938.00 **Jitterbug Transformation and Annihilation**

938.10 **Positive and Negative Tetrahedra**

938.11 The tetrahedron is the minimum-limit-case structural system of Universe (see Secs. 402 and 620). The tetrahedron consists of two congruent tetrahedra: one concave, one convex. The tetrahedron divides all of Universe into all the tetrahedral nothingness of all the cosmic outsideness and all the tetrahedral nothingness of all the cosmic insideness of any structurally conceived or sensorially experienced, special case, uniquely considered, four-starry-vertex-constellared, tetrahedral system somethingness of human experience, cognition, or thinkability.

938.12 The tetrahedron always consists of four concave-inward hedra triangles and of four convex-outward hedra triangles: that is eight hedra triangles in all. (Compare Fig. 453.02.) These are the same eight—maximally deployed from one another—equiangular triangular hedra or facets of the vector equilibrium that converge to differential inscrutability or conceptual zero, while the eight original triangular planes coalesce as the four pairs of congruent planes of the zero-volume vector equilibrium, wherein the eight exterior planes of the original eight edge-bonded tetrahedra reach zero-volume, eightfold congruence at the center point of the four-great-circle system. (Compare Fig. 453.02.)

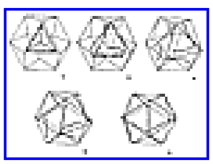
Fig. 938.13

938.13 The original—only vertexially single-bonded, vectorially structured—triangles of the vector-equilibrium jitterbug transform by symmetrical contraction from its openmost vector-equilibrium state, through the (unstable-without-six- additional-vector inserts; i.e., one vectorial quantum unit) icosahedral stage only as accommodated by the nuclear sphere's annihilation, which vanished central sphere reappears transformedly in the 30-vector-edged icosahedron as the six additional external vectors added to the vector equilibrium to structurally stabilize its six "square" faces, which six vectors constitute one quantum package. (See Fig. 938.13.)

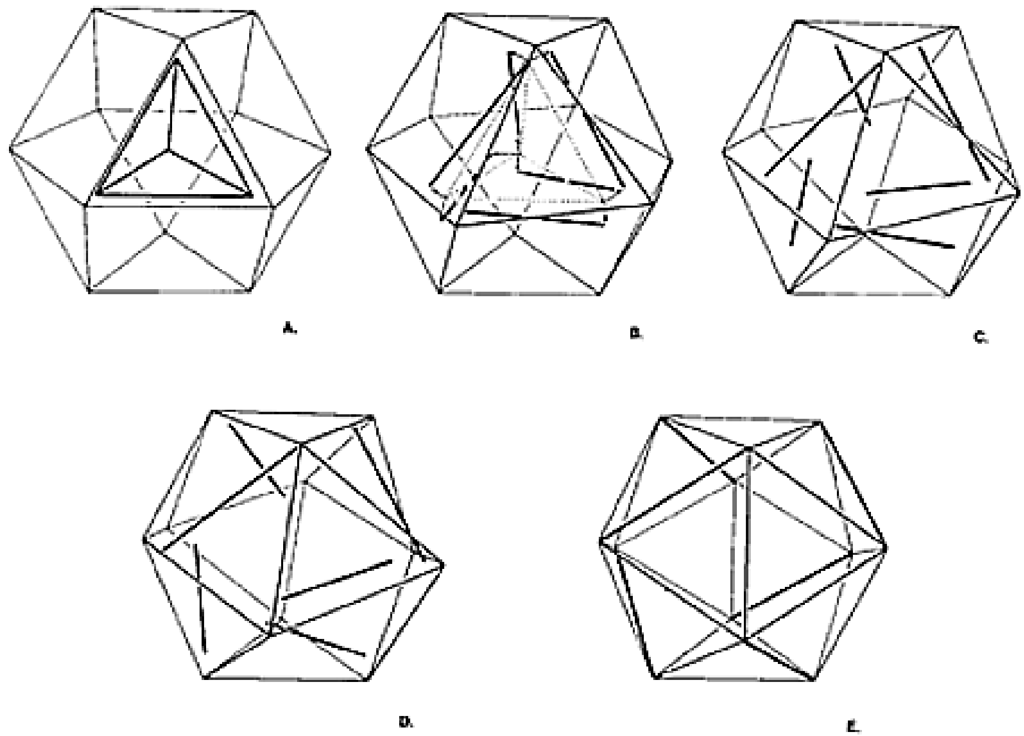

Fig. 938.13 Six Vectors of Additional Quantum Vanish and Reappear in Jitterbug Transformation Between Vector Equilibrium and Icosahedron: The icosahedral stage in accommodated by the annihilation of the nuclear sphere, which in effect reappears in transformation as six additional external vectors that structurally stabilize the six "square" faces of the vector equilibrium and constitute an additional quantum package. (See also color plate 7.)

938.14 Next the icosahedron contracts symmetrically to the congruently vectored octahedron stage, where symmetrical contraction ceases and precessional torque reduces the system to the quadrivalent tetrahedron's congruent four positive and four negative tetrahedra. These congruent eight tetrahedra further precess into eight congruent zero- altitude tetrahedral triangles in planar congruence as one, having accomplished this contraction from volume 20 of the vector equilibrium to volume 0 while progressively reversing the vector edges by congruence, reducing the original 30 vector edges (five quanta) to zero quanta volume with only three vector edges, each consisting of eight congruent vectors in visible evidence in the zero-altitude tetrahedron. And all this is accomplished without ever severing the exterior, gravitational-embracing bond integrity of the system. (See Figs. 461.08 and 1013.42.)

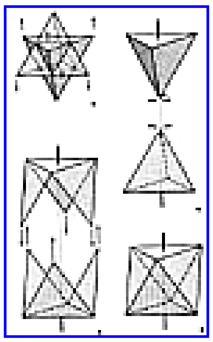

Fig. 938.15

938.15 The octahedron is produced by one positive and one negative tetrahedron. This is done by opening one vertex of each of the tetrahedra, as the petals of a flower are opened around its bud's vertex, and taking the two open-flowered tetrahedra, each with three triangular petals surrounding a triangular base, precessing in a positive-negative way so that the open triangular petals of each tetrahedron approach the open spaces between the petals of the other tetrahedron, converging them to produce the eight edge-bonded triangular faces of the octahedron. (See Fig. 938.15.)

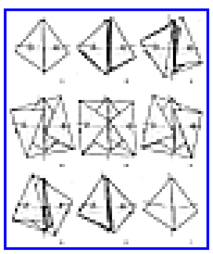

Fig. 938.16

938.16 Because the octahedron can be produced by one positive and one negative tetrahedron, it can also be produced by one positive tetrahedron alone. It can be produced by the four edge-bonded triangular faces of one positive tetrahedron, each being unbonded and precessed 60 degrees to become only vertex-interbonded, one with the other. This produces an octahedron of four positive triangular facets interspersed symmetrically with four empty triangular windows. (See Fig. 938.16.)

940.00 **Hierarchy of Quanta Module Orientations**

940.10 **Blue A Modules and Red B Modules**

940.11 *A Modules:* We color them *blue* because the As are energy conservers, being folded out of only one triangle.

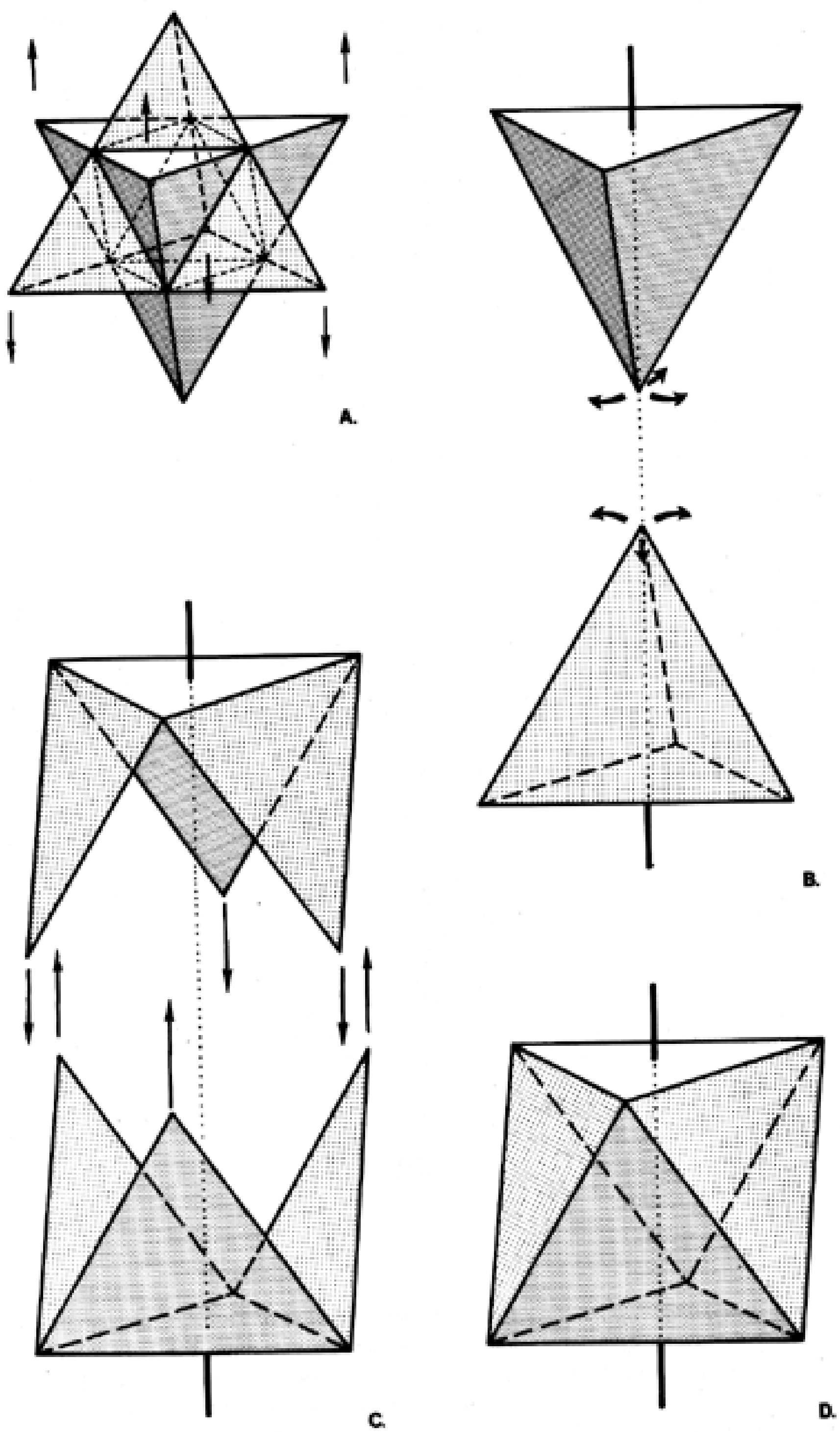

Fig 938.15 Two Tetrahedra Open Three Petal Faces and Precess to Rejoin as Octahedron.

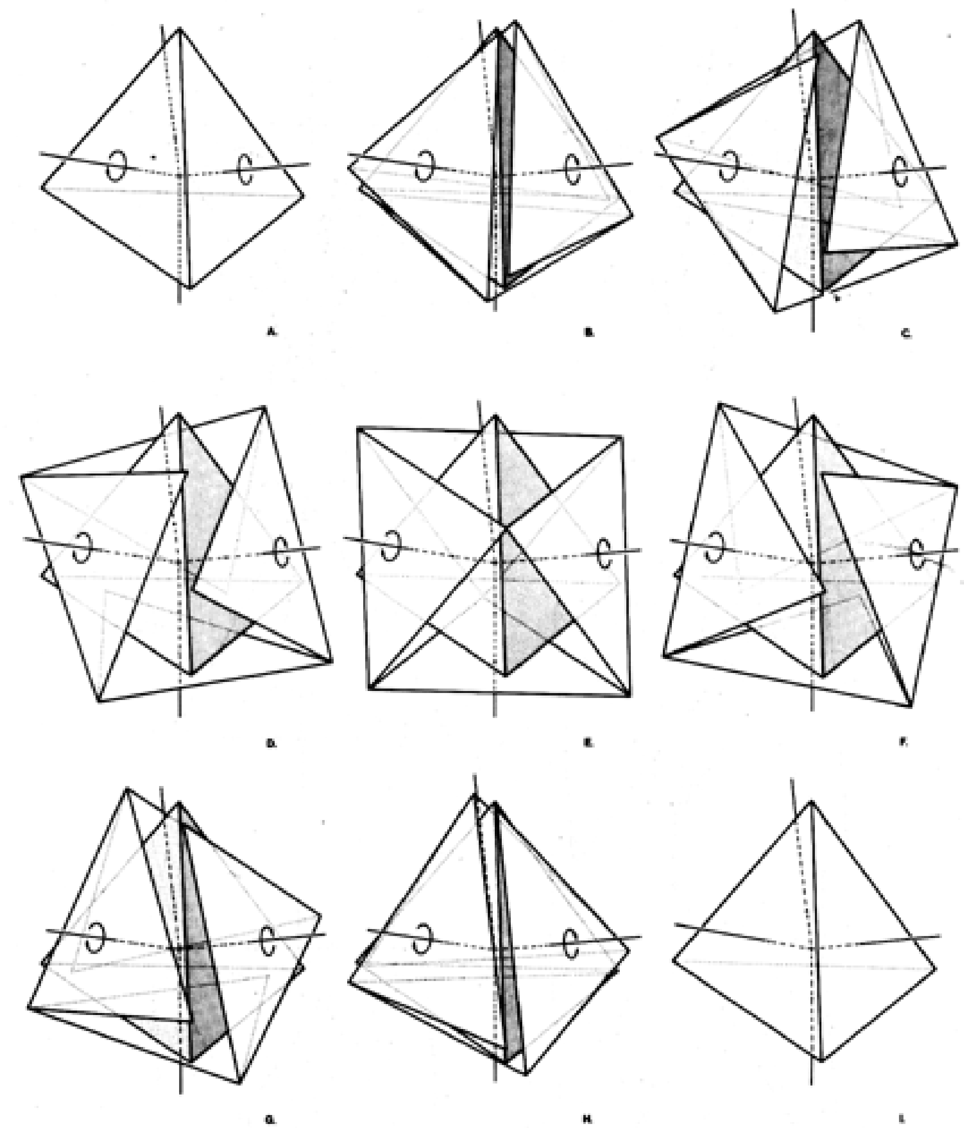

Fig. 938.16 Octahedron Produced from Precessed Edges of Tetrahedron: An octahedron may be produced from a single tetrahedron by detaching the tetra edges and precessing each of the faces 60 degrees. The sequence begins at A and proceeds through BCD at arrive at E with an octahedron of four positive triangular facets interspersed symmetrically with four empty triangular windows. From F through I the sequence returns to the original tetrahedron.

940.12 *B Modules:* We color them *red* because the Bs are energy distributors, not being foldable out of only one triangle.

940.13 This coloring will provide quick comprehension of the energy behaviors unique to the various geometrical systems and their transformations—for instance, in the outermost module layer shell of the vector equilibrium, all the triangular faces will be blue and all the square faces will be red, indicating that the eight tetrahedra of the vector equilibrium are conserving the system's structural integrity and will permit export of energy from the square faces of the system without jeopardizing the system's structural integrity.

941.00 **Relation of Quanta Modules to Closest-Packed Sphere Centers**

942.01 Illustrations of the A and B Quanta Modules may be made with spherical segment arcs of unit radius scribed on each of their three triangular faces having a common vertex at the sphere's center. The common center of those circular arcs lies in their respectively most acute angle vertexes; thus, when assembled, those vertexes will lie in the centers of the closest-packed spheres of which each A and B Quanta Module embraces a part, 1/l44th of a sphere, as well as its proportional part of the space between the closest-packed spheres.

942.00 **Progression of Geometries in Closest Packing**

942.01 Two balls of equal radius are closest packed when tangent to one another, forming a linear array with no ball at its center. Three balls are closest packed when a third ball is nested into the valley of tangency of the first two, whereby each becomes tangent to both of the other two, thus forming a triangle with no ball at its center. Four balls are closest packed when a fourth ball is nested in the triangular valley formed atop the closest- packed first three; this fourth-ball addition occasions each of the four balls becoming tangent to all three of the other balls, as altogether they form a *tetrahedron,* which is an omnidirectional, symmetrical array with no ball at its center but with one ball at each of its four comers. (See Sec. 411.)

942.02 Four additional balls can be symmetrically closest packed into the four nests of the closest-packed tetrahedral group, making eight balls altogether and forming the *star tetrahedron,* with no ball at its center.

942.03 Five balls are closest packed when a fifth ball is nested into the triangular valley on the reverse side of the original triangular group's side within whose triangular valley the fourth ball had been nested. The five form a polar-symmetry system with no ball at its center.

942.04 Six balls are closest packed when two closest-packed triangular groups are joined in such a manner that the three balls of one triangular group are nested in the three perimeter valleys of the other triangular group, and vice versa. This group of six balls is symmetrically associated, and it constitutes the six corners of the regular *octahedron,* with no ball at its center.

942.05 Eight additional balls can be mounted in the eight triangular nests of the octahedron's eight triangular faces to produce the *star octahedron,* a symmetrical group of 14 balls with no ball at the group's center.

942.10 **Tetrahedron:** The tetrahedron is composed exclusively of A Modules (blue), 24 in all, of which 12 are positive and 12 are negative. All 24 are asymmetrical, tetrahedral energy conservers.[3] All the tetrahedron's 24 blue A Modules are situate in its only one-module-deep outer layer. The tetrahedron is all blue: all energy-conserving.

(Footnote 3: For Discussion of the self-containing energy-reflecting patterns of single triangles that fold into the tetrahedron —symmetrical or asymmetrical— see Sec. 914 and 921.)

942.11 Since a tetrahedron is formed by four mutually tangent spheres with no sphere at its center, the A Modules each contain a portion of that sphere whose center is congruent with the A Module's most acute comer.

942.12 The tetrahedron is defined by the lines connecting the centers of the tetrahedron's four corner spheres. The leak in the tetrahedron's corners elucidates entropy as occasioned by the only-critical-proximity but nontouching of the tetrahedron's corners- defining lines. We always have the twisting—the vectorial near-miss—at the corners of the tetrahedron because not more than one line can go through the same point at the same time. The construction lines with which geometrical entities are structured come into the critical structural proximity only, but do not yield to spontaneous mass attraction, having relative Moon-Earth-like gaps between their energy-event-defining entities of realization. (See Sec. 921.15.)

942.13 The tetrahedron has the minimum leak, but it does leak. That is one reason why Universe will never be confined within one tetrahedron, or one anything.

942.15 **Quarter-Tetrahedra:** Quarter-Tetrahedra have vector-edged, equiangled, triangular bases that are congruent with the faces of the regular tetrahedron. But the apex of the Quarter-Tetrahedron occurs at the center of volume of the regular tetrahedron.

942.16 The Quarter-Tetrahedra are composed of three positive A Quanta Modules and three negative A Quanta Modules, all of which are asymmetrical tetrahedra. We identify them as six energy quanta modules. These six energy quanta modules result when vertical planes running from the three vertexes to their three opposite mid-edges cut the Quarter-Tetrahedron into six parts, three of which are positive and three of which are negative.

942.17 The triangular conformation of the Quarter-Tetrahedron can be produced by nesting one uniradius ball in the center valley of a five-ball-edged, closest-packed, uniradius ball triangle. (See Illus. 415.55C.) The four vertexes of the Quarter-Tetrahedron are congruent with the volumetric centers of four uniradius balls, three of which are at the comers and one of which is nested in the valley at the center of area of a five-ball-edged, equiangle triangle.

942.18 The Quarter-Tetrahedron's six edges are congruent with the six lines of sight connecting the volumetric centers of the base triangle's three uniradius corner balls, with one uniradius ball nested atop at the triangle's center of area serving as the apex of the Quarter-Tetrahedron.

942.20 **Isosceles Dodecahedron:** The isosceles dodecahedron consists of the regular tetrahedron with four Quarter-Tetrahedra extroverted on each of the regular tetrahedron's four triangular faces, with the extroverted Quarter-Tetrahedra's volumetric centers occurring outside the regular tetrahedron's four triangular faces, whereas the central nuclear tetrahedron's four Quarter Tetrahedra are introverted with their volumetric centers situate inwardly of its four outer, regular, equiangled, triangular faces.

942.21 The isosceles dodecahedron is composed of 48 blue A Modules, 24 of which are *introverted;* that is, they have their centers of volume inside the faces of the central, regular tetrahedron and constitute the nuclear layer of the isosceles dodecahedron. An additional 24 *extroverted* A Modules, with their volumetric centers occurring outside the four triangular faces of the central tetrahedron, form the outermost shell of the isosceles dodecahedron. The isosceles dodecahedron is all blue both inside and outside.

942.30 *Octahedron:* The octahedron or "Octa" is composed of 96 energy quanta modules of which 48 are red B Quanta Modules and 48 blue A Quanta Modules. It has two module layers, with the inner, or nuclear, aggregate being the 48 red Bs and the outer layer comprised of the 48 blue As. The octahedron is all blue outside with a red nucleus.

942.31 The octahedron has distributive energies occurring at its nucleus, but they are locked up by the outer layer of A Modules. Thus the tendency of the 48 red B Module energy distributors is effectively contained and conserved by the 48 blue A Module conservators.

942.40 **Cube:** The cube is composed of a total of 72 energy quanta modules, of which there are 48 blue A Modules and 24 red B Modules. The cube is produced by superimposing four Eighth-Octahedra upon the four equiangle triangular faces of the regular tetrahedron.

942.41 The cube is three module layers deep, and the layering occurs around each of its eight corners. All of the cube's nuclear and outer-shell-modules three-layer edges are seen to surface congruently along the six diagonal seams of the cube's six faces. The inner nucleus of the cube consists of the blue introverted tetrahedron with its 24 A Modules. This introverted tetrahedron is next enshelled by the 24 blue A Modules extroverted on the introvert nuclear tetrahedron's four faces to form the isosceles dodecahedron. The third and outer layer of the cube consists of the 24 red B Modules mounted outward of the isosceles dodecahedron's 24 extroverted A Modules.

942.42 Thus, as it is seen from outside, the cube is an all-red tetrahedron, but its energy-distributive surface layer of 24 red B Modules is tensively overpowered two-to- one and cohered as a cube by its 48 nuclear modules. The distributors are on the outside. This may elucidate the usual occurrence of cubes in crystals with one or more of their corners truncated.

942.43 The minimum cube that can be formed by closest packing of spheres (which are inherently stable, structurally speaking) is produced by nesting four balls in the triangular mid-face nests of the four faces of a three-layer, ten-ball tetrahedron, with no ball at its volumetric center. This produces an eight-ball-cornered symmetry, which consists of 14 balls in all, with no ball at its center. This complex cube has a total of 576 A and B Modules, in contradistinction to the simplest tetra-octa-produced cube constituted of 72 A and B Modules.

942.50 **Rhombic Dodecahedron:** The rhombic dodecahedron is composed of 144 energy quanta modules. Like the cube, the rhombic dodecahedron is a three-module layered nuclear assembly, with the two-layered octahedron and its exclusively red B Moduled nucleus (of 48 Bs) enveloped with 48 exclusively blue A Modules, which in turn are now enclosed in a third shell of 48 blue A Modules. Thus we find the rhombic dodecahedron and the cube co-occurring as the first three-layered, nuclearly centered symmetries-with the cube having its one layer of 24 red B Modules on the outside of its two blue layers of 24 A Modules each; conversely, the rhombic dodecahedron has its two blue layers of 48 A Modules each on the outside enclosing its one nuclear layer of 48 red B Modules.

942.51 The most simply logical arrangement of the blue A and red B Modules is one wherein their 1/144th-sphere-containing, most acute corners are all pointed inward and join to form one whole sphere completely contained within the rhombic dodecahedron, with the contained-sphere's surface symmetrically tangent to the 12 mid-diamond facets of the rhombic dodecahedron, those 12 tangent points exactly coinciding with the points of tangency of the 12 spheres closest-packed around the one sphere. (For a discussion of the rhombic dodecahedron at the heart of the vector equilibrium, see Sec. 955.50.)

942.60 **Vector Equilibrium:** The vector equilibrium is composed of 336 blue A Modules and 144 red B Modules for a total of 480 energy quanta modules: $480 = 2^5 \times 5 \times 3$. The eight tetrahedra of the vector equilibrium consist entirely of blue A Modules, with a total of 48 such blue A Modules Lying in the exterior shell. The six square faces of the vector equilibrium are the six half-octahedra, each composed of 24 blue As and 24 red Bs, from which inventory the six squares expose 48 red B Modules on the exterior shell. An even number of 48 As and 48 Bs provide an equilibrious exterior shell for the vector equilibrium: what an elegance! The distributors and the conservators balance. The six square areas' energies of the vector equilibrium equal the triangles' areas' energies. The distributors evacuate the half-octahedra faces and the basic triangular structure survives.

942.61 The vector equilibrium's inherently symmetrical, closest-packed-sphere aggregate has one complete sphere occurring at its volumetric center for the first time in the hierarchy of completely symmetrical, closest-packed sets. In our multilayered, omniunique patterning of symmetrical nuclear assemblies, the vector equilibrium's inner layer has four energy quanta modules in both its eight tetrahedral domains and its six half- octahedra domains, each of which domains constitutes exactly one volumetric twentieth of the vector equilibrium's total volume.

942.62 The blue A Modules and the red B Modules of the vector equilibrium are distributed in four layers as follows:

	Tetrahedral As	Octahedral As	Octahedral Bs	Layer Total
1st innermost layer	48	48	48	144
2nd middle layer	48	48	48	144
3rd middle layer	48	48	0	96
4th outermost layer	48	0	48	96
	------	------	------	------
	192	144	144	480
	144			
	------		------	------
Total:	336 A Modules		144 B Modules	480 Quanta Modules

942.63 In both of the innermost layers of the vector equilibrium, the energy-conserving introvert A Modules outnumber the B Modules by a ratio of two-to-one. In the third layer, the ratio is two-to-zero. In the fourth layer, the ratio of As to Bs is in exact balance.

942.64 Atoms borrow electrons when they combine. The open and unstable square faces of the vector equilibrium provide a model for the lending and borrowing operations. When the frequency is three, we can lend four balls from each square. Four is the greatest number of electrons that can be lent: here is a limit condition with the three-frequency and the four-ball edge. All the borrowing and lending operates in the squares. The triangles do not get jeopardized by virtue of lending. A lending and borrowing vector equilibrium is maintained without losing the structural integrity of Universe.

942.70 **Tetrakaidecahedron:** The tetrakaidecahedron—Lord Kelvin's "Solid"—is the most nearly spherical of the regular conventional polyhedra; ergo, it provides the most volume for the least surface and the most unobstructed surface for the rollability of least effort into the shallowest nests of closest-packed, most securely self-cohering, allspace- filling, symmetrical, nuclear system agglomerations with the minimum complexity of inherently concentric shell layers around a nuclear center. The more evenly faceted and the more uniform the radii of the respective polygonal members of the hierarchy of symmetrical polyhedra, the more closely they approach rollable sphericity. The four-facet tetrahedron, the six-faceted cube, and the eight-faceted octahedron are not very rollable, but the 12-faceted, one-sphere-containing rhombic dodecahedron, the 14-faceted vector equilibrium, and the 14-faceted tetrakaidecahedron are easily rollable.

942.71 The tetrakaidecahedron develops from a progression of closest-sphere-packing symmetric morphations at the exact maximum limit of one nuclear sphere center's unique influence, just before another nuclear center develops an equal magnitude inventory of originally unique local behaviors to that of the earliest nuclear agglomeration.

942.72 The first possible closest-packed formulation of a tetrakaidecahedron occurs with a three-frequency vector equilibrium as its core, with an additional six truncated, square-bottomed, and three-frequency-based and two-frequency-plateaued units superimposed on the six square faces of the three-frequency, vector-equilibrium nuclear core. The three-frequency vector equilibrium consists of a shell of 92 unit radius spheres closest packed symmetrically around 42 spheres of the same unit radius, which in turn closest-pack enclose 12 spheres of the same unit radius, which are closest packed around one nuclear sphere of the same unit radius, with each closest-packed-sphere shell enclosure producing a 14-faceted, symmetrical polyhedron of eight triangular and six square equiedged facets. The tetrakaidecahedron's six additional square nodes are produced by adding nine spheres to each of the six square faces of the three-frequency vector equilibrium's outermost 92-sphere layer. Each of these additional new spheres is placed on each of the six square facets of the vector equilibrium by nesting nine balls in closest packing in the nine possible ball matrix nests of the three-frequency vector equilibrium's square facets; which adds 54 balls to the

1
12
42
92

146

surrounding the nuclear ball to produce a grand total of 200 balls symmetrically surrounding one ball in an all-closest-packed, omnidirectional matrix.

942.73 The tetrakaidecahedron consists of 18,432 energy quanta modules, of which 12,672 are As and 5,760 are Bs; there are 1,008 As and only 192 Bs in the outermost layer, which ratio of conservancy dominance of As over distributive Bs is approximately two-to-one interiorly and better than five-to-one in the outermost layer.

Next Section: 943.00
