415.00 **Concentric Shell Growth Rates**

415.01 **Minimal Most Primitive Concentric Shell Growth Rates of Equiradius, Closest-Packed, Symmetrical Nucleated Structures:** Out of all possible symmetrical polyhedra produceable by closest-packed spheres agglomerating, only the vector equilibrium accommodates a one-to-one arithmetical progression growth of *frequency number* and *shell number* developed by closest-packed, equiradius spheres around one nuclear sphere. Only the vector equilibrium—"equanimity"—accommodates the symmetrical growth or contraction of a nucleus-containing aggregate of closest-packed, equiradius spheres characterized by either even or odd numbers of concentric shells.

415.02 **Odd or Even Shell Growth:** The hierarchy of progressive shell embracements of symmetrically closest-packed spheres of the vector equilibrium is generated by a smooth arithmetic progression of both even and odd frequencies. That is, each successively embracing layer of closest-packed spheres is in exact frequency and shell number atunement. Furthermore, additional embracing layers are accomplished with the least number of spheres per exact arithmetic progression of higher frequencies.

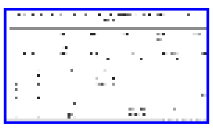
Chart 415.03

415.03 *Even-Number Shell Growth:* The tetrahedron, octahedron, cube, and rhombic dodecahedron are nuclear agglomerations generated only by even-numbered frequencies:

Nuclear tetrahedron:	F = 4 (34 around one)
	F = 8 (130 around one)
Nuclear octahedron:	F = 2 (18 around one)
	F = 4 (66 around one)
Nuclear cube:	F=4 (210 around one)
	F=6 (514 around one)
Nuclear rhombic dodecahedron:	F = 4 (74 around one)
	F = 8 (386 around one)

Chart 415.03 Rate of Occurrence of Symmetrically Nucleated Polyhedra of Closest Packing

Shell	Vector Equilib. Outer Shell:	$10F^2+2$ Vector Equilib. Cumulative: All Shells	$4F^2+2$ Octahedron $4(F+2)^2+2$	$2F^2+2$ Tetrahedron $2(F+4)^2+2$	$12F^2+2$ Rhombic Dodecahedron Octa=1/4 Tet × 8	$6F^2+2$ Cube Vector Equilib. + 1/8 Octa × 8	Icosahedron & Dodecahedron are Inherently Non-Nuclear at All Frequencies
0	zero=2	zero=2	zero=2	zero=2	zero=2	zero=2	
1	12	12					
2	42	54	18				
3	92	146					
			Outer shell 66	34	74	210	
4	162	308	Cumulative 84		92	364	
5	252	560					
						Outer shell 514	
6	362	922				Cumulative 1098	
7	492	1414					
				Outer shell 130	386		
8	642	2056		Cumulative 164	470		
9	812	2868					
10	1002	3870					

415.10 **Yin-Yang As Two (Note to Chart 415.03):** Even at zero frequency of the vector equilibrium, there is a fundamental twoness that is not just that of opposite polarity, but the twoness of the concave and the convex, i.e., of the inwardness and outwardness, i.e., of the microcosm and of the macrocosm. We find that the nucleus is really two layers because its inwardness tums around at its own center and becomes outwardness. So we have the congruence of the inbound layer and the outbound layer of the center ball.

$10F^2 + 2$

$F = 0$

$10 \times 0 = 0$

$0 + 2 = 2$ (at zero frequency)

Because people thought of the nucleus only as oneness, they for long missed the significant twoness of spherical unity as manifest in the atomic weights in the Periodic Table of the Elements.

415.11 When they finally learned that the inventory of data required the isolation of the neutron, they were isolating the concave. When they isolated the proton, they isolated the convex.

415.12 As is shown in the comparative table of closest-packed, equiradius nucleated polyhedra, the vector equilibrium not only provides an orderly shell for each frequency, which is not provided by any other polyhedra, but also gives the nuclear sphere the first, or earliest possible, polyhedral symmetrical enclosure, and it does so with the least number—12 spheres; whereas the octahedron closest packed requires 18 spheres; the tetrahedron, 34; the rhombic dodecahedron, 92; the cube, 364; and the other two symmetric Platonic solids, the icosahedron and the dodecahedron, are inherently, ergo forever, devoid of equiradius nuclear spheres, having insufficient radius space within the triangulated inner void to accommodate an additional equiradius sphere. This inherent disassociation from nucleated systems suggests both electron and neutron behavior identification relationships for the icosahedron's and the dodecahedron's requisite noncontiguous symmetrical positioning outwardly from the symmetrically nucleated aggregates. The nucleation of the octahedron, tetrahedron, rhombic dodecahedron, and cube very probably plays an important part in the atomic structuring as well as in the chemical compounding and in crystallography. They interplay to produce the isotopal Magic Number high point abundance occurrences. (See Sec. 995.)

415.13 The formula for the nucleated rhombic dodecahedron is the formula for the octahedron with frequency plus four (because it expands outwardly in four-wavelength leaps) plus eight times the closest-packed central angles of a tetrahedron. The progression of layers at frequency plus four is made only when we have one ball in the middle of a five-ball edge triangle, which always occurs again four frequencies later.

415.14 The number of balls in a single-layer, closest-packed, equiradius triangular assemblage is always

$$\frac{N^2 - N}{2} + 2$$

415.15 To arrive at the cumulative number of spheres in the rhombic dodecahedron, you have to solve the formula for the octahedron at progressive frequencies *plus four*, plus the solutions for the balls in the eight triangles .

415.16 The first cube with 14 balls has no nucleus. The first cube with a nucleus occurs by the addition of 87-ball corners to the eight triangular facets of a four-frequency vector equilibrium.

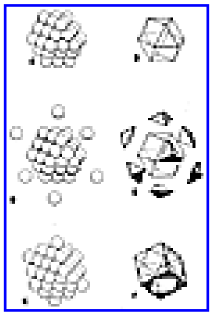
Fig. 415.17

415.17 **Nucleated Cube: The "External" Octahedron:** The minimum allspace-filling nuclear cube is formed by adding eight Eighth-Octahedra to the eight triangular facets of the nucleated vector equilibrium of tetravolume-20, with a total tetravolume involvement of 4 + 20 = 24 quanta modules. This produces a cubical nuclear involvement domain (see Sec. 1006.30) of tetravolume-24: 24 × 24 = 576 quanta modules. (See Sec. 463.05 and Figs. 415.17A-F.)

415.171 The nuclear cube and its six neighboring counterparts are the volumetrically maximum members of the primitive hierarchy of concentric, symmetric, pre-time-size, subfrequency-generalized, polyhedral nuclear domains of synergetic-energetic geometry.

415.172 The construction of the first nuclear cube in effect restores the vector-equilibrium truncations. The minimum to be composited from closestpacked unit radius squares has 55 balls in the vector equilibrium. The first nucleated cube has 63 balls in the total aggregation.

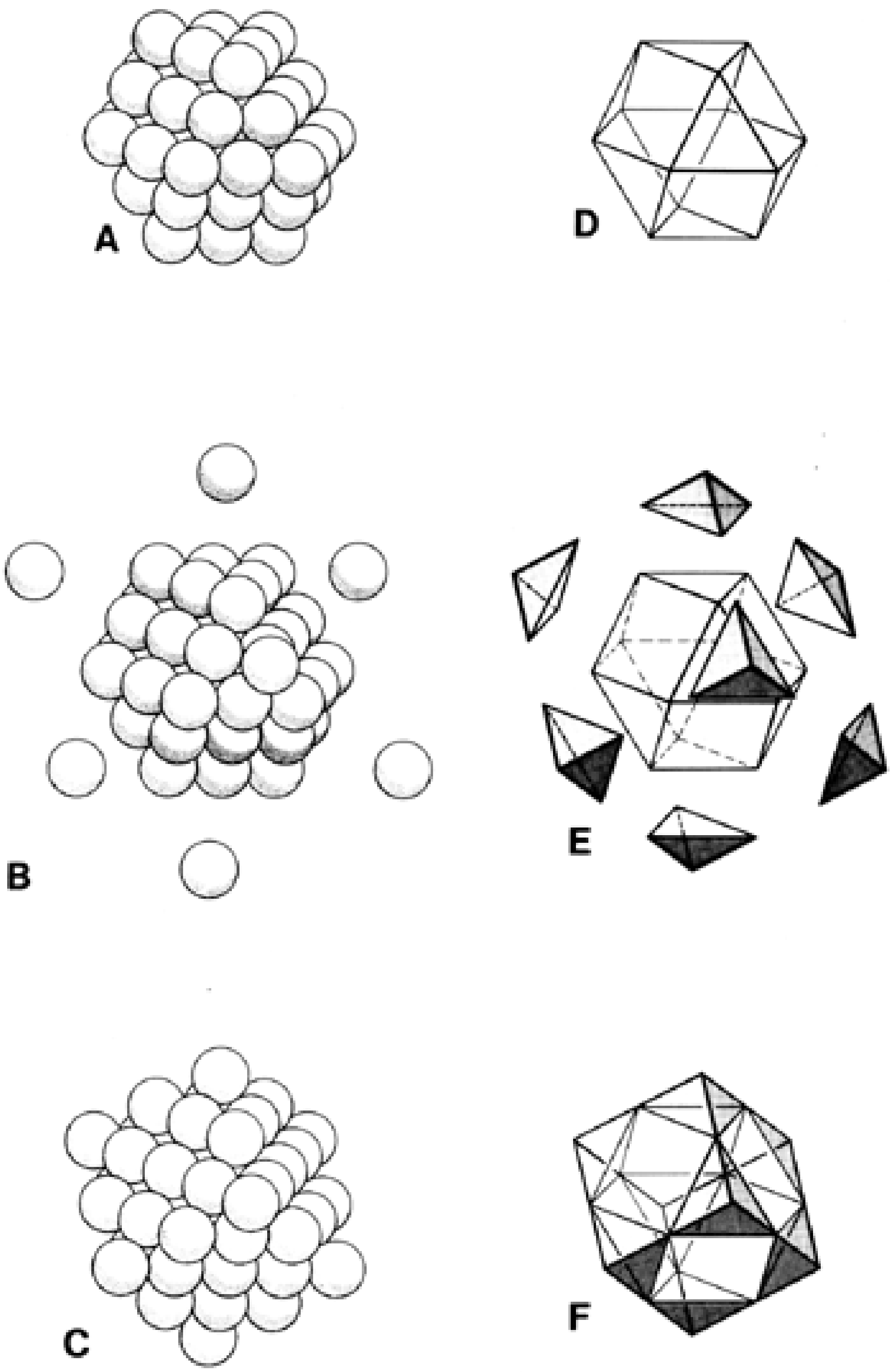

Fig. 415.17 Nucleated Cube: The "External" Octahedron: ABC shows that eight additional closest- packed spheres are required to form the minimum allspace-filling nuclear cube to augment the nuclear vector equilibrium. DEF show the eight Eighth-Octa required to complete the polyhedral transformation. (Compare Fig. 1006.32.)

Next Section: 415.20
