415.20 **Organics:** It could be that organic chemistries do not require nuclei.

415.21 The first closest-packed, omnitriangulated, ergo structurally stabilized, but non-nuclear, equiradius-sphered, cubical agglomeration has 14 spheres. This may be Carbon 14, which is the initially closest-packed, omnisymmetrical, polyhedral fourteenness, providing further closest-packability surface nests suitable for structurally mounting hydrogen atoms to produce all organic matter.

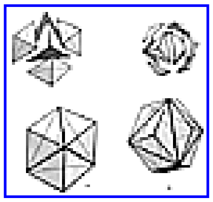
Fig. 415.22

415.22 The cube is the prime minimum omnisymmetrical allspace filler. But the cube is nonstructural until its six square faces are triangularly diagonaled. When thus triangularly diagonaled, it consists of one tetrahedron with four one-eighth octahedra, of three isosceles and one equilateral-faced tetrahedron, outwardly applied to the nuclear equilateral tetrahedron's four triangular faces. Thus structurally constituted, the superficially faced cube is prone to closest-packing self-associability. In order to serve as the carbon ring (with its six-sidedness), the cube of 14 spheres (with its six faces) could be joined with six other cubes by single atoms nestable in its six square face centers, which singleness of sphericity linkage potential is providable by Hydrogen 1.

415.23 In the atoms, we are always dealing in equiradius spheres. Chemical compounds may, and often do, consist of atomic spheres with a variety of radial dimensions. Since each chemical element's atoms are characterized by unique frequencies, and unique frequencies impose unique radial symmetries, this variety of radial dimensionality constitutes one prime difference between nuclear physics and chemistry.

415.30 **Eight New Nuclei at Fifth Frequency of Vector Equilibrium:** Frequency five embraces nine nuclei: the original central nucleus plus eight new nuclei occurring at the centers of volume of the eight tetrahedra symmetrically surrounding the nucleus, with each of the nine enclosed with a minimum of two layers of spheres.

415.31 The vector equilibrium at $f^0 = 12$; at $f^2 = 42$; $f^3 = 92$; $f^4 = 162$ spheres in the outer shell; and at $f^5 = 252$ we get eight new nuclei. Therefore, their eightness of "begetness" relates to the eight triangles of the vector equilibrium.

415.32 Six nucleated octahedra with two layer omni-enclosure of their nuclei does not occur until $f^6 = 362$ in the outer shell of the vector equilibrium. At this stage we have six new nuclei, with 14 nuclei surrounding the 15th, or original, nucleus.

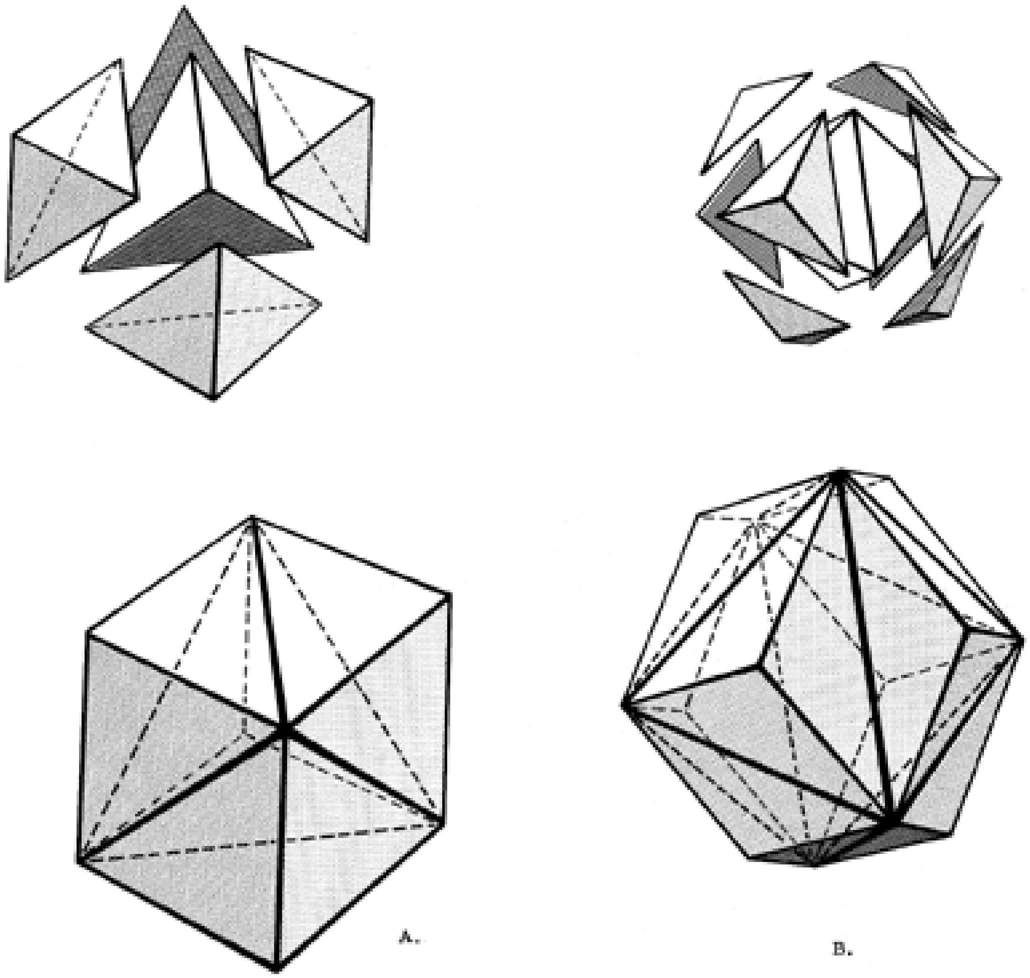

Fig. 415.22 Rational Volumes of Tetrahedroning:

A. The cube may be formed by placing four 1/8-octahedra with their equilateral faces on the faces of a tetrahedron. Since tetrahedron volume equals one, and 1/8-octahedron equals 1/2, the volume of the cube will be: 1 + 4(1/2) =3.
B. The rhombic dodecahedron may be formed by placing eight 1/4-tetrahedra with their equilateral faces on the faces of an octahedron. Since the octahedron volume equals four and 1/4-tetrahedron equals 1/4, the volume of the rhombic dodecahedron will be: 4 + 8 (1/4) = 6.

415.40 **Begetted Eightness:** The "begetted" *eightness* as the system-limit number of nuclear uniqueness of self-regenerative symmetrical growth may well account for the fundamental octave of unique interpermutative integer effects identified as plus one, plus two, plus three, plus four, as the interpermutated effects of the integers one, two, three, and four, respectively; and as minus four, minus three, minus two, minus one, characterizing the integers five, six, seven, and eight, respectively. The integer nine always has a neutral, or zero, intermutative effect on the other integers. This permutative, synergetic or interamplifying or dimensioning effect of integers upon integers, together with the octave interinsulative accommodation produced by the zero effect of the nineness, is discussed experientially in our section on *Indigs* in Chapter 12, Numerology.

415.41 The regenerative initial *eightness of* first-occurring potential nuclei at the frequency-four layer and its frequency-five confirmation of those eight as constituting true nuclei, suggest identity with the third and fourth periods of the Periodic Table of Chemical Elements, which occur as

1st period	= 2 elements
2nd period	= 8 elements
3rd period	= 8 elements

415.42 Starting with the center of the nucleus: plus one, plus two, plus three, plus four, outwardly into the last layer of nuclear uniqueness, whereafter the next pulsation becomes the minus fourness of the outer layer (fifth action); the sixth event is the minus threeness of canceling out the third layer; the seventh event is the minus twoness canceling out the second layer; thc eighth event is the minus oneness returning to the center of the nucleus— all of which may be identified with the frequency pulsations of nuclear systems.

415.43 The *None* or *Nineness/Noneness* permits wave frequency propagation cessation. The *Nineness/Zeroness* becomes a shutoff valve. The *Zero/Nineness* provides the number logic to account for the differential between potential and kinetic energy. The *Nineness/Zeroness* becomes the number identity of vector equilibrium, that is, energy differentiation at zero. (See Secs. 1230 et seq. and the Scheherazade Number.)

415.44 The eightness being nucleic may also relate to the relative abundance of isotopal magic numbers, which read 2, 8, 20, 50, 82, 126....

415.45 The inherent zero-disconnectedness accounts for the finite energy packaging and discontinuity of Universe. The vector equilibria are the empty set tetrahedra of Universe, i.e., the tetrahedron, being the minimum structural system of Universe independent of size, its four facet planes are at maximum remoteness from their opposite vertexes and may have volume content of the third power of the linear frequency. Whereas in the vector equilibrium all four planes of the tetrahedra pass through the same opposite vertex—which is the nuclear vertex—and have no volume, frequency being zero: F^0.

415.50 **Vector-Equilibrium Closest-Packing Configurations:** The vector equilibrium has four unique sets of axes of symmetry:

1. The three intersymmetrical axes perpendicular to, i.e., normal to, i.e., joining, the hemispherically opposite six square faces;
2. The four axes normal to its eight triangular faces;
3. The six axes normal to its 12 vertexes; and
4. the 12 axes normal to its 24 edges.

The tetrahedron, vector equilibrium, and octahedron, with all their planes parallel to those of the tetrahedron, and therefore derived from the tetrahedron, as the first and simplest closest-packed, ergo omnitriangulated, symmetrical structural system, accept further omnidirectional closest packing of spheres. Because only *eight* of its 20 planar facets are ever parallel to the four planes of the icosahedron, the icosahedron refuses angularly to accommodate anywhere about its surface further omnidirectional closest packing of spheres, as does the tetrahedron.

415.51 Consequently, the (no-nucleus-accommodating) icosahedron formed of equiradius, triangularly closest-packed spheres occurs only as a one-sphere-thick shell of any frequency only. While the icosahedron cannot accommodate omnidirectionally closest- packed multishell growth, it can be extended from any one of its triangular faces by closest-packed sphere agglomerations. Two icosahedra can be face-bonded.

415.52 The icosahedron has three unique sets of axes of symmetry:

1. The 15 intersymmetric axes perpendicular to and joining the hemispherically opposite mid-edges of the icosahedron's 30 identical, symmetrically interpatterned edges;
2. The 10 intersymmetric axes perpendicular to the triangular face centers of the hemispherically opposite 20 triangular faces of the icosahedron; and
3. The six intersymmetric axes perpendicularly interconnecting the hemispheric opposites of the icosahedron's 12 vertexes, or vertexial corner spheres of triangular closest packing.

415.53 While the 15-axes set and the 6-axes set of the icosahedron are always angularly askew from the vector equilibrium's *four* out of its 10 axes of symmetry are parallel to the set of four axes of symmetry of the vector equilibrium. Therefore, the icosahedron may be face-extended to produce chain patterns conforming to the tetrahedron, octahedron, vector equilibrium, and rhombic dodecahedron in omnidirectional, closest-packing coordination— but only as chains; for instance, as open linear models of the octahedron's edges, etc.

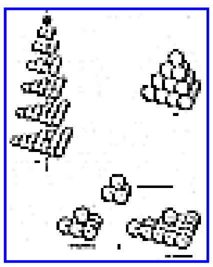
Fig. 415.55

415.55 **Nucleus and Nestable Configurations in Tetrahedra:** In any number of successive planar layers of tetrahedrally organized sphere packings, every third triangular layer has a sphere at its centroid (nucleus). The dark ball rests in the valley between three balls, where it naturally falls most compactly and comfortably. The next layer is three balls to the edge, which means two-frequency. There are six balls in the third layer, and there very clearly is a nest right in the middle. There are ten balls in the fourth layer: but we cannot nest a ball in the middle because it is already occupied by a dark centroid ball. Suddenly the pattern changes, and it is no longer nestable.

415.56 At first, we have a dark ball at the top; then a second layer of three balls with a nest but no nucleus. The third layer with six balls has a nest but no nucleus. The fourth layer with ten balls has a dark centroid ball at the nucleus but no nestable position in the middle. The fifth layer (five balls to the edge; four frequency) has 15 balls with a nest again, but no nucleus. This 35 sphere tetrahedron with five spheres on each edge is the lowest frequency tetrahedron system that has a central sphere or nucleus. (See Fig. A, illustration 415.55.)

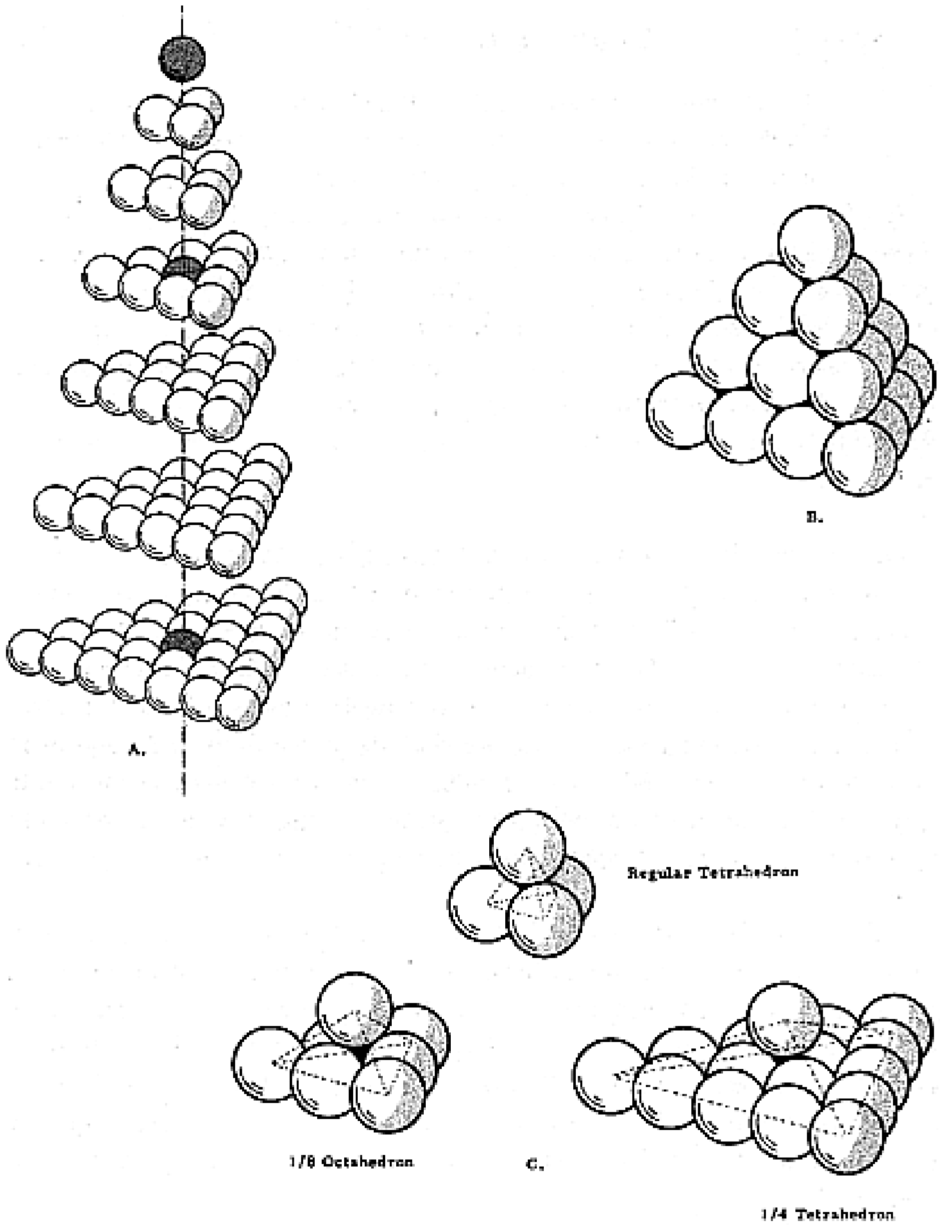

Fig. 415.55 Tetrahedral Closest Packing of Spheres: Nucleus and Nestable Configurations:

A. In any number of successive planar layers of tetrahedrally organized sphere packings, every third triangular layer has a sphere at its centroid (a nucleus). The 36-sphere tetrahedron with five spheres on an edge (four-frequency tetrahedron) is the lowest frequency tetrahedron system which has a central sphere or nucleus.
B. The three-frequency tetrahedron is the highest frequency without a nucleus sphere.
C. Basic "nestable" possibilities show how the regular tetrahedron, the 1/4-tetrahedron and the 1/8- octahedron may be defined with sets of closest packed spheres. Note that this "nesting" is only possible on triangular arrays which have no sphere at their respective centroids.

415.57 The three-frequency tetrahedron is the highest frequency singlelayer, closest- packed sphere shell without a nuclear sphere. This three-frequency, 20-sphere, empty, or nonsphere nucleated, tetrahedron may be enclosed by an additional shell of 100 balls; and a next layer of 244 balls totaling 364, and so on. (See Fig. B, illustration 415.55.)

415.58 **Basic Nestable Configurations:** There are three basic nestable possibilities shown in Fig. C. They are (1) the regular tetrahedron of four spheres; (2) the one-eighth octahedron of seven spheres; and (3) the quarter tetrahedron, with a 16th sphere nesting on a planar layer of 15 spheres. Note that this "nesting" is only possible on triangular arrays that have no sphere at their respective centroids. This series is a prime hierarchy. One sphere on three is the first possibility with a central nest available. One sphere on six is the next possibility with an empty central nest available. One sphere on 10 is impossible as a ball is already occupying the geometrical center. The next possibility is one on 15 with a central empty nest available.

415.59 Note that the 20-ball empty set (see Fig. B, illustration 415.55) consists of five sets of four-ball simplest tetrahedra and can be assembled from five separate tetrahedra. The illustration shows four four-ball tetrahedra at the vertexes colored "white." The fifth four-ball tetrahedron is dark colored and occupies the central octahedral space in an inverted position. In this arrangement, the four dark balls of the inverted central tetrahedron appear as center balls in each of the four 10-ball tetrahedral faces.

Next Section: 416.00
