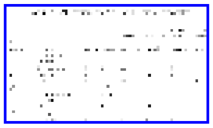


Table 943.00

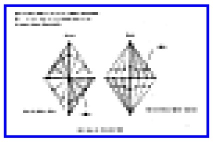


Fig. 943.00A

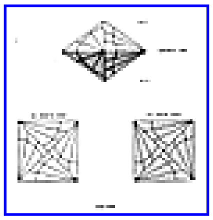


Fig. 943.00B

943.00 **Table: Synergetics Quanta Module Hierarchy**

943.01 The orderly elegance of progressive numbers of concentric shells, starting with one as a discrete arithmetical progression, as well as the pattern of energy quanta modules growth rate, and their respective layer-transformation pairings of positive and negative arrangements of A and B Quanta Modules, of which there are always an even number of (+) or (-) As or Bs, is revealed in the synergetic quanta module hierarchy of topological characteristics.

950.00 Allspace Filling

950.01 The regular tetrahedron will not associate with other regular tetrahedra to fill allspace. (See Sec. 780.10 for a conceptual definition of allspace.) If we try to fill allspace with tetrahedra, we are frustrated because the tetrahedron will not fill all the voids above the triangular-based grid pattern. (See Illus. 950.31.) If we take an equilateral triangle and bisect its edges and interconnect the mid-points, we will have a "chessboard" of four equiangular triangles. If we then put three tetrahedra chessmen on the three corner triangles of the original triangle, and put a fourth tetrahedron chessman in the center triangle, we find that there is not enough room for other regular tetrahedra to be inserted in the too-steep valleys Lying between the peaks of the tetrahedra.

Table 943.00 Synergetics Quanta Module Hierarchy

Whole Balls at Center:	System:	Volume	Layers	Interior *A*s Implosive Conserver	Interior *B*s Explosive Exportive	Exterior Shells: *A*s Implosive Conserver	Exterior Shells: *B*s Explosive Exportive	Total Quanta Modules	Total Tetrahedral Quanta Modules (24)
0	Tetrahedron	1	1			24		24	1
0	Isosceles Dodecahedron	2	2	24		24		48	2
0	Octahedron	4	2		48	48		96	4
0	Cube	3	3	48			24	72	3
1*	Rhombic Dodecahedron #1	6	1 (triple deep)					144	6
0	Rhombic Dodecahedron #2	6	3		48	96		144	6
1**	Vector Equilibrium	20	4	288	96	48	48	480	20
	Tetrakaidecahedron			11,664	5,568	1,008	192	18,432	768

* Sun only; no satellites
** Sun + 12 partial sphere satellites

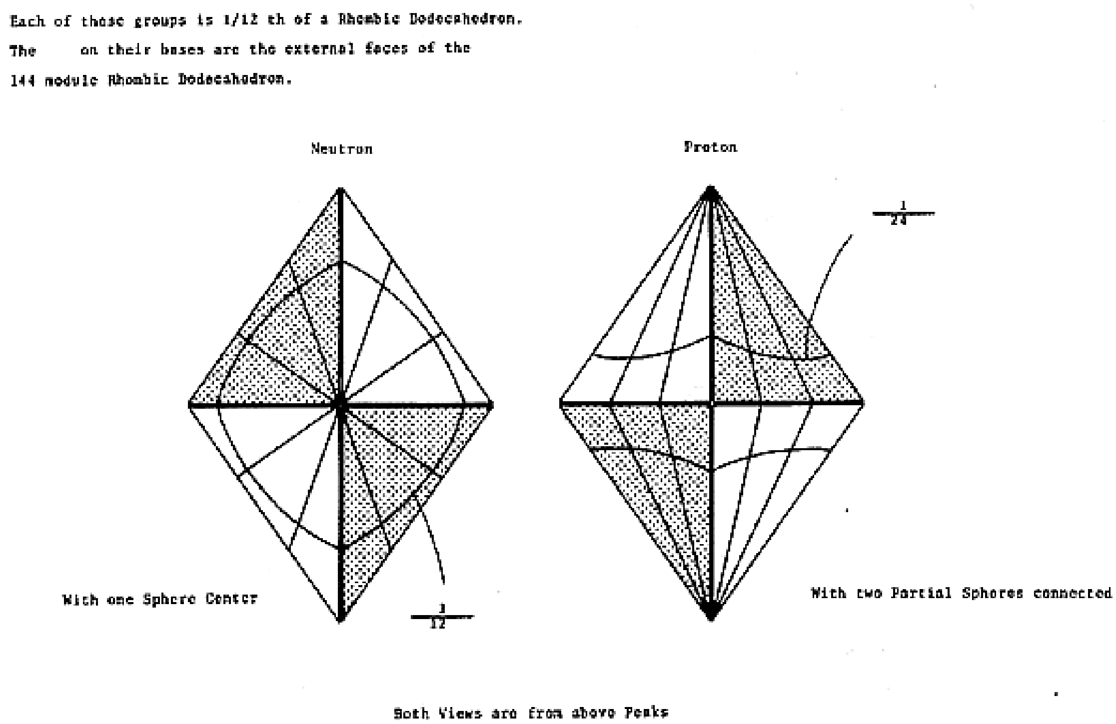
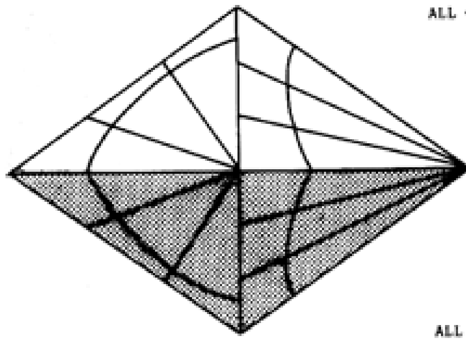


Fig. 943.00A Quanta Module Orientations as Neutron and Proton 1/24-sphere Centers: A and B Quanta Modules.

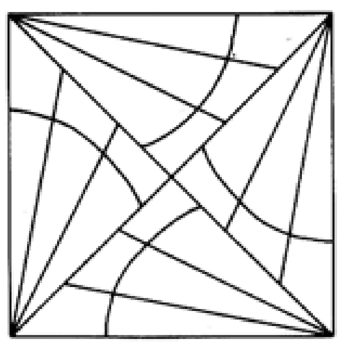
ALL −



EQUATORIAL VIEW

ALL +

ALL NEGATIVE MITES



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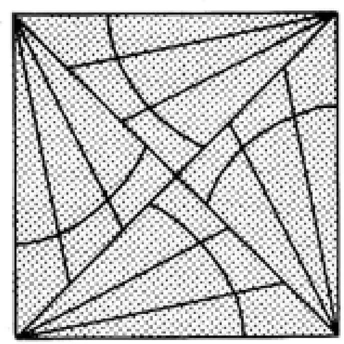

POLAR VIEWS

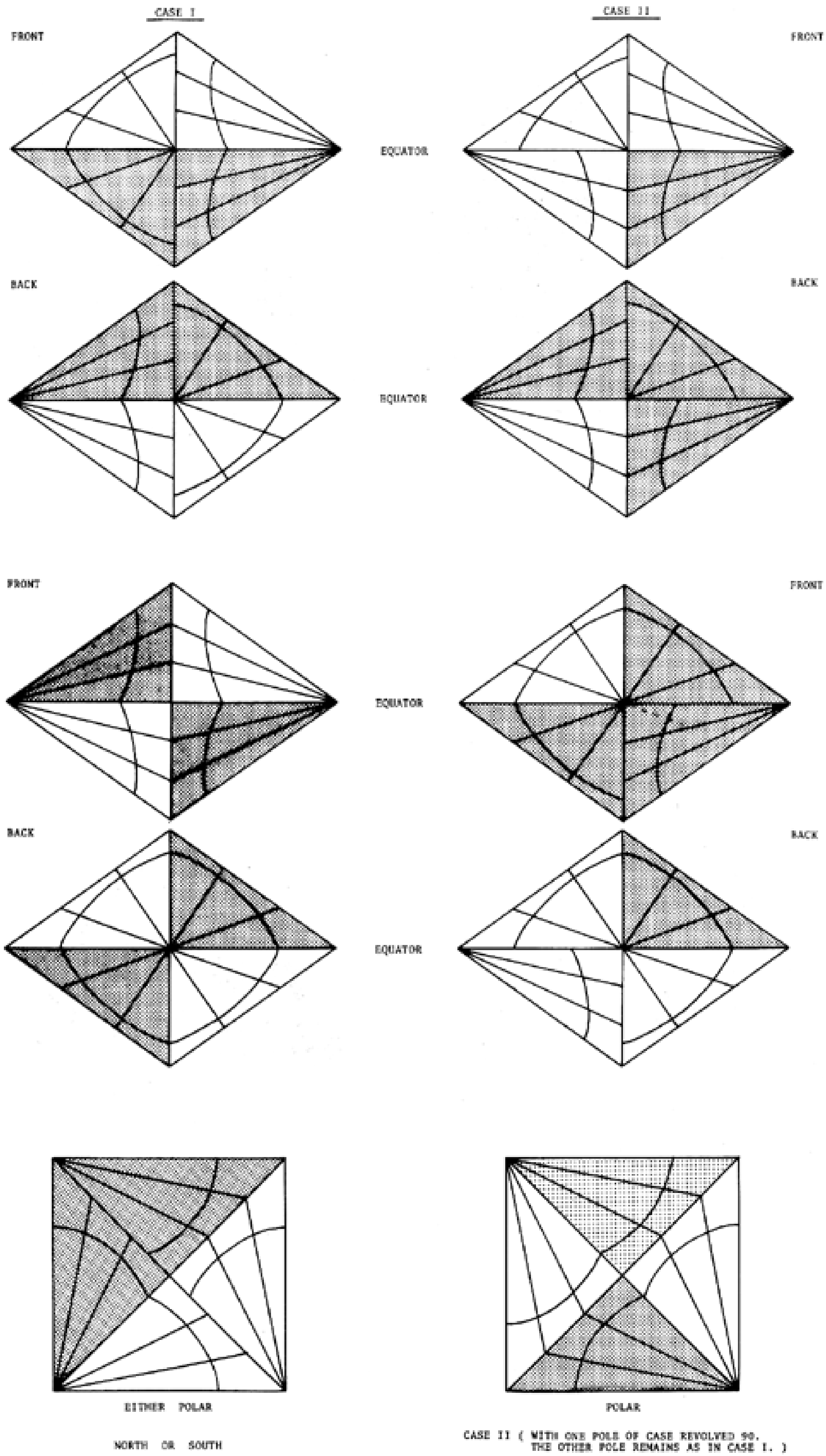

Fig. 943.00B Hierarchy of Quanta Module Orientations: A and B Quanta Modules.

950.02 If we remove the one tetrahedral chessman from the center triangle of the four-triangle chessboard and leave the three tetra-chessmen standing on the three corner triangles, we will find that one octahedral chessman (of edges equal to the tetra) exactly fits into the valley Lying between the first three tetrahedra; but this is not allspace-filling exclusively with tetrahedra.

950.10 **Self-Packing Allspace-Filling Geometries**

950.11 There are a variety of self-packing allspace-filling geometries. Any one of them can be amplified upon in unlimited degree by highfrequency permitted aberrations. For instance, the cube can reoccur in high frequency multiples with fundamental rectilinear aspects_with a cubical node on the positive face and a corresponding cubical void dimple on the negative face_which will fill allspace simply because it is a complex of cubes.

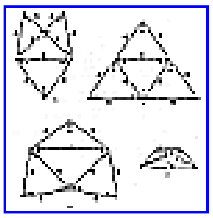
Fig. 950.12

950.12 There are eight familiar self-packing allspace-fillers:

1. The *cube.* (6 faces) Discoverer unknown.
2. The *rhombic dodecahedron.* (12 faces) Discoverer unknown. This allspace filler is the one that occurs most frequently in nature. Rhombic dodecahedron crystals are frequently found in the floor of mineral-rich deserts.
3. Lord Kelvin's *tetrakaidecahedron.* (14 faces)
4. Keith Critchlow's *snub-cornered tetrahedron.* (16 faces)
5. The *truncated octahedron.* (14 faces)
6. The *trirectangular tetrahedron.* (4 faces) Described by Coxeter, "Regular Polytopes," p. 71. (See Illus. 950.12B.)
7. The *tetragonal disphenoid.* (4 faces) Described by Coxeter, "Regular Polytopes," p. 71. (See Illus. 950.12C.)
8. The *irregular tetrahedron (Mite).* (4 faces) Discovered and described by Fuller. (See Illus. 950.12A.)

950.20 **Cubical Coordination**

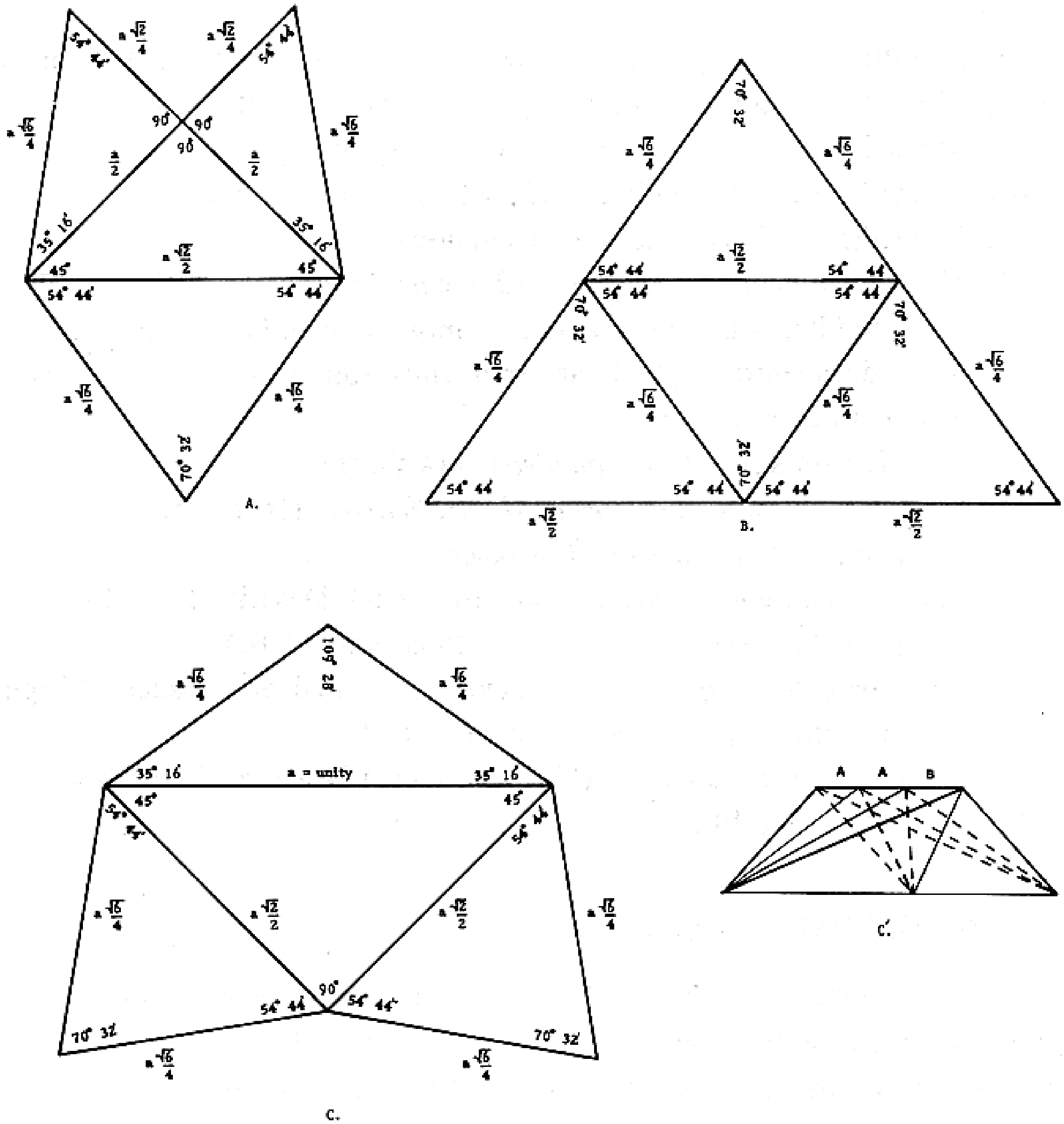

Fig 950.12 Three Self-Packing, Allspace-Filling Irregular Tetrahedra: There are three self-packing irregular tetrahedra that will fill allspace without need of any complementary shape (not even with the need of right- and left-hand versions of themselves). One, the Mite (A), has been proposed by Fuller and described by Coxeter as a tri-rectangular tetrahedron in his book Regular Polytopes, p.71. By joining together two Mites, two varieties of irregular tetrahedra, both called Sytes, can be formed. The tetragonal disphenoid (B), described by Coxeter, is also called the isosceles tetrahedron because it is bounded by four congruent isosceles triangles. The other Syte is formed by joining two Mites by their right-triangle faces (C). It was discovered by Fuller that the Mite has a population of two A quanta modules and one B quanta module (not noted by Coxeter). It is of interest to note that the B quanta module of the Mite may be either right- of left-handed (see the remarks of Arthur L. Loeb). Either of the other two self-packing irregular tetrahedra (Sytes) have a population of four A quanta modules and two B quanta modules, since each Syte consists of two Mites. Since the Mites are the limit case all space-filling system, Mites may have some relationship to quarks. The A quanta module can be folded out of one planar triangle, suggesting that it may be an energy conserver, while the B quanta module can not, suggesting that it may be an energy dissipator. This gives the Mite a population of two energy conservers (A quanta module) and one energy dissipator (B quanta module).

950.21 Because the cube is the basic, prime-number-three-elucidating volume, and because the cube's prime volume is three, if we assess space volumetrically in terms of the cube as volumetric unity, we will exploit three times as much space as would be required by the tetrahedron employed as volumetric unity. Employing the extreme, minimum, limit case, ergo the prime structural system of Universe, the tetrahedron (see Sec. 610.20), as prime measure of efficiency in allspace filling, the arithmetical-geometrical volume assessment of relative space occupancy of the whole hierarchy of geometrical phenomena evaluated in terms of cubes is threefold inefficient, for we are always dealing with physical experience and structural systems whose edges consist of events whose actions, reactions, and resultants comprise one basic energy vector. The cube, therefore, requires threefold the energy to structure it as compared with the tetrahedron. We thus understand why nature uses the tetrahedron as the prime unit of energy, as its energy quantum, because it is three times as efficient in every energetic aspect as its nearest symmetrical, volumetric competitor, the cube. All the physicists' experiments show that nature always employs the most energy-economical strategies.

950.30 **Tetrahedron and Octahedron as Complementary Allspace Fillers: A and B Quanta Modules**

950.31 We may ask: What can we do to negotiate allspace filling with tetrahedra? In an isotropic vector matrix, it will be discovered that there are only two polyhedra described internally by the configuration of the interacting lines: the regular tetrahedron and the regular octahedron. (See Illus. 950.31.)

950.32 All the other regular symmetric polyhedra known are also describable repetitiously by compounding rational fraction elements of the tetrahedron and octahedron: the A and B Quanta Modules, each having the volume of 1/24th of a tetrahedron.

950.33 It will be discovered also that all the polygons formed by the interacting vectors consist entirely of equilateral triangles and squares, the latter occurring as the cross sections of the octahedra, and the triangles occurring as the external facets of both the tetrahedra and octahedra.

950.34 The tetrahedra and octahedra complement one another as space fillers. This is not very satisfactory if you are looking for a monological explanation: the "building block" of the Universe, the "key," the ego's wished-for monopolizer. But if you are willing to go along with the physicists, recognizing complementarity, then you will see that tetrahedra plus octahedra_and their common constituents, the unit-volume, A and B Quanta Modules_provide a satisfactory way for both physical and metaphysical, generalized cosmic accounting of all human experience. Everything comes out rationally.

Next Section: 951.00
