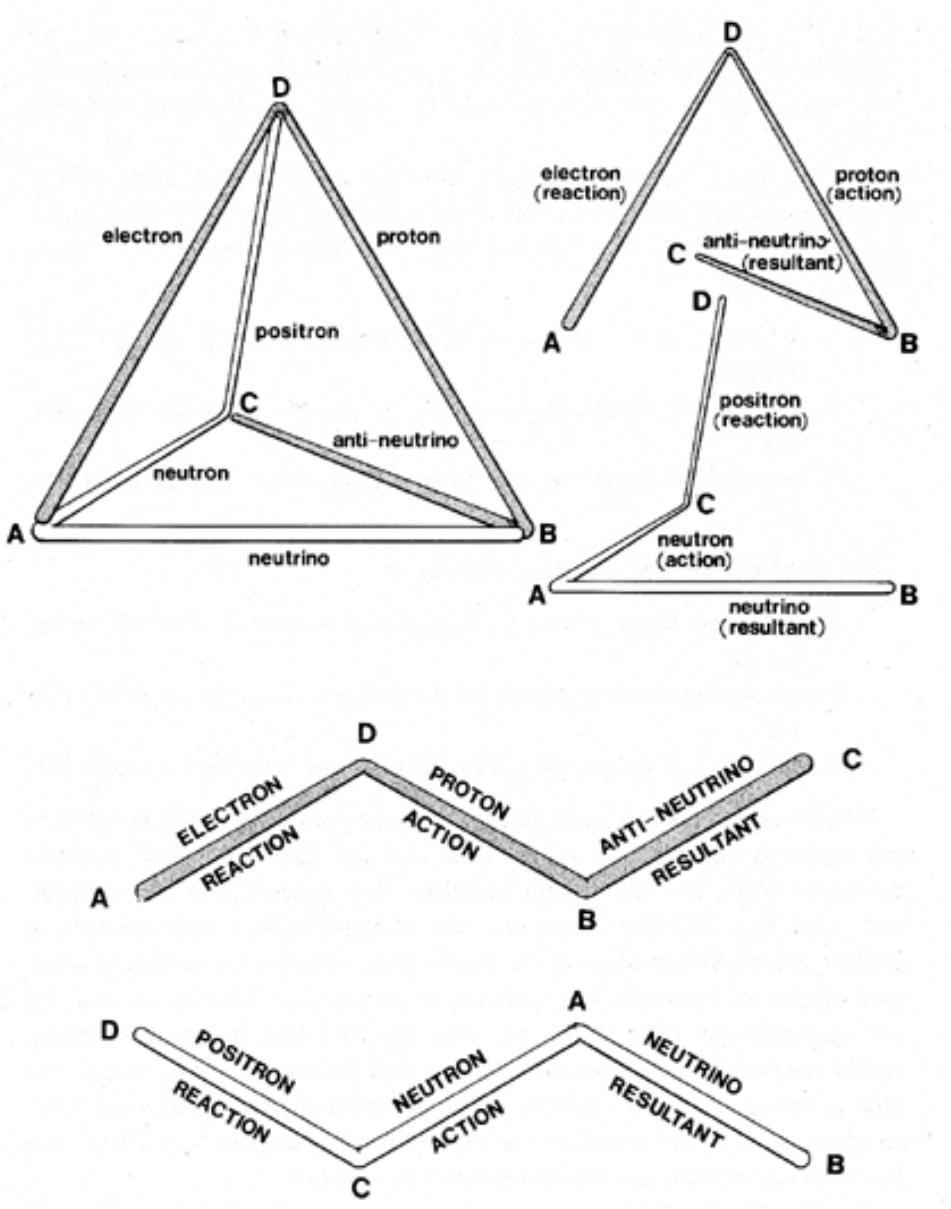


Fig. 935.23 Proton and Neutron Three-vector Teams: The proton and neutron always and only coexist as action vectors of half-quanta associable as quantum.

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935.24 The tetrahedral model of the quantum as the minimum structural system of Universe is a prime component in producing the conceptual bridge to span the vast chasm identified by C. P. Snow as having for so long existed between the one percent of the world people who are scientists and the 99 percent of humanity comprehendingly communicated with by the writers in literature and the humanities. This chasm has been inadvertently sustained by the use of an exclusively mathematical language of abstract equations on the part of scientists, thus utterly frustrating the comprehension of the scientists' work by the 99 percent of humanity that does not communicate mathematically. This book, *Synergetics,* contains the conceptualizing adequate to the chasm-bridging task, and it does so in vectorially structured geometry and in exclusively low-order prime numbers in rational whole-number accounting.

935.25 As an instance of chasm-spanning between science and the humanities by conceptually transformative energy-quanta accounting, synergetics conceptually elucidates the Boltzmann import-export, entropy-syntropy transaction and the elegant manner in which nature accommodates the "hidden ball" play of now-you-see-it-now-you-don't energy transference.

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936.00 **Volumetric Variability with Topological Constancy**

936.10 **Symmetrical and Asymmetrical Contraction**

936.11 An octahedron consists of 12 vector edges and two units of quantum and has a volume of four when the tetrahedron is taken as unity. (See Table 223.64.) Pulling two ends of a rope in opposite directions makes the rope's girth contract precessionally in a plane at 90 degrees to the axis of purposeful tensing. (Sec. 1054.61.) Or if we push together the opposite sides of a gelatinous mass or a pneumatic pillow, the gelatinous mass or the pneumatic pillow swells tensively outward in a plane at 90 degrees to the line of our purposeful compressing. This 90-degree reaction—or resultant—is characteristic of precession. Precession is the effect of bodies in motion upon other bodies in motion. The gravitational pull of the Sun on the Earth makes the Earth go around the Sun in an orbit at degrees to the line of the Earth-Sun gravitational interattraction. The effect of the Earth on the Moon or of the nucleus of the atom upon its electron is to make these interattractively dependent bodies travel in orbits at 90 degrees to their mass-interattraction force lines.

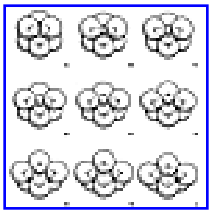
Fig. 936.12

936.12 The octahedron represents the most commonly occurring crystallographic conformation in nature. (See Figs. 931.10 and 1054.40.) It is the most typical association of energy-as-matter; it is at the heart of such association. Any focused emphasis in the gravitational pull of the rest of the Universe upon the octahedron's symmetry precesses it into asymmetrical deformation in a plane at 90 degrees to the axis of exaggerated pulling. This forces one of the 12 edge vectors of the octahedron to rotate at 90 degrees. If we think of the octahedron's three XYZ axes and its six vertexes, oriented in such a manner that X is the north pole and X' is the south pole, the other four vertexes—Y, Z, Y', Z'—all occur in the plane of, and define, the octahedron's equator. The effect of gravitational pull upon the octahedron will make one of the four equatorial vectors disengage from its two adjacent equatorial vertexes, thereafter to rotate 90 degrees and then rejoin its two ends with the north pole and south pole vertexes. (See Fig. 936.12 and color plate 6.)

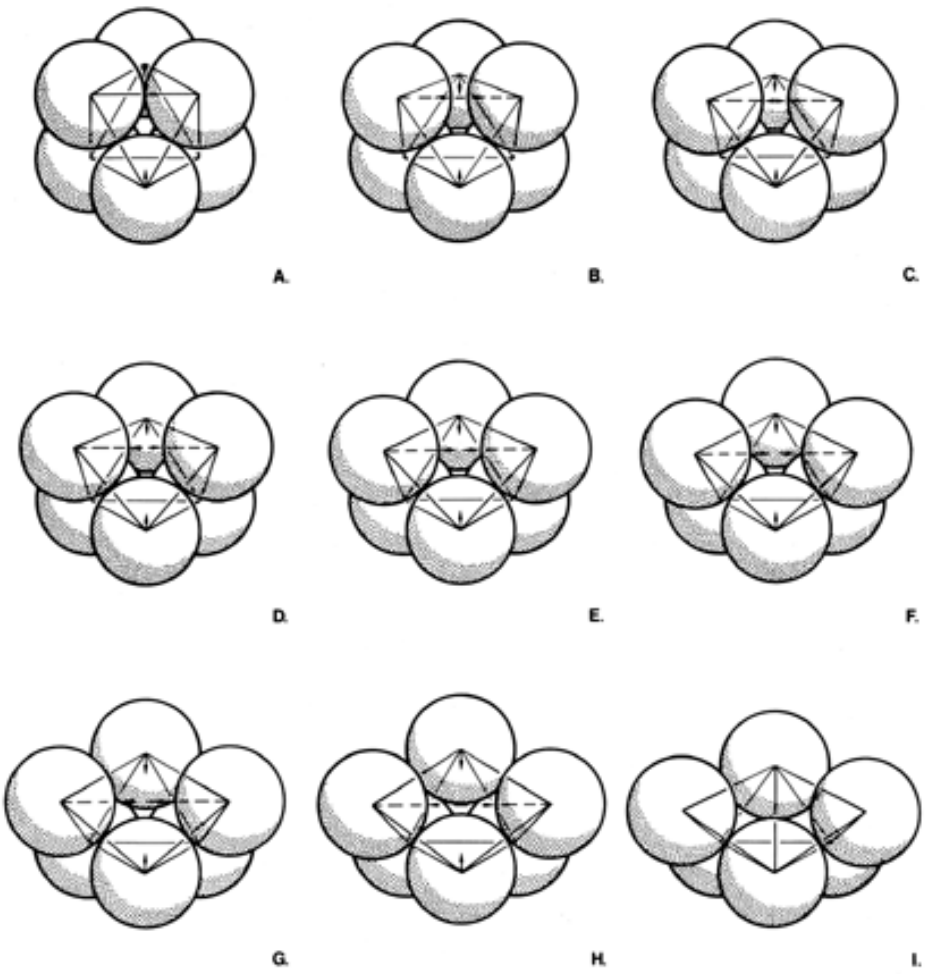


Fig. 936.12 Octahedron as Conservation and Annihilation Model: If we think of the octahedron as defined by the interconnections of six closest-packed spheres, gravitational pull can make one of the four equatorial vectors disengage from its two adjacent equatorial vertexes to rotate 90 degrees and rejoin the north and south vertexes in the transformation completed as at I. (See color plate 6.)

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936.13 When this precessional transformation is complete, we have the same topological inventories of six vertexes, eight exterior triangular faces, and 12 vector edges as we had before in the symmetrical octahedron; but in the process the symmetrical, four- tetrahedra-quanta-volume octahedron has been transformed into three tetrahedra (three- quanta volume) arranged in an arc section of an electromagnetic wave conformation with each of the two end tetrahedra being face bonded to the center tetrahedron. (See Sec. 982.73)

936.14 The precessional effect has been to rearrange the energy vectors themselves in such a way that we have gone from the volume-four quanta of the symmetrical octahedron to the volume-three quanta of the asymmetric tetra-arc-array segment of an electromagnetic wave pattern. Symmetric matter has been entropically transformed into asymmetrical and directionally focused radiation: one quantum of energy has seemingly disappeared. When the radiation impinges interferingly with any other energy event in Universe, precession recurs and the three-quantum electromagnetic wave retransforms syntropically into the four-quantum octahedron of energy-as-matter. And vice versa. Q.E.D. (See Fig. 936.14.)

936.15 The octahedron goes from a volume of four to a volume of three as one tensor is precessed at 90 degrees. This is a demonstration in terms of tension and compression of how energy can disappear and reappear. The process is reversible, like Boltzmann's law and like the operation of syntropy and entropy. The lost tetrahedron can reappear and become symmetrical in its optimum form as a ball-bearing-sphere octahedron. There are six great circles doubled up in the octahedron. Compression is radiational: it reappears. Out of the fundamental fourness of all systems we have a model of how four can become three in the octahedron conservation and annihilation model.

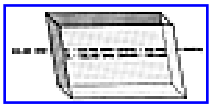

Fig. 936.16

936.16 See the Iceland spar crystals for the octahedron's double vector-edge image.

936.17 The interior volume of the concave-vector-equilibrium-shaped space occurring interiorly between the six uniradius octahedral collection of closest-packed spheres is greater than is the concave-octahedrally-shaped space occurring interiorly between the four uniradius tetrahedral collection of closest-packed spheres, which tetrahedral collection constitutes the minimum structural system in Universe, and its interior space is the minimum interior space producible within the interstices of closest- packed uniradius spheres.

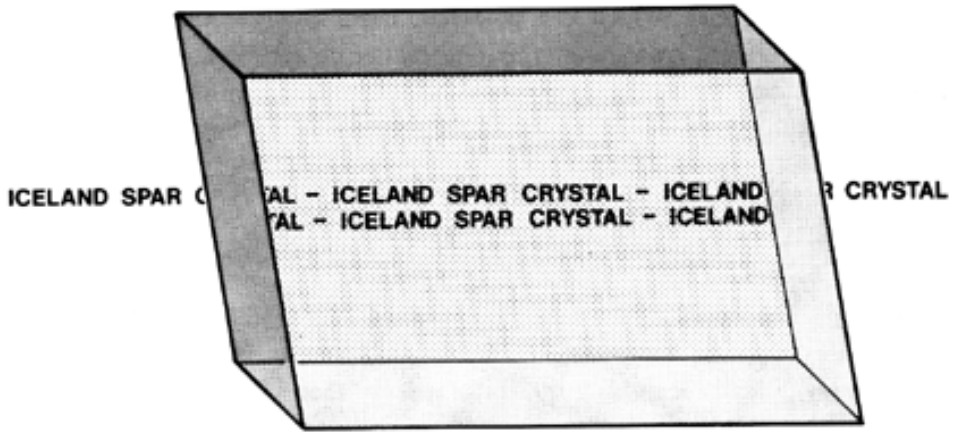


Fig. 936.16 Iceland Spar Crystal: Double vector image.

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936.18 Thus the larger interior space within the omnitriangularly stable, six-vertex- ball, 12-vector-edge octahedron is subject to volumetric compressibility. Because its interior space is not minimal, as the octahedron is omniembracingly tensed gravitationally between any two or more bodies, its six balls will tend precessionally to yield transformingly to produce three closest-packed, uniradius, sphere-vertex-defined, face- bonded tetrahedra.

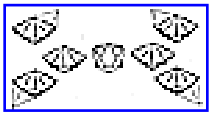
Fig. 936.19

936.19 As we tense the octahedron, it strains until one vector (actually a double, or unity-as-two, vector) yields its end bondings and precesses at 90 degrees to transform the system into three double-bonded (face-bonded) tetrahedra in linear arc form. This tetra- arc, embryonic, electromagnetic wave is in neutral phase. The seemingly annihilated—but in fact only separated-out-quantum is now invisible because vectorless. It now becomes invisibly face-bonded as one invisible tetrahedron. The separated-out quantum is face- bonded to one of the furthermost outward triangular faces occurring at either end of the tetra-arc array of three (consisting of one tetra at the middle with each of the two adjacent tetra face-bonded to it); the fourth invisible tetrahedron is face-bonded to one or the other of the two alternatively vacant, alternatively available furthermost end faces of the tetra- arc group. With this fourth, invisible tetrahedral addition the overall triple-bonded tetrahedral array becomes either rightwardly or leftwardly spiraled to produce a four- tetrahedron tetrahelix, which is a potential, event embryo, electromagnetic-circuitry gap closer. Transmission may thereafter be activated as a connected chain of the inherently four-membered, individual-link continuity. This may explain the dilemma of the wave vs the particle. (See Sec. 973.30, Fig. 936.19, and color plates 6 and 7.)

936.20 **Conceptual Conservation and Annihilation**

936.21 The octahedron as the conservation and annihilation model provides an experiential and conceptual accounting for the question: What happens to entropically vanishing quanta of energy that have never been identified as discretely lost when new quanta appeared elsewhere and elsewhen? Were these appearing and disappearing quanta being encountered for the first time as we became capable of penetrating exploration of ever vaster ranges of Universe?

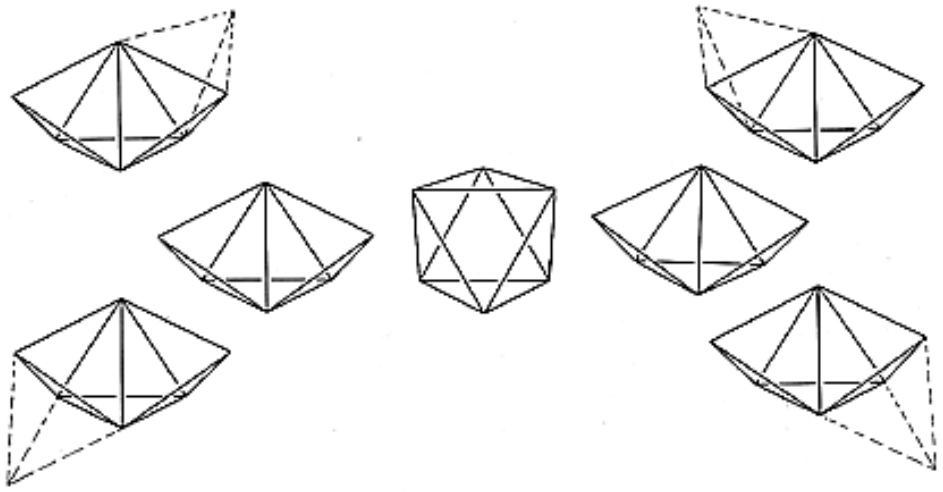

Fig. 936.19 Tetrahedral Quantum is Lost and Reappears in Transformation between Octahedron and Three-tetra-arc Tetrahelix: This transformation has the precessional effect of rearranging the energy vectors from 4-tetravolumes to 3-tetravolumes and reverse. The neutral symmetric octahedron rearranges itself into an asymmetric embryonic wave pattern. The four-membered individual-link continuity is a potential electromagnetic-circuitry gap closer. The furthermost ends of the tetra-arc group are alternatively vacant. (See also color plate 6.)

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936.22 Boltzmann hypothesized and Einstein supported his working assumption—stated in the conceptual language of synergetics—that there can be no a priori stars to radiate entropically and visibly to the information-importing, naked eyes of Earthian humans (or to telescopes or phototelescopy or electromagnetic antennae) if there were not also invisible cosmic importing centers. The importing centers are invisible because they are not radiantly exporting; they are in varying stages of progressive retrieving, accumulating, sorting, storing, and compressing energies. The cosmic abundance of the myriads of such importing centers and their cosmic disposition in Scenario Universe exactly balances and conserves the integrity of eternally regenerative Universe.

936.23 In Scenario Universe (in contrast to a spherically-structured, normally-at-rest, celestially-concentric, single-frame-picture Universe) the episodes consist only of such frequencies as are tune-in-able by the limited-frequency-range set of the viewer.

936.24 There is no such phenomenon as space: there is only the at-present-tuned-in set of relationships and the untuned intervalling. *Points* are twilight-border-line, only amplitude-tuned-in (AM), directionally oriented, static squeaks or pips that, when frequency-tuned (FM), become differentially discrete and conceptually resolvable as topological systems having withinness and withoutness—ergo, at minimum having four corner-defining yet subtunable system pips or point-to-able corner loci. In systemic cosmic topology Euler's vertexes (*points*) are then always only twilight energy-event loci whose discrete frequencies are untunable at the frequency range of the reception set of the observer.

937.00 **Geometry and Number Share the Same Model**

937.10 **Midway Between Limits**

937.11 The grand strategy of quantum mechanics may be described as progressive, numerically rational fractionating of the limit of total energy involved in eternally regenerative Universe.

937.12 When seeking a model for energy quanta conservation and annihilation, we are not surprised to find it in the middle ranges of the geometrical hierarchy of prime structural systems—tetrahedron, octahedron, and icosahedron (see Sec. 610.20). The tetrahedron and icosahedron are the two extreme and opposite limit cases of symmetrical structural systems: they are the minimum-maximum cosmic limits of such prime structures of Universe. The octahedron ranks in the neutral area, midway between the extremes.

937.13 The prime number characteristic of the tetrahedron is 1; the prime number characteristic of the icosahedron is 5. Both of these prime numbers—1 and 5—are odd numbers, in contradistinction to the prime number characteristic of the middle-case structural-system octahedron, which is 2, an even number and the *only even numbered prime* number. Again, we are not surprised to find that the octahedron is the most common crystal conformation in nature.

937.14 The tetrahedron has three triangles around each vertex; the octahedron has four; and the icosahedron has five. The extreme-limit cases of structural systems are vertexially locked by odd numbers of triangular gears, while the vertexes of the octahedron at the middle range have an even number of reciprocating triangular gears. This shows that the octahedron's three great circles are congruent pairs—i.e., six circles that may seem to appear as only three, which quadrivalent doubling with itself is clearly shown in the jitterbug model, where the 24 vector edges double up at the octahedron phase to produce 12 double-congruent vector edges and thus two congruent octahedra. (See Fig. 460.08D.)

937.15 The octahedron is doubled-up in the middle range of the vector equilibrium's jitterbug model; thus it demonstrates conceptually the exact middle between the macro- micro limits of the sequence of intertransformative events. The octahedron in the middle of the structural-system hierarchy provides us with a clear demonstration of how a unit quantum of energy seemingly disappears—i.e., becomes annihilated—and vice versa.

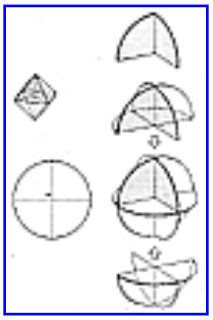

Fig. 937.20

937.20 **Doubleness of Octahedron**

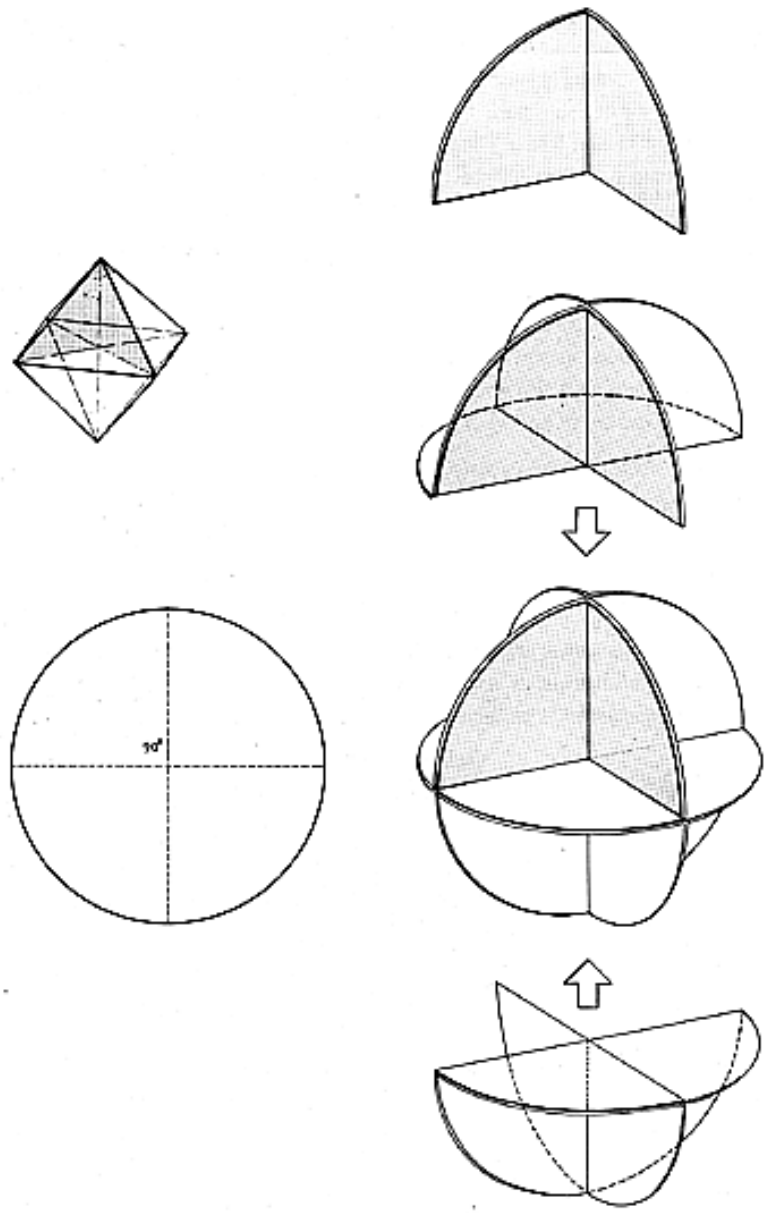

Fig. 937.20 Six-great-circle Spherical Octahedron: The doubleness of the octahedron is illustrated by the need for two sets of three great circles to produce its spherical foldable form.

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937.21 The octahedron always exhibits the quality of doubleness. When the octahedron first appears in the symmetrical contraction of the vector equilibrium jitterbug system, it appears with all of its vectors doubled (see Fig. 460.08D 460.08D). It also takes two sets of three great circles each to fold the octahedron. You might think you could do it with one set of three great circles, but the foldability of the octahedron requires two sets of three great circles each. (See Secs. 835 and 836.) There are always six great circles doubled up in the octahedron to reappear only as three. (See Fig. 937.20.)

937.22 And we also recall that the octahedron appears as the prime number 2 in the geometrical hierarchy, while its volume is 4 when the tetrahedron is taken as volumetric units (see Table 223.64).

The tetrahedron's prime number identity is 1

The octahedron's prime number identity is 2

Both cubes and rhombic dodecahedra are 3

And icosahedra and vector equilibria are 5

They first occur volumetrically, respectively, as

1, 4, 3, 6, 18.51, and 20.

937.30 **Octahedron as Sphere of Compression**

937.31 The slenderness ratio in gravitationally tensed functioning has no minimum overall limit of its structural-system length, as compared to the diameter of the system's midlength cross section; ergo,

$$\frac{\text{tensile length}}{\text{diameter}} = \frac{\text{alpha}}{0}$$

In crystalline compression structures the column length minimum limit ratio is 40/1. There may be a length/diameter compression-system-limit in hydraulics, but we do not as yet know what it is. The far more slender column/diameter ratio attainable with hydraulics permits the growth of a palm tree to approach the column/diameter ratio of steel columns. We recognize the sphere—the ball bearing, the spherical island— column/diameter = 1/1 constituting the optimal, crystalline, compressive-continuity, structural-system model. (See Fig. 641.01.) The octahedron may be considered to be the optimum crystalline structural representation of the spherical islands of compression because it is double-bonded and its vectors are doubled.

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