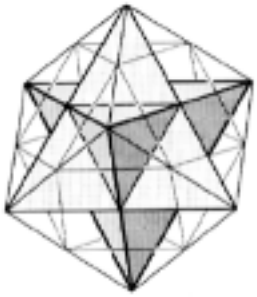

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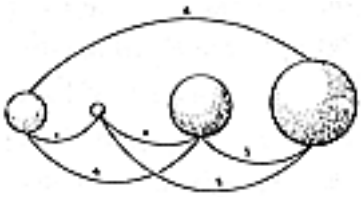
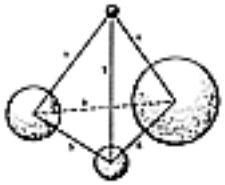




1000.00 **Omnitopology**

1001.00 **Inherent Rationality of Omnidirectional Epistemology**

1001.10 Spherical Reference: Operationally speaking, the word *omnidirectional* involves a speaker who is observing from some viewing point. He says, "People and things are going every which way around me." It seems chaotic to him at first, but on further consideration he finds the opposite to be true, that only inherent order is being manifest. First, we observe that we do not and cannot live and experience in either a one- dimensional linear world nor in a two-dimensional infinitely extended planar world.

1001.11 Omnidirectional means that a center of a movable sphere of observation has been established a priori by Universe for each individual life's inescapably mobile viewpoint; like shadows, these move everywhere silently with people. These physical- existence-environment surrounds of life events spontaneously resolve into two classes:

1. those events that are to pass *tangentially* by the observer; and
2. those event entities other than self that are moving *radially* either toward or away from the observer.

1001.12 The tangentially passing energy events are always and only moving in lines that are at nearest moment perpendicular to the radii of the observer, which means that the multiplicity of his real events does not produce chaos: it produces discretely apprehendable experience increments, all of which can be chartingly identified by angle and frequency data therewith to permit predictable reinterpositioning events and environmental transformations .

1001.13 The observer's unfamiliarity with the phenomena he is observing, the multiplicity of items of interaction and their velocity of transformations, and their omniengulfing occurrences tend to dismay the observer's hope of immediate or reasonable comprehension. Therefore, observers are often induced to discontinue their attempts at technical comprehension of their experience, in a surrender of the drive to comprehend. This fills the potential comprehension void of the observer with a sense of chaos, which sensation he then subconsciously converts into a false rationale by explaining to himself that the environment is inherently chaotic, ergo, inherently incomprehensible. Thus he satisfies himself that he is being super-reasonably "realistic" and that Universe is just annoyingly disorderly—ergo, frequently dismissible—which seemingly warrants his invention of whatever kind of make-believe Universe seems momentarily most satisfying to him.

1001.14 The more humanity probes and verifies experimentally by reducing its theories to demonstrable practice in order to learn whether or not the theories are valid, the more clearly does Universe reveal itself as being generated and regenerated only upon a complex of entirely orderly relationships. The inherent spherical center viewpoint with which each individual is endowed generates its own orderly radii of observation in a closed finite system of event observations that are subject to orderly angular subdividing, recording, and interrelating in spherical trigonometric computational relationship to the observer's inherently orderly sphere of reference.

1001.15 The expression "frame" of reference is not only "square" as imputed by the two-dimensional language of youth, but also by its exclusive three-dimensional axes of reference. Such XYZ coordinates impose inept, exclusively rectilinear definings, which are uncharacteristic of the omniwavilinear orbiting Universe reality. Science has not found any continuous surfaces, solids, straight lines, or infinitely extensible, nonclosed-system planes. The only infinity humanity has discovered experimentally is that of the whole-fraction subdivisibility of wholes into parts, as for instance by the progressive halvings that divide the finitely closed circle into ever smaller, central-angle-expressed, arc increments. The spherical dimensions of tangent and angle frequencied intervals can always be searchlighted "right on" all actual event tracery.

1001.16 Because spherical trigonometry sounded so formidable, it was omitted from primary education. Humans preferred to rationalize their observed experience exclusively in terms of nonexistent straight lines and planes, and thus they evolved illogical linear and square models of Universe such as the four corners of the wide, wide world with its nonexistent fixed *up* and *down* coordinates. Employment of the "square" XYZ coordinate frame of mensural reference in all present scientific exploration is similar to going to Washington from Boston only via Chicago because that pattern conformed to the scientists' only right-angled-expressibility of relationships. Of course, if you know calculus, you could evolve a curve plotted on the XYZ gridding which may shorten your course; but if you don't know calculus, you have to go via Chicago.

1001.20 **Field of Geodesic Event Relationships**

1001.21 Since the myriads of eccentricities of cyclic periodicities of omni-everywhere-and-everywhen complex intermotions of intertransforming Universe inherently defy any "fixed" overall frame of cosmic motion referencing; and *since* the omnicosmic presence of mass-attractive and tensionally operative gravity means that no so-called straight line can be generated by any one body, as all bodies are affected by other bodies in varying degrees; and *since* all bodies are in motion either independently or in company with other bodies and are axially rotating on precessionally skewed axes as they elliptically orbit their dominant bodies (or dominant collection of bodies); *wherefore,* any point on any body progressively describes only an overall pattern in Universe of a cyclic, curlicue, wavilinear, elliptically-orbiting-within-elliptically-orbiting of larger systems.

1001.22 Within the total cosmic complexity the directions taken by each and all of the moving bodies are always the paths of least resistance. Because the paths are those of least resistance, all events of all transforming and traveling entities require the least energy to accomplish their complex action programmed passages—ergo, their accomplished curvilinear courses are always the most economical lines of travel. These most economical routes of travel are known as geodesic lines. Geodesics are not only nature's most economical lines of interrelationship travel, but ipso facto they are also nature's shortest- time-of-travel lines.

1001.23 When using string to secure the cover on a cubical box whose edges are two feet long, people spontaneously surround the box in a direction perpendicular to the cube's edges and, having run the string completely around the cubical box in one direction, they do so again in a plane at right angle to the first wind-around. This takes 16 feet of string and a pair of mid-top and mid-bottoms knots to securely bind-in all six faces of the cube. However, all six faces can be surrounded and the cover held secure almost twice as economically by using only one string eight-and-one-half-feet long and following the geodesic line that winds around the corners of the cube from midedge to adjacent mid- edge to produce an equiedged hexagon whose length of line-of-string-reach-around is the shortest distance around all six faces of a cube, wherefore the string cannot slide off the cube. To make this most economical path dynamically evident, hold a cube between the index fingers of your left and right hands with the left index finger pressed against one top corner of the cube and your right index finger pressed against the corner of the bottom of the cube most diagonally opposite the first corner pressed. Now, holding the box firmly between the two index fingers and stretching your arms in front of you with your fingers at the same level above the floor, ask someone to spin the box around the axis between your two fingers; as they do so, you will see the top and bottom profile of the spinning box and its six free corners rotating in two pairs of three each to produce two hills in the top and bottom profiles of the revolving box with a valley between them running around the box's equator of spinning. Along the bottom-most valley runs the hexagonally wound eight-and-one-half-feet-long string in its geodesic valley of least distance around all six faces.

1001.24 When a man shoots a bird in flight, he aims at a point where he thinks the bird will be by the time the bullet can travel that far; he must also allow for gravitational pull Earthward and cross-wind deflection of the bullet's always-consequently-corkscrew line of travel. The corkscrew line of successful travel between gun and bird is the most energy-economical trajectory. It is a geodesic line. If the man chooses the seemingly straight, "shortest" line between himself and the bird at the time he is aiming—which is the way he was taught by geometry in school—he will miss the bird.

1001.25 The misconception of a "straight" line and its popular adoption into humanity's education system as constituting the "shortest distance between two points" takes no consideration of what the invisible, dynamic, atomically structured system may be which provides the only superficially flat paper-and-lead-pencil-pattern of interrelationship graphing of the line running between the two points considered. Nor does the straight-line shortest-distance assumption consider what a "point" is and where it begins and ends— ergo, it cannot determine where and when its dimensionless points have been reached, and it cannot determine what the exact length of that shortest distance between "points" may be.

1001.26 Such self-deceiving misinterpretations of experiences have been introduced by education into human sensing and traditional reasoning only because of humanity's microstature and microlongevity in respect to the terrestrial environment and geological time. Individual humans have also been overwhelmed by the momentum of tradition, the persuasions of "common sense," and a general fear of questioning long-established and ultimately power-backed authority and tradition. Thus has innocent humanity been misinformed or underinformed by the spoken-word-relayed inventory of only popularly explained, naked-eye impressions of local environment experiences as they have occurred throughout millions of years prior to humanity's discovery and development of instrumentally accommodated, macroscoped and microscoped exploration of our comprehensive environment. The experientially obtained, macro-micro, instrumentally measured data found no evidence of the existence of dimensionless "points," "lines," and "planes," nor of dimensioned "solids," nor of any "thing," nor of any noun-designatable, thing-substantiated, static entities. The experiments of human scientists have disclosed only verb-describable events—four-dimensionally coordinate behaviors of complexedly and ceaselessly intertransforming events, wavilinear event trajectories, interferences, and resonant event fields.

1002.10 **Omnidirectional Nucleus**

1002.11 Omnidirectional invokes a nucleus. Omnidirectional consideration as generalized conceptual pattern integrity requires an inherently regenerative nucleus of conceptual observation reference. Because of omni-closest-packing of 12 spheres triangularly surrounding one, inwardly-outwardly precessed pulsations cannot distribute energy further inwardly than the nuclear sphere's prime volume, ergo nucleus-free, and only geometrically approximatable center of volume; whereafter it can only be distributed outwardly.

1002.12 With 12 omnidirectional, equally-most-economical, alternative-move options accommodating each event, each multiplied in optional diversity by myriads of alternate frequencies-of-occurrence rates, it is inherent to the "game" of Universe that complex redistribution of event identities swiftly ensues, as with a vast omnidirectionally observed kaleidoscope in ever-accelerating acceleration of pulsatively intertransformed pattern continuities.

1002.13 Because there are spaces between closest-packed spheres, energy can be imported syntropically all the way inward to the prime nuclear domain, which thereafter can only be articulated outwardly—ergo, as entropy. The omnidirectional grid of the isotropic vector matrix, whose vertexes always coincide with the sphere centers of all closest-sphere packings, always provides the new spherical reference system that spontaneously accommodates the observer's omnirational accounting of all Universe relations by providing an omnidirectionally observing observer's nuclear-sphere viewpoint; and all the other relevantly-to-be-identified nuclear (star) sphere centers all inherently interpositioned in omnispherical, uniradius, isotropic matrix array with omnivectorially accommodated, omnidirectionally permitted intertransformability, apprehendibility, and discrete vectorially quantated and angularly identified comprehensibility of all intertransformative transactions.

1003.10 **Isotropic-Vector-Matrix Reference**

1003.11 *Isotropic* means everywhere the same, which also means omnidirectionally the same. The isotropic vector matrix provides the actual and only systematic scheme of reference that agrees with all the experimentally disclosed behaviors of nature, while also disclosing only whole-number increments of nature's and individual's special-case objectifications of the often only subjectively apprehended information regarding the generalized principles being employed by nature. All the isotropic-vector-matrix identifications of experience are expressible in terms of angle and frequency. The angles are independent of size and absolutely generalized. The frequencies are all special-case, time-space-limited specifics and identify relative sizes and magnitudes of eternally conceptual generalizations.

1004.10 **An Omnisynergetic Coordinate System**

1004.11 The omnirational, omnidirectional, comprehensive coordinate system of Universe is omnisynergetic. The name *synergetic* refers specifically to the cosmically rational, most omnieconomic coordinate system with which nature interaccommodates the whole family of eternal generalized principles that are forever omni-interaccommodatively operative. This coordinate system is ever regenerative in respect to the nuclear centers, all of which are rationally accounted for by synergetics.

1005.10 **Inventory of Omnidirectional Intersystem Precessional Effects**

1005.11 Precession has been thought of only as an angularly reoriented, single-plane resultant of orbiting forces, as expounded, for instance, in the author's 1940 article on the gyroscope (see footnote at Sec. 1009.60). Sun's planets are precessed to orbit in a plane generated at 90 degrees to the axis of its poles. In synergetics, we discover omnidirectional precession as in tensegrity geodesic spheres. When we push inwardly on any two diametrically opposite points of a tensegrity geodesic sphere, the whole sphere contracts symmetrically; when we pull outwardly from one another on any two diametrically opposite and islanded compression members of a geodesic tensegrity sphere, the whole sphere is precessionally and symmetrically expanded. Precession is not an exclusively single-plane, 90-degree reorientation, for it also operates omnidirectionally, as do all electromagnetic wave phenomena, which can, however, be reflectively concentrated and unidirectionally beamed. The fact that waves can be reflectively and refractively focused does not alter the fact that they are inherently omnidirectional.

1005.12 While all great circles of a sphere always cross each other twice, any two such orbits precess one another into 90-degree-polar crossings, while three-way great- circling interprecesses to equiangularly intertriangulate and thus interstabilize each other.

1005.13 Today, society is preoccupied with exclusively linear information inputs.

1005.14 Pushing on one individual pole of a tensegrity geodesic sphere is the same as pushing on two poles, because you only have to push at one point for the inertia of the system to react against your pushing. This point produces a spherical wave set that if uninterfered with, will travel encirclingly around the sphere from any one starting point to its 180-degree antipodes. It is like dropping a pebble into the water: the crest is the expanded phase of Universe, and the trough is the contracted phase of Universe. Looking at the ripples, we see that they are the locally initiated expanding-contracting of whole Universe as a consequence of local energy-event inputs. This is why tensegrity and pneumatic balls bounce. Contracting as they contact, their equally violent expansion impels them away from the—relative to them—inert body of contact.

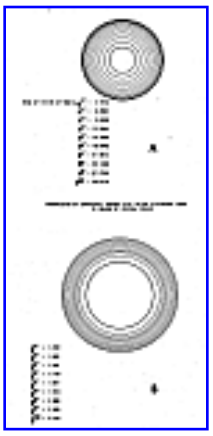
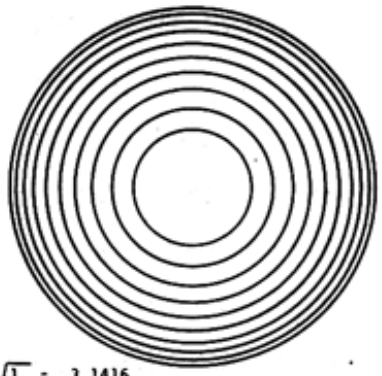


Fig. 1005.15

1005.15 **Volume and Area Progressions:** Omnidirectional precession involves both volumetric progressions and areal progressions that are interaccommodative as radial (volumetric) precessions and circumferential (surface) precessions resulting per given unit of energy input into the system. The ratios of these concentric progressions are illustrated at Figs. 1005.15A-D.

Next Section: 1005.20



Area of Circle of Radius $\sqrt{1}$ = 3.1416

$\sqrt{2}$ = 6.2832

$\sqrt{3}$ = 9.4248

$\sqrt{4}$ = 12.5664

$\sqrt{5}$ = 15.7080

$\sqrt{6}$ = 18.8496

$\sqrt{7}$ = 21.9912

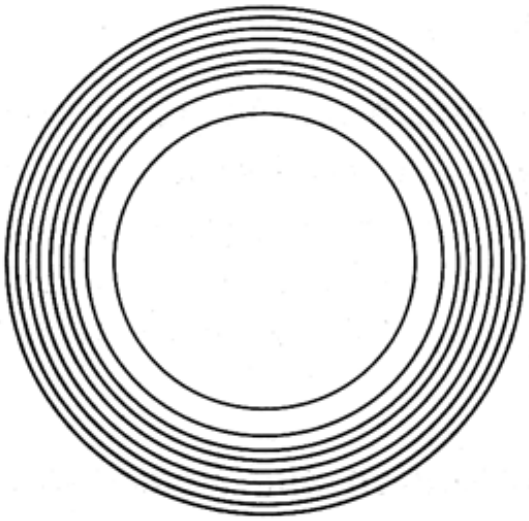
$\sqrt{8}$ = 24.1328

$\sqrt{9}$ = 27.2754

$\sqrt{10}$ = 30.4170

A

PROGRESSION OF CONCENTRIC SPHERES WITH VOLUME DIFFERENCE EQUAL TO VOLUME OF CENTRAL SPHERE



$\sqrt[3]{2}$ = 1.259

$\sqrt[3]{3}$ = 1.442

$\sqrt[3]{4}$ = 1.587

$\sqrt[3]{5}$ = 1.710

$\sqrt[3]{6}$ = 1.817

$\sqrt[3]{7}$ = 1.913

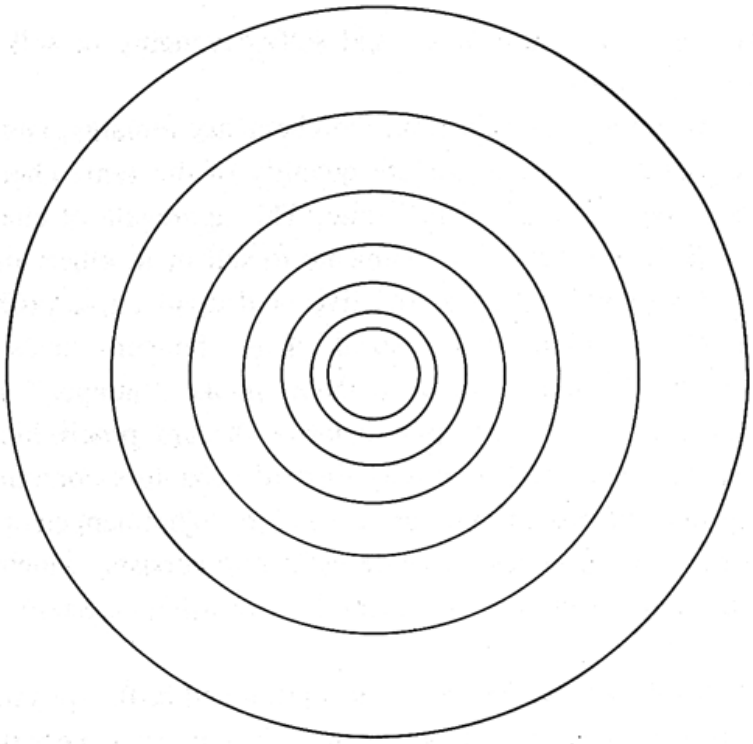
$\sqrt[3]{8}$ = 2.000

$\sqrt[3]{9}$ = 2.080

$\sqrt[3]{10}$ = 2.154

B

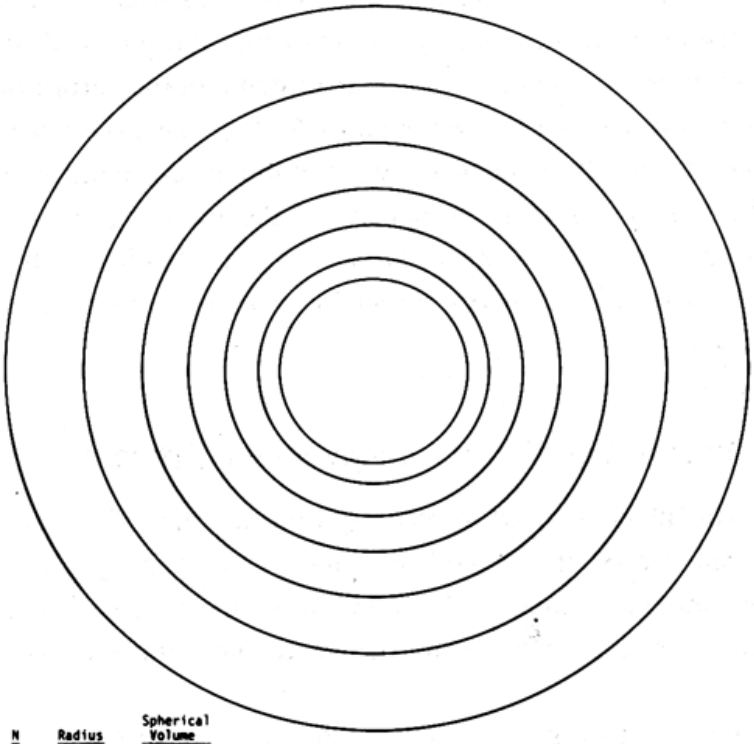
DOUBLING AREAL OF PROGRESSIVE CONCENTRIC CIRCLES



N	Radius
T	1.000
2	1.414
4	2.000
8	2.828
16	4.000
32	5.656
64	8.000

C

DOUBLING VOLUMES OF PROGRESSIVE CONCENTRIC SPHERES



N	Radius	Spherical Volume
T	1.000	4.1888
2	1.259	8.3776
4	1.587	16.7552
8	2.000	33.5104
16	2.519	67.0208
32	3.174	134.0416
64	4.000	268.0832

D

Fig. 1005.15 Omnidirectional Intersystem Precessional Effects: Volume and Area Progressions:

A. Progression of concentric circles with area difference equal to area of central circle.
B. Progression of concentric spheres with volume difference equal to volume of central sphere.
C. Doubling areas of progressive concentric circles.
D. Doubling volumes of progressive concentric spheres.

1005.20 **Biospherical Patterns:** Here we see the interplay of all the biological systems wherein all the "life"-accommodating organisms of Earth's biosphere are exclusively regenerated by energy sent to Earth by radio from the energy-broadcasting stars, but most importantly from the star Sun, by which design-science system the terrestrial vegetation and algae are the only energy radio-receiving sets.

1005.21 You and I and all the other mammals cannot by sunbathing convert Sun's energy to direct life support. In the initial energy impoundment of the powerful Sun- energy radiation's exposure of its leaves and photosynthesis, the vegetation would be swiftly dehydrated were it not watercooled. This is accomplished by the vegetation putting its roots into the ground and drawing the water by osmosis from the ground and throughout its whole system, finally to atomize it and send it into the atmosphere again to rain down upon the land and become available once more at the roots.

1005.22 Because the rooted vegetation cannot get from one place to another to procreate, all the insects, birds, and other creatures are given drives to cross-circulate amongst the vegetation; for instance, as the bee goes after honey, it inadvertently cross- pollinates and interfertilizes the vegetation. And all the mammals take on all the gases given off by the vegetation and convert them back to the gases essential for the vegetation. All this complex recirculatory system combined with, and utterly dependent upon, all the waters, rocks, soils, air, winds, Sun's radiation, and Earth's gravitational pull are what we have come to call *ecology*.

1005.23 As specialists, we have thought of all these design programmings only separately as "species" and as independent linear drives, some pleasing and to be cultivated, and some displeasing and to be disposed of by humans. But the results are multiorbitally regenerative and embrace the whole planet, as the wind blows the seeds and insects completely around Earth.

1005.24 Seen in their sky-returning functioning as recirculators of water, the ecological patterning of the trees is very much like a slow-motion tornado: an evoluting- involuting pattern fountaining into the sky, while the roots reverse-fountain reaching outwardly, downwardly, and inwardly into the Earth again once more to recirculate and once more again—like the pattern of atomic bombs or electromagnetic lines of force. The magnetic fields relate to this polarization as visually witnessed in the Aurora Borealis. (Illus. 505.41)

1005.30 **Poisson Effect:** Pulling on a rope makes it precess by taut contracting at 90 degrees to the line of pulling, thus going into transverse compression. That's all the Poisson Effect is—a 90-degree resultant rather than a 180-degree resultant; and it's all precession, whether operative hydraulically, pneumatically, crystallographically, or electromagnetically.

1005.31 The intereffect of Sun and planets is precessional. The intereffect of the atom and the electrons is precessional. They can both be complex and elliptical because of the variability in the masses of the satellites or within the nuclear mass. Planar ellipses have two foci, but "to comprehend what goes on in general" we have to amplify the twofold planar elliptical restraints' behavior of precession into the more generalized four- dimensional functions of radiation and gravitation.

1005.32 All observability is inherently nuclear because the observer is a nucleus. From nucleus to circle to sphere, they all have radii and become omniintertriangulated polyhedrally arrayed, interprecessing event "stars."

1005.40 **Genetic Intercomplexity:** DNA-RNA genetics programming is precessionally helical with only a net axial linear resultant. The atoms and molecules are all always polarized, and their total interprecessional effects often produce overall linear resultants such as the stem of a plant. All the genetic drives of all the creatures on our Earth all interact through chemistry, which, as with DNA-RNA, is linearly programmable as a code, all of which is characterized by sequence and intervals that altogether are realized at various morphologically symmetrical and closely intercomplementary levels of close proximity intercomplexity. On the scale of complexity of ecology, for instance, we observe spherically orbiting relay systems of local discontinuities as one takes the pattern of regenerativity from the other to produce an omniembracing, symmetrically interfunctioning, synergetic order. The basic nuclear symmetries and intertransformabilities of synergetics omniaccommodates the omnidirectional, omnifrequencied, precessional integrity.

1005.50 **Truth and Love: Linear and Embracing:** Metaphysically speaking, systems are conceptually independent of size. Their special-case realizations are expressible mathematically in linear equations, although they are only realizable physically as functions of comprehensive-integrity, interprecessionally complex systems. And the tetrahedron remains as the minimum spheric-experience system.

1005.51 The very word *comprehending* is omni-interprecessionally synergetic.

1005.52 The eternal is omniembracing and permeative; and the temporal is linear. This opens up a very high order of generalizations of generalizations. The truth *could not be more omni-important,* although it is often manifestly operative only as a linear identification of a special-case experience on a specialized subject. Verities are semi- special-case. The metaphor is linear. (See Secs. 217.03 and 529.07.)

1005.53 And all the categories of creatures act individually as special-case and may be linearly analyzed; retrospectively, it is discoverable that inadvertently they are all interaffecting one another synergetically as a spherical, interprecessionally regenerative, tensegrity spherical integrity. Geodesic spheres demonstrate the compressionally discontinuous—tensionally continuous integrity. Ecology is tensegrity geodesic spherical programming.

1005.54 Truth is cosmically total: synergetic. Verities are generalized principles stated in semimetaphorical terms. Verities are differentiable. But love is omniembracing, omnicoherent, and omni-inclusive, *with no exceptions.* Love, like synergetics, is nondifferentiable, i.e., is integral. Differential means locally-discontinuously linear. Integration means omnispherical. And the intereffects are precessional.

1005.55 The dictionary-label, special cases seem to go racing by because we are now having in a brief lifetime experiences that took aeons to be differentially recognized in the past.

1005.56 The highest of generalizations is the synergetic integration of truth and love.

1005.60 **Generalization and Polarization:** In cosmic structuring, the general case is tensegrity: three-way great-circling of islands of compression. Polarized precession is special-case. Omnidirectional precession is generalized.

1005.61 It is notable that the hard sciences and mathematics have discovered ever- experimentally-reverifiable generalizations. But the social scientists and the behaviorists have not yet discovered any anywhere-and-everywhere, experimentally-reverifiable generalizations. Only economics can be regarded as other than special-case: that of the utterly uninhibited viewpoint of the individual. Nature's own simplest instructional trick in its economic programming is to give us something we call "hunger" so that we will eat, take in regenerative energy. Arbitrarily contrived "scarcity" is the only kind of behavioral valving that the economists understand. There is no other way the economists know how to cope. Selfishness is a drive so that we'll be sure to regenerate. It has nothing to do with morals. These are organic chemical compounds at work. Stones do not have hunger.

1005.611 **Metabolic Generalizations:** Within economics we may be able to demonstrate the existence of a metabolic process generalization which is akin to, if not indeed implicitly inherent in, a composite of Boltzman's, Einstein's, and others' concept of a cosmically regenerative omniintercomplementation of a diversity of energetic export- import centers whose local cosmic episodes nonsimultaneously ebb and flow to accommodate the entropically and syntropically, omnidiversally, omniregenerative intertransformings of the nonsimultaneous intercomplementations of nonunitarily conceptual but finite Scenario Universe. How can economics demonstrate a generalization from the utterly uninhibited viewpoint of the individual human? It is said that stones do not have hunger. But stones are hygroscopic and do successively import and export both water and energy as heat or radiation. New stones progressively aggregate and disintegrate. We may say stones have both syntropically importing "appetites" and self- scavenging or self-purging entropic export proclivities.

1005.612 When a person dies, all the chemistry remains, and we see that the human organism's same aggregate quantity of the same chemistries persists from the "live" to the "dead" state. This aggregate of chemistries has no metaphysical interpreter to communicate to self or to others the aggregate of chemical rates of interacting associative or disassociative proclivities, the integrated effects of which humans speak of as "hunger" or as the need to "go to the toilet." Though the associative intake "hunger" is unspoken metaphysically after death, the disassociative discard proclivities speak for themselves as these chemical-proclivity discard behaviors continue and reach self-balancing rates of progressive disassociation. What happens physically at death is that the importing ceases while exporting persists, which produces a locally unbalanced—thereafter exclusively exporting—system. (See Sec. 1052.59.)

1005.613 It follows that between conception and birth—physically speaking—"life" is a progression of predominantly importive energy-importing-and-exporting transactions, gradually switching to an exportive predominance—ergo, life is a synthesis of the absolutely exportive entropy of radiation and the absolutely importive syntropy of gravity.

1005.614 The political, religious, and judicial controversies prevailing in the late 1970s with regard to abortion and "the right to life" will all ultimately be resolved by the multiplying elucidation for popular comprehension of science's discovery at the virological level that the physical and chemical organism of humans consists entirely of inanimate atoms. From this virological discovery it follows that the *individual life* does not exist until the umbilical cord is cut and the child starts its own metabolic regeneration; prior to that the life in the womb is merely composed of the mother organism, as is the case with any one individual egg in her ovary. Life begins with individually self-startered and sustained energy importing and dies when that independent importing ceases.

1005.62 Because man is so tiny and Earth is so great, we only can see gravity operating in the perpendicular. We think of ourselves as individuals with gravity pulling us Earthward individually in perpendiculars parallel to one another. But we know that in actuality, radii converge. We do not realize that you and I are convergently interattracted because gravity is so big. The interattraction is there, but it seems so minor we dismiss it as something we call "aesthetics" or a "love affair." Gravity seems so vertical.

1005.63 Initial comprehension is holistic. The second stage is detailing differentiation. In the next stage the edges of the tetrahedron converge like petals through the vector- equilibrium stage. The transition stage of the icosahedron alone permits individuality in progression to the omni-intertriangulated spherical phase.

1006.10 **Omnitopology Defined**

1006.11 Omnitopology is accessory to the conceptual aspects of Euler's superficial topology in that it extends its concerns to the angular relationships as well as to the topological domains of nonnuclear, closest-packed spherical arrays and to the domains of the nonnuclear-containing polyhedra thus formed. Omnitopology is concerned, for instance, with the individually unself-identifying concave octahedra and concave vector- equilibria volumetric space domains betweeningly defined within the closest-packed sphere complexes, as well as with the individually self-identifying convex octahedra and convex vector equilibria, which latter are spontaneously singled out by the observer's optical comprehensibility as the finite integrities and entities of the locally and individual-spherically closed systems that divide all Universe into all the macrocosmic outsideness and all the microcosmic insideness of the observably closed, finite, local systems—in contradistinction to the indefinability of the omnidirectional space nothingness frequently confronting the observer.

1006.12 The closest-packed symmetry of uniradius spheres is the mathematical limit case that inadvertently "captures" all the previously unidentifiable otherness of Universe whose inscrutability we call "space." The closest-packed symmetry of uniradius spheres permits the symmetrically discrete differentiation into the individually isolated domains as sensorially comprehensible concave octahedra and concave vector equilibria, which exactly and complementingly intersperse eternally the convex "individualizable phase" of comprehensibility as closest-packed spheres and their exact, individually proportioned, *concave-in-betweenness* domains as both closest packed around a nuclear uniradius sphere or as closest packed around a nucleus-free prime volume domain. (See illustrations 1032.30 and 1032.31.)

1006.13 Systems are individually conceptual polyhedral integrities. Human awareness's concession of "space" acknowledges a nonconceptually defined experience. The omniorderly integrity of omnidirectionally and infinitely extensible, fundamentally coordinating, closest packing of uniradius spheres and their ever coordinately uniform radial expandibility accommodates seemingly remote spherical nucleations that expand radially into omniintertangency. Omni-intertangency evidences closest sphere packing and its inherent isotropic vector matrix, which clearly and finitely defines the omnirational volumetric ratios of the only concave octahedra and concave vector equilibria discretely domaining all the in-betweenness of closest-packed-sphere interspace. The closest-packed- sphere interspace had been inscrutable a priori to the limit phase of omni-intertangencies; this limit phase is, was, and always will be omnipotential of experimental verification of the orderly integrity of omni-intercomplementarity of the space-time, special-case, local conceptualizing and the momentarily unconsidered, seeming nothingness of all otherness.

1006.14 Human awareness is conceptually initiated by special-case otherness observability. Humans conceptualize, i.e., image-ize or image-in, i.e., bring-in, i.e., capture conceptually, i.e., in-dividualize, i.e., systemize by differentiating local integrities from *out* of the total, nonunitarily conceptualizable integrity of generalized Universe.

1006.20 **Omnitopological Domains:** In omnitopology, spheres represent the omnidirectional domains of points, whereas Eulerian topology differentiates and is concerned exclusively with the numerical equatability of only optically apprehended inventories of superficial vertexes, faces, and lines of whole polyhedra or of their local superficial subfacetings: (V + F = L + 2) when comprehensive; (V + F = L + 1) when local.

1006.21 In omnitopology, the domains of volumes are the volumes topologically described. In omnitopology, the domain of an external face is the volume defined by that external face and the center of volume of the system.

1006.22 All surface areas may be subdivided into triangles. All domains of external facets of omnitopological systems may be reduced to tetrahedra. The respective domains of each of the external triangles of a system are those tetrahedra formed by the most economical lines interconnecting their external apexes with the center of volume of the system.

1006.23 In omnitopology, each of the lines and vertexes of polyhedrally defined conceptual systems have their respective unique areal domains and volumetric domains. (See Sec. 536.)

1006.24 The respective volumetric domains of a system's vertexes are embracingly defined by the facets of the unique polyhedra totally subdividing the system as formed by the set of planes interconnecting the center of volume of the system and each of the centers, respectively, of all those surface areas of the system immediately surrounding the vertex considered.

1006.25 The exclusively surface domains of a system's vertexes are uniquely defined by the closed perimeter of surface lines occurring as the intersection of the internal planes of the system which define the volumetric domains of the system's respective vertexes with the system's surface.

1006.26 The respective areal domains of external polyhedral lines are defined as all the area on either surface side of the lines lying within perimeters formed by most economically interconnecting the centers of area of the polyhedron's facets and the ends of all the lines dividing those facets from one another. Surface domains of external lines of polyhedra are inherently four-sided.

1006.27 The respective volumetric domains of all the lines—internal or external of all polyhedra are defined by the most economical interconnectings of all adjacent centers of volume and centers of area with both ends of all their respectively adjacent lines.

1006.30 **Vector Equilibrium Involvement Domain**

1006.31 The unfrequenced vector equilibrium has 12 external vertexes and one internal vertex of the nuclear sphere embraced by the 12 uniradius closest-packed spheres around it; the omniinterconnecting vectors between the 12-around-one spheric centers define the vector equilibrium *involvement domain.*

Fig. 1006.32

1006.32 We learn from the complex jitterbugging of the VE and octahedra that as each sphere of closest-packed spheres becomes a space and each space becomes a sphere, each intertransformative component requires a tetravolume-12 "cubical" space, while both require 24 tetravolumes. The total internal-external closest-packed-spheres-and-their- interstitial-spaces involvement domains of the unfrequenced 20-tetravolume VE is tetravolume-24. This equals either eight of the nuclear cube's (unstable) tetravolume-3 or two of the rhombic dodecahedron's (stable) tetravolume-6. The two tetravolume-12 cubes or four tetravolume-6 dodecahedra are intertransformable aspects of the nuclear VE's local-involvement domain. (See Fig. 1006.32.)

1006.33 The vector equilibrium at initial frequency, which is frequency^2, manifests the fifth-powering of nature's energy behaviors. Frequency begins at two. The vector equilibrium of frequency^2 has a prefrequency inherent tetravolume of 160 ($5 \times 2^5 = 160$) and a quanta-module volume of $120 \times 24 = 1 \times 3 \times 5 \times 2^8$ nuclear-centered system as the integrated product of the first four prime numbers: 1, 2, 3, 5. Whereas a cube at the same frequency accommodates only eight cubes around a nonnucleated center. (Compare Sec. 1033.632)

1006.34 For the first moment in history synergetics is providing operational comprehensibility of the fourth-and-fifth-dimensional-coordinated, most economical behaviors of physical Universe as well as of their intellectual, metaphysical conceptuality. We have arrived at a new phase of comprehension in discovering that all of the physical cases experimentally demonstrable are only special cases of the generalized principles of the subfrequency, subtime, and subsize patterning integrity of the nucleus-containing, closest-packed isotropic vector matrix system.

1006.35 With reference to our operational definition of a sphere (Sec. 224.07), we find that in an aggregation of closest-packed uniradius spheres:

Tetravolume 1 = minimum F^0 F^0 tetrasphere

Tetravolume 5 = maximum F^h F^h sphere (h = high frequency geodesic icosasphere, Sec. 985.01)

Tetravolume 6 = maximum F^h F^h sphere (high-frequency icosa plus the intersphere volumetric involvement domain of each closest-packed uniradius sphere = rhombic dodecahedron)

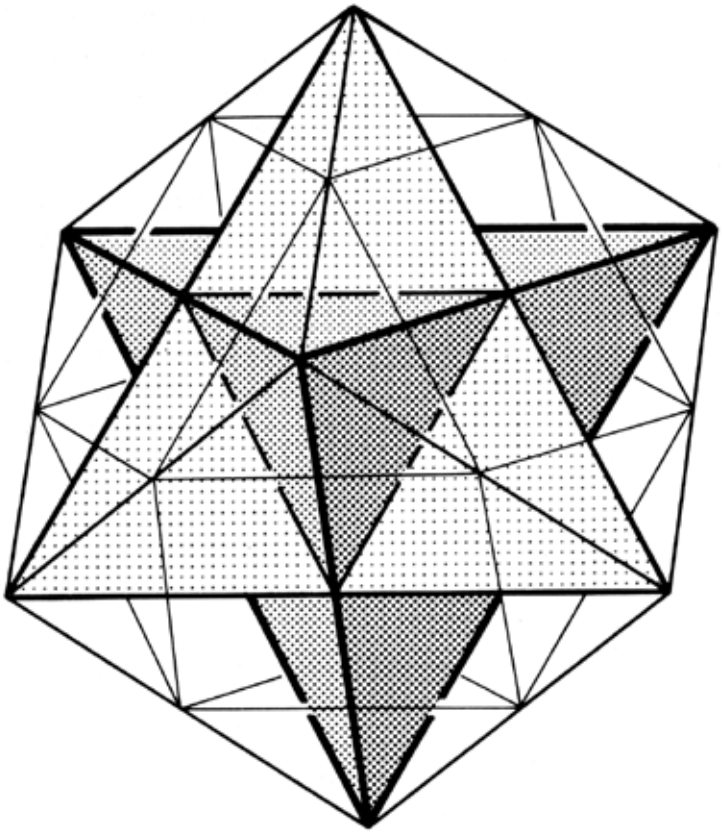


Fig. 1006.32 Duo-Tet Star Polyhedron Defines Vector Equilibrium Involvement Domain: The Duo-Tet star polyhedron that first appears in Fig. 987.242A is shown here within a vector equilibrium net. The complex also illustrates the eight Eighth-Octa that must be added to the eight triangular faces of the vector equilibrium to form the nucleated cube—the total complex of which functions as the vector equilibrium nuclear involvement domain. A closest-sphere-packing evolution of this same transformation (adding eight Eighth-Octa to the VE's six triangular faces) appears at Fig. 415.17.

1006.36 In respect to each uniradius, omni-closest-packed spherical domain of 6:

Maximum icosa sphere F^h	=	5 plus tetra quanta inside 1 minus tetra quantum outside	integrating as +4
Tetra Sphere F^0	=	1 plus tetra quanta inside 5 minus tetra quantum outside	integrating as -4

1006.37 For other manifestations of the vector equilibrium involvement domain, review Sections 415.17 (Nucleated Cube) and 1033 (Intertransformability Models and Limits), *passim.*

1006.40 **Cosmic System Eight-dimensionality**

1006.41 We have a cosmically closed system of eight-dimensionality: four dimensions of convergent, syntropic conservation → + 4, and four dimensions of divergent, entropic radiation → - 4 intertransformabilities, with the non-inside-outable, symmetric octahedron of tetravolume 4 and the polarized semiasymmetric Coupler of tetravolume 4 always conserved between the interpulsative 1 and the rhombic dodecahedron's maximum- involvement 6, (i.e., 1 + 4 + 1); ergo, the always double-valued—2^2 —symmetrically perfect octahedron of tetravolume 4 and the polarized asymmetric Coupler of tetravolume 4 reside between the convergently and divergently pulsative extremes of both maximally aberrated and symmetrically perfect (equilibrious) phases of the generalized cosmic system's always partially-tuned-in-and-tuned-out eight-dimensionality.

1007.10 **Omnitopology Compared with Euler's Topology**

1007.11 While Euler discovered and developed topology and went on to develop the structural analysis now employed by engineers, he did not integrate in full potential his structural concepts with his topological concepts. This is not surprising as his contributions were as multitudinous as they were magnificent, and each human's work must terminate. As we find more of Euler's fields staked out but as yet unworked, we are ever increasingly inspired by his genius.

1007.12 In the topological past, we have been considering domains only as surface areas and not as uniquely contained volumes. Speaking in strict concern for always omnidirectionally conformed experience, however, we come upon the primacy of topological domains of systems. Apparently, this significance was not considered by Euler. Euler treated with the surface aspects of forms rather than with their structural integrities, which would have required his triangular subdividing of all polygonal facets other than triangles in order to qualify the polyhedra for generalized consideration as structurally eternal. Euler would have eventually discovered this had he brought to bear upon topology the same structural prescience with which he apprehended and isolated the generalized principles governing structural analysis of all symmetric and asymmetric structural components.

1007.13 Euler did not treat with the inherent and noninherent nuclear system concept, nor did he treat with total-system angle inventory equating, either on the surfaces or internally, which latter have provided powerful insights for further scientific exploration by synergetical analysis. These are some of the differences between synergetics and Euler's generalizations.

1007.14 Euler did formulate the precepts of structural analysis for engineering and the concept of neutral axes and their relation to axial rotation. He failed, however, to identify the structural axes of his engineering formulations with the "excess twoness" of his generalized identification of the inventory of visual aspects of all experience as the polyhedral vertex, face, and line equating: $V + F = L + 2$. Synergetics identifies the twoness of the poles of the axis of rotation of all systems and differentiates between polar and nonpolar vertexes. Euler's work, however, provided many of the clues to synergetics' exploration and discovery.

1007.15 In contradistinction to, and in complementation of, Eulerian topology, omnitopology deals with the generalized equatabilities of a priori generalized omnidirectional domains of vectorially articulated linear interrelationships, their vertexial interference loci, and consequent uniquely differentiated areal and volumetric domains, angles, frequencies, symmetries, asymmetries, polarizations, structural-pattern integrities, associative interbondabilities, intertransformabilities, and transformative-system limits, simplexes, complexes, nucleations, exportabilities, and omni-interaccommodations. (See Sec. 905.16.)

1007.16 While the counting logic of topology has provided mathematicians with great historical expansion, it has altogether failed to elucidate the findings of physics in a conceptual manner. Many mathematicians were content to let topology descend to the level of a fascinating game—dealing with such Moebius-strip nonsense as pretending that strips of paper have no edges. The constancy of topological interrelationships—the formula of relative interabundance of vertexes, edges, and faces—was reliable and had a great potential for a conceptual mathematical strategy, but it was not identified operationally with the intertransformabilities and gaseous, liquid, and solid interbondings of chemistry and physics as described in Gibbs' phase rule. Now, with the advent of vectorial geometry, the congruence of synergetic accounting and vectorial accounting may be brought into elegant agreement.

1007.20 **Invalidity of Plane Geometry**

1007.21 We are dealing with the Universe and the difference between conceptual thought (see Sec. 501.101) and nonunitarily conceptual Universe (see *Scenario Universe,* Sec. 320). We cannot make a model of the latter, but we can show it as a scenario of meaningfully overlapping conceptual frames.

1007.22 About 150 years ago Leonhard Euler opened up the great new field of mathematics that is topology. He discovered that all visual experiences could be treated as conceptual. (But he did not explain it in these words.) In topology, Euler says in effect, all visual experiences can be resolved into three unique and irreducible aspects:

- vertexes, faces, and edges (Secs. 223.04 and 1006.20) or, as unique dimensional abundances:
- points, areas, and lines (Sec. 527.11) or, as structural identifications:
- joints, windows, and struts (Sec. 986.053) or, as we say in synergetics topology:
- crossings, openings, and trajectories (Sec. 524.30) or the more generalized: events, nonevents, and traceries or more refined as:
- fixes, discontinuities, and continuities or in most refined synergetics: events, novents, and even interrelatabilities (Sec. 269.05).

1007.23 In topology, then, we have a unique aspect that we call a line, not a straight line but an event tracery. When two traceries cross one another, we get a fix, which is not to be confused in any way with a noncrossing. Fixes give geographical locations in respect to the system upon which the topological aspects appear. When we have a tracery or a plurality of traceries crossing back upon one another to close a circuit, we surroundingly frame a limited view of the omnidirectional novents. Traceries coming back upon themselves produce windowed views or areas of novents. The areas, the traces, and the fixes of crossings are never to be confused with one another: all visual experiences are resolved into these three conceptual aspects.

1007.24 Look at any picture, point your finger at any part of the picture, and ask yourself: Which aspect is that, and that, and that? That's an area; or it's a line; or it's a crossing (a fix, a point). Crossings are loci. You may say, "That is too big to be a point"; if so, you make it into an area by truncating the corner that the point had represented. You will now have two more vertexes but one more area and three more lines than before. Euler's equation will remain unviolated.

1007.25 A circle is a loop in the same line with no crossing and no additional vertexes, areas, or lines.

1007.26 Operationally speaking, a plane exists only as a facet of a polyhedral system. Because I am experiential I must say that a line is a consequence of energy: an event, a tracery upon what system? A polyhedron is an event system separated out of Universe. Systems have an inside and an outside. A picture in a frame has also the sides and the back of the frame, which is in the form of an asymmetrical polyhedron.

1007.27 In polyhedra the number of V's (crossings) plus the number of F's, areas (novents-faces) is always equal to the number of L's lines (continuities) plus the number 2. If you put a hole through the system—as one cores an apple making a doughnut-shaped polyhedron—you find that V + F = L. Euler apparently did not realize that in putting the hole through it, he had removed the axis and its two poles. Having removed two axial terminal (or polar) points from the inventory of "fixes" (loci-vertexes) of the system, the V + F = L + 2 equation now reads V + F = L, because two V's have been deducted from the inventory on the left side of the equation.

1007.28 Another very powerful mathematician was Brouwer. His theorem demonstrates that if a number of points on a plane are stirred around, it will be found after all the stirring that one of the points did not move relative to all the others. One point is always the center of the total movement of all the points. But the mathematicians oversimplified the planar concept. In synergetics the plane has to be the surface of a system that not only has insideness and outsideness but also has an obverse and re- exterior. Therefore, in view of Brouwer, there must also always be another point on the opposite side of the system stirring that also does not move. Every fluidly bestirred system has two opposed polar points that do not move. These two polar points identify the system's neutral axis. (See Sec. 703.12.)

1007.29 Every system has a neutral axis with two polar points (vertexes-fixes). In synergetics topology these two polar points of every system become constants of topological inventorying. Every system has two polar vertexes that function as the spin axis of the system. In synergetics the two polar vertexes terminating the axis identify conceptually the abstract—supposedly nonconceptual—function of nuclear physics' "spin" in quantum theory. The neutral axis of the equatorially rotating jitterbug VE proves Brouwer's theorem polyhedrally.

Fig. 1007.30

1007.30 When you look at a tetrahedron from above, one of its vertexes looks like this: (See Fig. 1007.30)

You see only three triangles, but there is a fourth underneath that is implicit as the base of the tetrahedron, with the Central vertex D being the apex of the tetrahedron. The crossing point (vertex-fix) in the middle only superficially appears to be in the same plane as ABC. The outer edges of the three triangles you see, ACD, CDB, ADB, are congruent with the hidden base triangle, ABC. Euler assumed the three triangles ACD, CDB, ADB to be absolutely congruent with triangle ABC. Looking at it from the bird's-eye view, unoperationally, Euler misassumed that there could be a nonexperienceable, no-thickness plane, though no such phenomenon can be experientially demonstrated. Putting three points on a piece of paper, interconnecting them, and saying that this "proves" that a no-thickness, nonexperiential planar triangle exists is operationally false. The paper has thickness; the points have thickness; the lines are atoms of lead strewn in linear piles upon the paper.

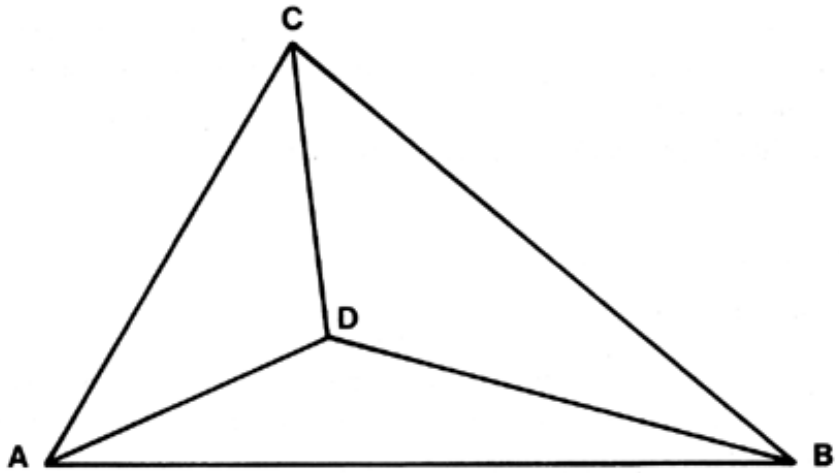


Fig. 1007.30 View of Tetrahedron from Above: There are four triangles: three surround the top vertex; the fourth is implicit in the base.

1007.31 You cannot have a something-nothingness, or a plane with no thickness. Any experimental event must have an insideness and an outsideness. Euler did not count on the fourth triangle: he thought he was dealing with a plane, and this is why he said that on a plane we have V + F = L + 1 . When Euler deals with polyhedra, he says "plus 2." In dealing with the false plane he says "plus 1." He left out "1" from the right-hand side of the polyhedral equation because he could only see three faces. Three points define a minimum polyhedral facet. The point where the triangles meet in the center is a polyhedral vertex; no matter how minimal the altitude of its apex may be, it can never be in the base plane. Planes as nondemonstrably defined by academic mathematicians have no insideness in which to get: ABCD is inherently a tetrahedron. Operationally the fourth point, D, is identified or fixed subsequent to the fixing of A, B, and C. The "laterness" of D involves a time lag within which the constant motion of all Universe will have so disturbed the atoms of paper on which A, B, and C had been fixed that no exquisite degree of measuring technique could demonstrate that A, B, C, and D are all in an exact, so-called flat-plane alignment demonstrating ABCD to be a zero-altitude, no-thickness-edged tetrahedron.

Next Section: 1008.10

1008.10 **Geodesic Spheres in Closest Packing**

1008.11 What we call *spheres* are always geodesics. While they may superficially appear to be spherical, they are always high-frequency geodesic *embracements.*

1008.12 In the closest packing of omnitriangulated geodesic spheres, the closest the spheres can come to each other is as triangular face-bonding, which is of course triple- bonded, or trivalent. In such cohering tangency, the closest-packed geodesic "spherical" polyhedra would constitute crystalline arrangements and would take up the least amount of space, because the midfaces are radially closer to the center of the sphere than are the midedges (midchords) of the omnifaceted "spheric" polyhedra, while the vertexes are at greatest radius.

1008.13 Taking up a little more room would be closest packing of geodesic spheres by edge-bonding, which is double-bonded, or bivalent. Bivalently tangential spherical polyhedra, being hinged edge-to-edge, may have characteristics similar to liquid or gelatinous aggregates.

1008.14 Single-bonded geodesic spherical polyhedra closest packed point-to-point are univalent. This point-to-point arrangement takes up the most space of all closest- packed spherical tangency agglomerates and may illustrate the behavior of gases.

1008.15 These nuances in closest-packing differentiations may explain many different unexpected and hitherto unexplained behaviors of Universe.

1009.00 **Critical Proximity**

1009.10 **Interference: You Really Can't Get There from Here:** Omnitopology recognizes the experimentally demonstrable fact that two energy-event traceries (lines) cannot pass through the same point at the same time. It follows that no event vectors of Universe ever pass through any of the same points at the same time. Wherefore, it is also operationally evidenced that the conceptual-system geometries of omnitopology are defined only by the system withinness and withoutness differentiating a plurality of loci occurring approximately midway between the most intimate proximity moments of the respectively convergent-divergent wavilinear vectors, orbits, and spin equators of the system. (See Sec. 517, "Interference.") The best you can do is to get almost there; this is evidenced by physical discontinuity. Zeno's paradox thus loses its paradoxical aspects.

1009.11 In omnitopology, a vertex (point) is the only-approximate, amorphous, omnidirectional region occurring mid-spatially between the most intimate proximity of two almost-but-never-quite, yet critically intertransformatively, interfering vectors. (See Sec. 518.)

1009.20 **Magnitude of Independent Orbiting:** Most impressively illustrative of what this means is evidenced by the mass-attractively occasioned falling in toward Earth of all relatively small objects traveling around Sun at the same rate as Earth, Earth itself being only an aggregate of all the atoms that are cotravelers around Sun at the same velocity, while each atom's nucleus is only one-ten-thousandth the diameter of its outer electron shell. There is as much space between the atom's nucleus and its electron-orbit- produced shell as proportionately exists between Sun and its planet Pluto.

1009.21 The tendency to fall in to Earth or any other celestial body will be reduced as a cotraveling object increases its distance away from Earth or any other relatively large body as a consequence of its being given acceleration into orbital speed greater than Earth's Sun-orbiting speed. In 99.9999999999 percent of Universe no body tends to fall in to any other; 99.999999×10^{30} of all known Universe bodies are independently orbiting.

1009.30 **Symmetrical Conformation of Flying-Star Teams:** We have terms such as "boundary layer" that have to be recognized in hard technology where we find that despite the accurate machining to fine tolerance of such things as steel bearings, there is always a dimensional aberration that is unaccounted for in man's eyes but, when measured instrumentally in nuclear-diameter magnitudes, is as relatively great as that between the stars of the Milky Way. Men think superficially only of lubricants and mechanically-fitting- bearings tolerances whereas—focused at the proper magnitude of conceptuality—what goes on in the affairs of lubricants and bearings discloses discrete geometrical relationships where no event ever makes absolute contact with another. There are simply orbital interferences, where the mass attractions will always be just a little more powerful than the fundamental disintegrative tendencies.

1009.31 The relative frequency timing of orbits is such that as one complex energy event (a body) approaches critical proximity between any two other equal mass bodies to that of the intruder, the group mass interattraction fourfolds. We get to a condition where the approaching body is suspended between two others like landing on an invisible trampoline. Similarly, in manmade machinery as the teeth of gears enter into the matching gears' valleys, the mass-attraction forces finally provide an invisible suspension field whereby none of the atoms ever touches another. (See Sec. 1052.21.)

1009.32 When metallic alloys are produced, we have such conditions, for instance, as four symmetrically orbiting stars producing a tetrahedral flying formation, each trying to orbit away from the other but inter-mass-attractively cohered. When this flying team of four stars in tetrahedral conformation joins together with a second team of four stars in tetrahedral conformation, they take position symmetrically with each member star of the two sets of four becoming congruent with the eight corners of a cube.

1009.33 Now each of the stars in the flying teams has nearer neighbors than it had before, and this mass interattractiveness is multiplied as the second power of relative proximity. Their initial acceleration of 186,000 miles per second keeps their orbits always intact. Each of the flying formations is made up of other flying teams of atoms with a central commander nucleus and a fleet of electrons buzzing around it at 186,000 miles per second; being interfrequenced, the four nucleated team members synchronously interact as the orbits of their electrons in closest proximity are intervally geared in second-power accelerations of intertenuousness, producing an omnicoordinate condition akin to the mid- gear-tooth trampoline (an invisible muscular field).

1009.34 Next, a six-member flying team (octahedron) heaves into critical proximity with the original two teams now flying a group formation in the form of the eight comer positions of the cube. The acceleration stability of each of the flying teams is such that they join with the new six-star team taking symmetrical positions in the middle of the six square faces of the eight-star-team cube. The mass interattraction of the 14 now becomes vastly greater, and the electron-orbit-gear-trampolines of each of the 14 nuclear-flow spherical ships are now in very much greater second-power increase of interattractiveness.

1009.35 This cubical flying team of 14 ships now sights another flying team of 12 ships, and the team of 14 and the team of 12 are flown into group formation with the 12 ships taking station at the midpoints of the 12 edges of the 14-star-team cube. Thus the mass attraction is ever more vastly increased, yet the integrity of their interpositioning and their non-falling-into-one-anotherness is guaranteed by the centrifugal forces of the orbiting superbly balanced by the second-power increase of the gravitational buildup already noted.

1009.36 Thus are planets cohered, and thus are metallic alloys on planets even more powerfully cohered—all within the rules of never-quite-touching; all within the rules of interval; all within the rules of no actual particulate "solids." They may fly wavilinear patterns, but the atoms are found to be as discontinuous as the wavilinear sky trails of the jet airplane. While physics is as yet formally puzzling over the paradox of the wave and the particle, the apparent contradiction is occasioned only by the superficial misconception of a particle where none exists. We deal only with events in pure principle. The sense of physical, textural reality, of awareness itself, which uniquely identifies life and time (in contradistinction to eternal, weightless metaphysics), is inherent to the plurality of frequencies and degrees of freedom that in pure principle theoretically provide different interpositionings within given amounts of time. The plurality of principles, which themselves are interaccommodative, inherently generates awareness differentiability. The exquisite perfection of the total interaccommodation and the limited local set of the tunabilities of the terrestrial living organisms, such as the human instrument vehicle, are all permitted in the general complexity and permit local-focus, limited awareness as individual-seeming perceptivity. (See Sec. 973.30.)

1009.37 What I am saying is that we have only eternity and integrity. Unity is plural in pure principle. The awareness we speak of as life is inherently immortal and equieternal.

1009.40 **Models and Divinity:** Because of indeterminism, the exclusive tenuous nature of integrity—discontinuity—means that no exact hard particulate models may ever be fashioned by man. The conscientious and competent modelmaker undertaking to make a beautiful tetrahedron suddenly becomes aware that it is impossible to make a perfect corner at a point. There is always both a terminal and a radius and an askew convergence- divergence at noncontacting critical proximity. When he magnifies the edges which look sharp to the naked eye, he sees they are never sharp. The more powerful the magnification he brings to bear on his work, the more he becomes aware of the lumpy radii of the micropatterning of the stuff with which he works. Finally, the electron microscope tells him that the point of a needle is a pile of oranges and that the blade of the razor is a randomly dumped breakwater of spherical rubble. When further meticulously studied and magnified, this superficial seeming randomness proves to be our flying squadrons, earlier described, enjoying a vast number of intricately orderly team maneuvers but with never a pilot in sight. The whole is flown by remote control with fantastic feedback and local automation, all governed by an eternally complex integrity of complementary, interaccommodative principles.

1009.41 Little man on little planet Earth evoking words to describe his experiences, intuiting ever and anon the greater integrity, struggles to form a word to manifest his awareness of the greater integrity. His lips can express, his throat and lungs can produce, in the limited atmosphere of planet Earth, he may make a sound like g o d . . . which is obviously inadequate to identify his inherent attunement to eternal complex integrity. The little humans on little Earth, overwhelmed these millions of years with the power of the bigger over the lesser (muscles), have spontaneously identified the cosmic integrity with the local terrestrial experience. The conditioned-reflex feedbacks have introduced enormous confusion of approximate identification, fusing the local physical muscular authority with the eternal complex integrity, whose absolute generalizability can never be locked into or described as a special case.

1009.50 **Acceleration:** Physics does not speak of motion; it speaks of acceleration. And physics has identified only two kinds of acceleration, linear and angular. We are informed experientially that this is a misinterpretation of the data.

1009.51 There are indeed two kinds of acceleration, but they are both angular. All accelerations are angular and cyclically complete. There are no open endings in Universe. Physics has discovered only waves, no straight lines.

1009.52 The angular accelerations, however, manifest a vast variety of radii. The differentiation of physics into linear and angular occurred when the humans involved failed to realize that the diameter of the little circle is always a small arc of a vastly greater circle passing through it. The greater the radius, the slower the total cyclic realization. There are no straight lines or "linear infinities." Realization of this is what Einstein spoke of as "curved space." (See Sec. 522.21.)

1009.53 Einstein was up against trying to communicate with the mathematicians in terms of their adopted mathematical models, all of which were— and still are—straight- line, XYZ models on a linear frame and with linear coordinates going outward from the model to infinity. So "field" was always a little set of local perpendicular crossings of straight lines each outward bound to an infinity of infinities.

1009.54 All the experimentally harvested information says that the "field" must now be recognized as a complex of never-straight lines that, at their simplest, always will be very short arcs of very great circular orbits. And the orbits are all elliptical due to the fact that unity is plural and at minimum two. There will always be at least one other critical proximity-imposing aberration restraint focus.

1009.55 A single ellipse is a wave system with two diametric peak phases—a gear with only two teeth—at 180 degrees from one another. All other gears are multitoothed, high-frequency waves. All is wavilinear.

1009.56 Critical proximity crimping-in is realized by local wave-coil-spring contractions of the little system's diameter by the big system, but local radius is always a wavilinear, short-section arc of a greater system passing through it in pure generalized eternal principle. (See Sec. 541.04.)

Fig. 1009.75A

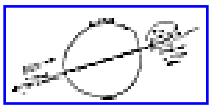


Fig. 1009.57B

1009.57 An apparent straight line is not only locally wavilinear but a short-section arc of a greater system passing through a lesser system. (See Figs. 1009.57A-B.) Universe lines return upon themselves.

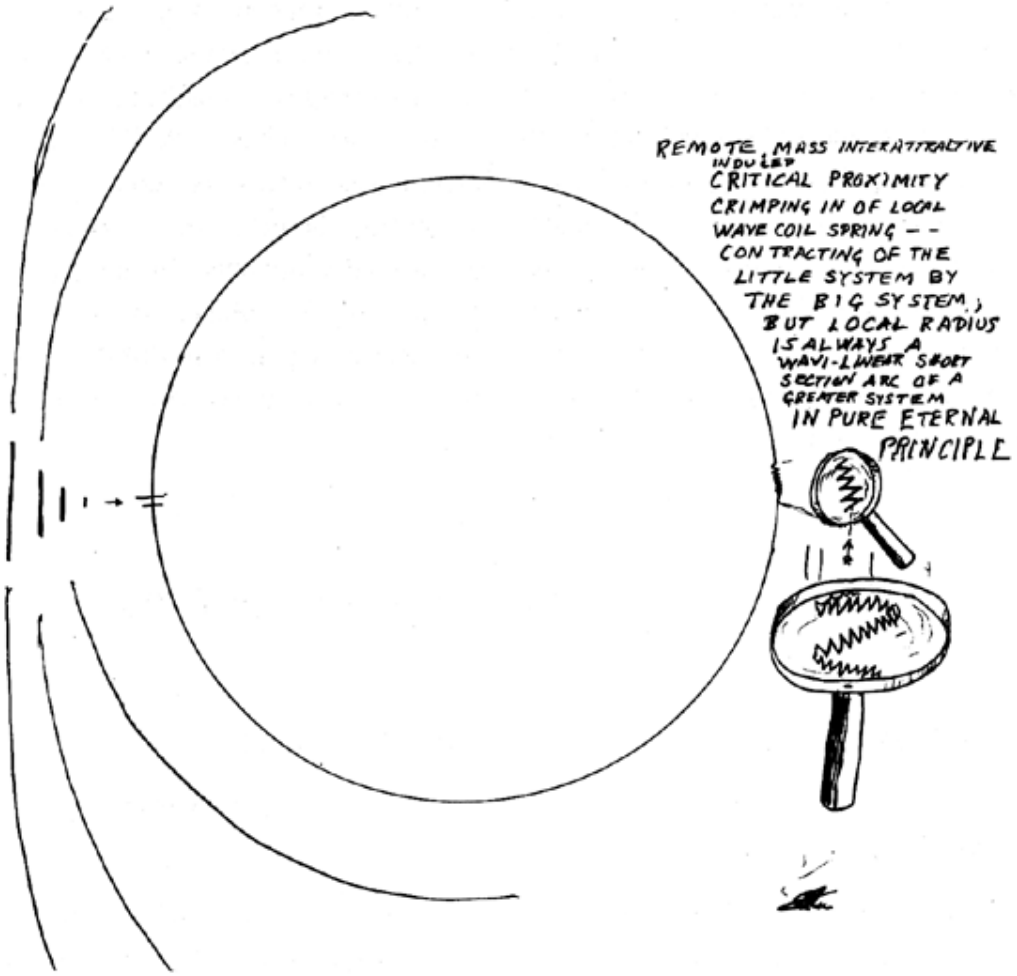


Fig 1009.57A Critical Proximity Crimping-in of Local Wave Coil-spring: Consideration of the little system by the big system. Local radius is always a wavilinear short section arc of a great system in pure principle.

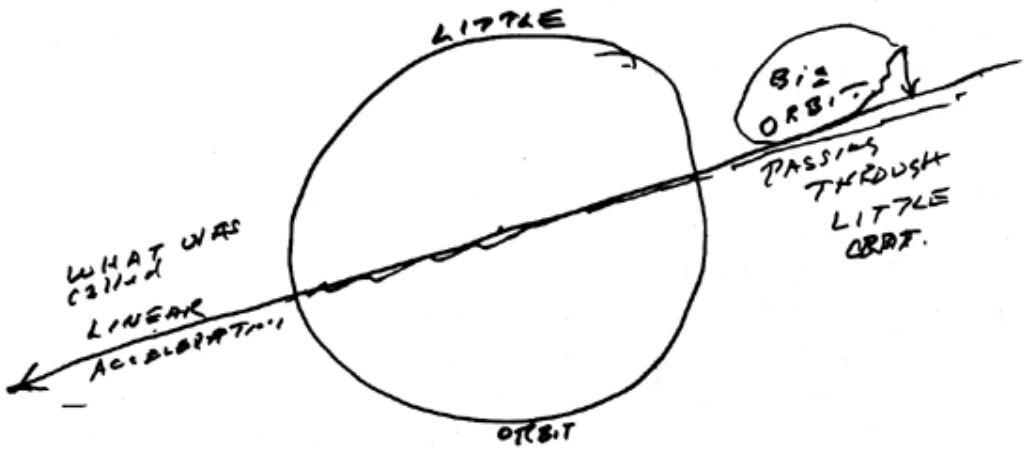


Fig. 1009.57B Big Orbit Passing through Little Orbit: What was called linear acceleration is an unrecognized arc of a bigger system.

1009.60 **Hammer-Thrower:** The effect of bodies in acceleration upon other bodies in acceleration is always precessional, and the resultant is always at an angle other than degrees. Even today, the physicists consider precession to be only mathematically treatable by quantum mechanics because they have failed to realize that the complex intereffects are conceptually comprehendible.[1]

(Footnote 1: The author established this fact with the authority of the great specialists in applied precession (i.e., gyroscoping), the chief engineer and vice president for research of the Sperry Gyroscope Company. See the author's article on the gyroscope in *Fortune,* Vol. XXI, No. 5, May 1940.)

1009.61 The model of the man fastening a weight to a string and swinging it around his head is the familiar one of the hammer-thrower. With each accelerating cycle the object swung around his head accumulates in its velocity the progressive energy imports metabolically exported through the action of the human's muscles. (See Sec. 826.03 for description of the metabolic energy accumulation of the hammer-thrower.) Men have not accurately interpreted their instinctively articulated performance of slinging, hammer- throwing, baseball pitching, and other angularly accelerated hurlings. When a human picks up a stone and throws it, he thinks of it as a different kind of a sport from the hammer- thrower's activity. But the only difference is that with throwing the stone, his arm is the rod of the hammer and instead of accumulating velocity by many cycles of acceleration, he operates through only one-third of a circle in which he can accumulate a certain amount of metabolic muscle energy to transform into acceleration. Substituting the athlete's "hammer" for the stone or baseball, the hammer-thrower is able to build much more of his metabolically generated energy into muscular acceleration, which accumulates to produce very great force. The baseball-throw and the hammer-throw utilize the same principle, except that the rate of accumulation is one-third cycle for the former while it is a plurality of cycles for the latter, thus permitting the introduction of larger amounts of time-of-effort application.

1009.62 A man with a weight on a string swings it above his head and lets go of it, but the man is in such close proximity to Earth that the attraction of Earth takes over and pulls the weight in toward Earth. This tends to misinform the observer, who may lose sight of the fact that the man and Earth and the weight on the string are all going together around Sun at 60,000 mph.

1009.63 Despite the overwhelming power of the attraction of Earth, we must continue to keep in mind the critical-proximity concept. For instance, let us consider two steel magnets lying on a table and apparently not attracting one another simply because Earth-pull against the table and the friction of the table prevent them from indicating their pull for one another. But as they are given a series of pushes toward one another there comes a point when Earth's gravity-induced friction is overcome by the local magnetic interattraction which increases as the second power of the relative interdistance increase; and there comes a moment when friction is overcome and the two magnets start moving toward one another and accelerate to a fast, final-snap closure. It is when such other forces are overcome that the two magnets articulate their interattraction independent of all other forces: this is the point we call critical proximity. (See Sec. 518.)

1009.64 Earth and Moon were, still are, and always will be pulling on the two magnets to some extent—as are all the other galaxies of Universe. The critical-proximity moment is when all the other pulls are overcome by the pull between the two magnets and "falling-in" occurs; and the falling-in is always of the lesser toward the greater.

1009.65 The astronaut can go out space-walking because he and his space vehicle are in the same Universe orbit at the same rate, as would be any other object the space-walker had in his hand. Here is an opportunity for the mutual mass attractions to articulate themselves, except that in this situation, the prime force is the acceleration itself. What the physicists have failed to elucidate to society, and possibly to themselves, as well, is that *linear acceleration is also orbital* but constitutes release from co-orbiting (or critical- proximity orbiting) into the generalized orbiting of all Universe.

1009.66 All the creatures on board planet Earth are in such critical proximity that the falling-in effect of the apple hitting the grass, the rain dropping on the sidewalk, the hammer falling to the floor, or the child bottoming to the deck of the crib are all typical of the critical-proximity programmability of a design integrity, which programmability is employable by humans in design science. All of the creatures of planet Earth are in a "fall- in" programmed by a critical-proximity guarantee.

1009.67 The bee goes after his honey and, inadvertently, at 90 degrees to his honey- seeking plunge, his tail takes on pollen and knocks off pollen to produce a large, slowly orbiting interfertilization of the vegetation's prime-energy impoundment of photosynthesis from the stars—particularly the Sun star—of all the radio-transmitted energies to Earth. Photosynthesis impounds energy, and by orderly molecular formation and crystal building, the synergetic intertransformabilities and the associabilities and disassociabilities of the isotropic-vector-matrix field accommodation occur. What is spoken of as ecology is slowly orbiting local interaction of mutual intersupport within unpremeditatedly accomplished tuning of the prime drive programming of the spontaneous fall-in-ability of the creatures within the critical-proximity conditions: the sugar on the table, the naked girl on the bed.

1009.68 All special-case events are generated in critical proximity. Critical proximity is inherent to all intertransformability and interaccounting of eternally regenerative Universe—as, for instance, in the myriad varieties of frequencies ranging from eons to split-seconds. When Earth's orbit passes through a comet's stardust plume, we witness some of the comet's stardust falling in to Earth captivity, some of it igniting as it enters the atmospheric gases, some falling into Earth, and some with such acceleration as only to pass through the atmosphere leaving meager entropic dust to fall to Earth.

1009.69 Comet: A comet is a celestial itinerant, a cosmic skyways vacuum cleaner trying to accommodate an aggregation of stardust as it travels successively through the orbital neighborhoods of planets, stars, and other comets. The radiation pressures from the nearest stars, however, tend to blow the vacuum cleaner's stardust gleanings out into a bagless "dustbag," causing what we erroneously speak of as the comet's tail. These "tail" displays should be spoken of as Sun-radiation blowout trajectories. As comets come into critical proximity of syntropically importing planets, the stardust aggregates of their inverted "tails" are gravitationally depleted by the planets they pass, as much of that stardust is attracted into the planets or moons to become part of those import centers' syntropic buildup in a multibillions-of-years syntropic preparation of their stored-energy aggregates to be converted into the state of an entropically exporting star.

1009.70 **Orbital Escape from Earth's Critical-Proximity Programmability:** Human mind, while discovering generalized principles, eternally persisted in special-case experience sequences, but has gradually developed the capability to employ those principles to put vehicles and then self into such acceleration as to escape the fall-back-in proclivity and to escape the general ecological fall-in program of invisible interorbiting regeneration.

1009.71 As each human being discovers self and others and employs more principles more and more consciously to the advantage of others, the more effectively does the individual retain the integrity of his own unique orbiting in Universe, local though it may seem aboard our planet. His unique orbiting brings him into a vast variety of critical- proximity fall-ins. Man has progressively acquired enough knowledge to raise his vision from the horizontal to the vertical, to stay first atop the watery ocean and next atop the airocean heights, and most recently to orbit beyond the biosphere with ever greater independence, with ever greater competence, and with ever greater familiarity with the reliability of the generalized principles.

1009.72 Little individuals in orbit around little berry patches, fruit trees, nut piles, and fishing holes are instinctively programmed to pick up rocks and pile up walls around the patches, orchards, and gathering places. Some men floating on the waters and blown by the wind were challenged to respond to the accelerating frequence of stress and high- energy impacts, and they went into vastly longer orbital voyages. Others went into lesser and slower orbits on camels and horses, or even slower orbits on their own legs. The effect of human beings on other human beings is always precessional. All of us orbit around one another in ever greater acceleration, finally going into greater orbits. The local critical-proximity fall-in and its 99.9999 percent designed-in programming becomes no longer in critical-proximity evidence, while all the time the apprehending and comprehending of the generalized principles elucidates their eternal integrity in contrast to the complex inscrutability of the local critical-proximity aberrations permitted and effected in pure principle whenever the frictional effect on the two stones lying before us overcomes their tendency to fall in to one another—with naught else in Universe but two stones—which statement in itself discloses our proclivity for forgetting all the billions of atoms involved in the two stones, and their great electron orbits around their nuclei, guaranteeing the omniacceleration, yet synergetically and totally cohered by the mass- interattractiveness, which is always more effective (because of its finite closures) than any of the centrifugal disintegrative effects of the acceleration. All the interaberrations imposed on all

the orbits bring about all the wave-frequency phenomena of our Universe. The unique wave frequencies of the unique 92 chemical elements are unique to the local critical-proximity event frequency of the elemental event patternings locally and precessionally regenerated. Finally, we must recall that what man has been calling "linear" is simply *big orbit arc* seemingly attained by escaping at 90 degrees from local orbit. There are only two kinds of acceleration, greater and lesser, with the lesser being like the radius of the nucleus of an atom in respect to the diameter of its electron shell.

1009.73 Humanity at this present moment is breaking the critical-proximity barrier that has programmed him to operate almost entirely as a part of the ecological organisms growing within the planet Earth's biosphere. His visit to Moon is only symptomatic of his total, local, social breakout from a land-possessing, fearful barnacle into a world-around- swimming salmon. Some have reached deep-water fish state, some have become world- around-migrating birds, and some have gone out beyond the biosphere. Long ago, man's mind went into orbit to understand a little about the stars. And little man on little Earth has now accumulated in the light emanating from all the stars a cosmic inventory of the relative abundance of each of the 92 regenerative chemical elements present in our thus- far-discovered billion galaxies of approximately a hundred billion stars each, omnidirectionally observed around us at a radius of 11 billion light years. Man can always go into infinitely great, eternal orbit. Mind always has and always will.

1009.80 **Pea-Shooter, Sling-Thrower, and Gyroscope:** Gravity and Mass-Attraction: Highly specializing, formula-preoccupied, conventional academic science of the late twentieth century seems to have lost epistemological sight of the operationally derived mathematics identifying Galileo's accelerating-acceleration of free-falling bodies as being simply R^2, where R is the relative proximity of any two bodies whose mutual interattraction is isolatingly considered. R^2 says that every time the proximity is halved, the mass-interattraction of the two bodies will be increased as 2^2, i.e., fourfolded.

1009.81 Isaac Newton did comprehend this. Newton was inspired by the early Greeks and by Copernicus, Kepler, and Galileo. Newton compounded Kepler's discovery of the mathematical regularities manifest by the differently sized solar system's interattractions with Galileo's discoveries—which information Newton's own intuition then further integrated with ancient experience of the sling-throwers, which showed that the more the sling-thrower converted his muscle power into increasing the speed of the sling orbiting around his head before freeing one end of it to release his stone pellet, the faster and farther would the impelled stone travel horizontally before another more powerful force pulled it inwardly toward Earth's center.

1009.82 The gravitational constant is expressed as a second power. Second-powering means that the number is multiplied by itself. Thus the forces of the accelerating- acceleration of gravity can be calculated, provided the masses of the two interapproaching bodies are multiplied and their relative proximity is expressed in the terms of the relative radii magnitudes of the bodies.

1009.83 When we see the pea-shooter blowing peas out in a trajectory, we see that if it is blown harder, the impelled peas may attain a longer trajectory before they curve down and toward Earth as they yield to gravity. Assuming no wind, the gradual curvature from approximately horizontal to vertical of the peas' trajectory all occurs in the same single vertical plane. When you insert your finger into the blown pea's trajectory, you interfere with the pea and deflect it angularly. This means deflecting the plane with which the pea's horizontal course is translated toward the vertical from below, or sideways, or from any direction. This trajectory altering is a phenomenon described by the physicists as angular deflection.

1009.84 In the same way, you can also deflect the plane of travel of water coming out of a garden hose—to aim the stream of water in any direction you want before gravity overcomes the initial force impelling the water. We cannot see the individual molecules of water we are deflecting one by one when our finger angularly modifies the stream of water at the hose nozzle, but we can see the individual shooter-blown peas that we can deflect individually, thus aiming them to hit various targets. The vertical plane of the pea is deflected sideways by you, and its falling within the plane is directed by gravity. There is a vertical integrity of the trajectory plane. The finger only deflects the horizontal orientation plane. The pea does not have a memory and after initial deflection by your finger does not try to resume the vertical plane of its previous travel.

1009.85 Two forces have operated to determine the pea's trajectory:

1. gravity, which continues to operate, deflecting it progressively; and
2. the finger, which momentarily deflected it but is no longer doing so.

When we come back to the spinning Olympic hammer-thrower this time rotating vertically between head-and-foot-clamped ball-bearing turntables which in turn are mounted in gimbaled rings, to whose belt is hooked a complete, 360-degree, ball-to-ball, "grass-skirt- like" ring of horizontally revolving steel balls on the outer ends of steel rods, on the inner ends of which are pairs of triangular steel handles now hooked to the hammer-thrower's belt after his successive angular acceleration of each hammer into the horizontal spinning ring of his "grass skirt." His separately accelerated and horizontally traveling balls are each similar to each of the peas as first blown horizontally out of the pea-shooter tube. Both the peas and the steel balls are being affected by two forces: the peas by gravity pulling upon them and by the force with which they were originally propelled in horizontal trajectory; the spinning steel balls have their original horizontal acceleration, which was so great as to overcome gravity's Earthward-pulling effect, plus their second restraint, that of the steel rods successfully restraining and countering the centrifugal force that seeks to release the balls into *tangential*, not radial trajectory.

1009.86 Because centrifuges separate "heaviers" from "lighters" by expelling the heavy from the light—such as milk centrifuges out of cream— people have mistakenly thought of the expelling as radial rather than tangential. Make yourself a diagram of your own spinning of a weight around your head—you tend to think of it as being released in a horizontal plane at a point on the spun circle directly in the line running between your eyes and the target direction in which you wish the hammer to travel, that is leading perpendicularly outward from the circle in the direction in which the released pellet travels. The fact is that if it were released at that point, it would travel at a direction 90 degrees, or sidewise from your desired trajectory, from that actually realized. Studying the action of an Olympic hammer-thrower, you will find that the spherical hammer and its rod are released at a point facing away 90 degrees from the direction in which the released hammer travels: i.e., the hammer always goes off tangentially from the circle of acceleration. This contradicts the popular conception of a centrifugal force as being radial rather than tangential.

1009.87 Returning to our Olympic hammer-thrower's steel-ball, flying skirt, if you touch evenly their successively passing tops, thus downwardly deflecting each ball of the full circle of ball hammers spinning around, each is discretely deflected, say 30-degrees downwardly, which changes the plane of its individual orbital spinning. Each "peels off," like an airplane flying formation and obeying a command to break company and go into a descending path followed exactly by each successive ball coming into touch-contact with your deflecting finger held rigidly at the same point.

1009.88 If your rigidly held finger is lowered further to another discrete point in the line of travel of the successively revolving balls, and if it is held rigidly at this new point, each of the circle of revolving spherical hammers will again be discretely deflected into an additionally tilted plane (with the hammer-thrower himself as axis of rotation always maintaining perpendicularity to the plane of the hammers' revolution, his axial tilting being accommodated by the three-dimensionally oriented axles of the two gimbal rings within and to which his ball-bearing foot-and-head clamps are firmly attached).

1009.89 We had learned earlier about fixed or progressive-horizontal reangling of the plane of the peas' coincidentally yielding to gravity (Sec. 1009.83), as we tried discrete deflecting of the successive peas shot from the pea-shooter. By experimenting, moving our finger progressively deeper, in deliberately distanced stages, into the peas' profile- described "tubular" space-path of travel, we found that the nearer our finger came to the center line of travel within that "tubular" space-path, the wider the resulting angle of deflection of the peas' trajectory. When finally our finger crossed the tube's center line, the angular deflection ceased and direct 180-degree opposition to the line of pea travel occurred, whereat all the horizontal force originally imparted to the peas by the pea- shooter's pneumatic pressure-blowing is almost absorbed by impact with the finger. The pea bounces back horizontally for a usually imperceptibly meager distance before yielding entirely to gravity and traveling Earthward at 90 degrees to its original horizontal trajectory.

1009.90 What we also learned observationally before and after deflecting the peas experimentally was that gravity went to work on the peas as soon as they left the tube, and that as the peas were decelerated by air resistance below the rate of acceleration that rendered them approximately immune to the pull of gravity, that latter force became ever more effective as the air resistance took its toll of energy from the peas, and the peas were deflected progressively Earthward. We also observed that no wind was blowing, and when we did not deflect the peas with our finger, they all followed a progressively descending path in exactly the same plane until they hit the ground. Next we learned that if we intruded our finger horizontally a discrete distance into the tubular space-path of the peas, they were deflected at some discrete angle (less than 90 degrees, diametrically away from the point of entry of our finger into the peas' tubular space-path), and that if we did not move our finger further into the tubular space-path, each traveling pea thus interfered with deflected the same angular amount horizontally away from our intruding finger and held that newly angled direction, yielding further only to air resistance and gravity, with the result that each successive pea thus discretely deflected proceeded in a progressively curved trajectory, but always within the same vertical plane. In other words, successively separate and discretely distanced progressive intrusions of our finger into the tubular space-path of travel deflected the vertical plane of the trajectory of the peas into a new but again sustained vertical plane of travel, that new vertical plane occurring each time at a more abrupt angle from the original nonintruded vertical plane of the stream of traveling peas. Thus we learned that we could deliberately aim the peas to hit targets within the range of such traveling. (We have all succeeded in deflecting the trajectory of a pressured stream of water in just such a manner, but we cannot see the individual molecules of water thus deflected and think of it as a continuous stream.) The discretely modified behavior of our pea-shooter's individual peas and the individual steel-ball "hammers" of the Olympic hammer-thrower altogether permit our comprehension of the parts played by individual, but invisible-to-human-eyes energy quanta in bringing about only superficially witnessed motion phenomena that most often appear deceivingly as motionless solids or as swiftly rotating solid flywheels such as those of gyroscopes.

1009.91 Thus we now can understand that our touching the rim of a flywheel of an XYZ-axialed and gimbaled gyroscope causes each of the successively and discretely top- touched quanta to be deflected downward into a new plane of travel, accompanied always by the coincident tilting of the axle of the flywheel, which always maintains its perpendicularity to the plane of spin of the flywheel. The tilting of the plane of spin of the flywheel, caused by our finger touching the rim of the spinning wheel, tilts that wheel around an axis of tilt, which axis is the line diametrically crossing the circular plane of spin from the rim point that you touched. This diametric line is the tilting-hinge line. It runs directly away from you across the wheel. This means that as the wheel's extended axle perpendicular to the flywheel plane tilts with the wheel, as permitted by the three-axial degrees of freedom of the gimbaled gyroscope, then the axle tilts in a plane at right angles to the tilting-hinge line in the flywheel. Because the steel wheel and its axle are integral, it would be in exactly the same plane of force in which you applied your touch to the flywheel's rim, if, instead, you took hold of the top bearing housing the flywheel's top axle extremity and pulled that gimbal-freed bearing toward the rim point at which your finger had applied its initial touch, the bearing housing and the axle of the flywheel will rotate exactly sidewise from the direction in which you are pulling on it because that force makes the flywheel tilt hingingly around the line running diametrically across the wheel from your rim-touching point.

1009.92 Thus we learn that pulling the axle bearing atop the gyroscope toward the rim-touching point, which is also incidentally pulling the top axle bearing in the gimbaled system toward yourself, results in the wheel plane tilting around the described hinging line, and the axle and its bearing are thus forced to move coincidentally in a plane perpendicular to that hinge line and in the direction which is tangential to the wheel spinning at the initial touching point. This means that pulling on top of the gyroscope does not result in its yielding toward you, as you might have expected from its three-axial degrees of gimbaled freedom, as it would have done had the wheel not been spinning. Instead, it seemingly travels rotatingly in a plane at 90 degrees to your effort and continues to do so so long as you apply the force, and does so ever more speedily if you increase the force. This yielding at a plane angled at 90 degrees to your (or anyone's) applied effort is *precession*, which is the effect of a body in motion on any other body in motion; the resulting angles of precession are never in a plane congruent with the precessionally actuating force.

1009.93 Since all Universe is in motion, all the intereffects of its energy concentrations as "matter" are always intereffecting one another precessionally. The pull of Sun on Earth results in Earth orbiting around Sun at 90 degrees to the line of Sun's mass attraction of Earth. Bodies "fall" toward Earth only when their relatively small size and the critical proximity of their respectively mutual orbiting of Sun at 60,000 mph allows their progressive orbital convergence; the lesser body is only negligibly affected by the precessional forces of other astro bodies because of the second-power rate of diminution of intermass-attraction occurring as the intervening distances are increased.

1009.94 All the foregoing illustrates the integration of (1) Newton's mass-attraction law, (2) precession, and (3) synergy. They are all coming together here: Kepler, Galileo, and Newton. The earliest sling-thrower revolving the sling around his head (angular acceleration, as it is called by the physicists) demonstrates the added energy of the sling- thrower extending the trajectory. The pea-shooter does the same thing in linear acceleration. It can extend its trajectories with greater energy, but its pellets, too, yield to the gravity of Earth. Earth is very powerful, but the pea-shooter or the sling-thrower discover that the harder they swing or blow—i.e., the more energy they put into accelerating their pellets—the farther the pellets go horizontally before gravity deflects them at 90 degrees.

1009.95 But there is an integration of the horizontal and vertical planes of applied forces, between the horizontal plane of your varying effort and the vertical plane of the constant Earth's pull. Realization of this integration may be what inspired Newton. Galileo used the phrase "accelerating-acceleration," which means that the velocity is continually increasing. But the sling-thrower's force was discontinued, and the air resistance decelerated its missile until gravity's force at 90 degrees became greater. If the sling- thrower propelled his missile outside the atmosphere of Earth and beyond the critical- proximity limits within which falling in occurs, his missile would keep on traveling ad infinitum in an astro-wandering orbit.

1009.96 The logic of sensorially satisfactory experience acquired in the foregoing elucidation of precession—and the discovery of our self-deceivingly-conditioned reflex in respect to assuming 180 degrees to be the normal angular direction of spin-off instead of reality's 90-degreeness—not only renders precession comprehendible, but can make its 90-degree spin-off and other effects understandably normal and can explain much that has heretofore seemed inexplicable and abnormal. The two angular-acceleration planes become very important devices of comprehension. In our generalization of generalizations, we find that synergy, as "the behavior of whole systems unpredicted by any of the systems' parts taken separately," embraces both the generalized mass attraction and the precessional laws. Apparently, synergy embraces our definition of Universe and is therefore probably the most generalized definition of Universe.

1009.97 The generalizations are of the mind and are omniembracing and omnipermeative. Like the rays of Sun, radiations are radii and are focusable. Gravity cannot be focused; it is circumferentially embracing. Radiation has shadows; gravity has none. Radiation produces the phenomenon known to Einstein as the bending of space, the gravitational field.

1009.98 Gravitation is omniembracing. In the barrel hoops (see Sec. 705), gravity operates only in single and parallel, separate planes. Omnitriangulated geodesic spheres consisting exclusively of three-way interacting great circles are realizations of gravitational-field patterns. Events are forced to bounce in spherically contained circles because they seek the largest possible interior circumference patterns. All great circles cross each other twice. Three or more noncongruent great circles are automatically inter- self-triangulating in their repetitive searching for the "most comfortable" interactions, which always resolve their three-way-great-circle patterning into regular spherical icosahedra, octahedra, or tetrahedra. The gravitational field will ultimately be disclosed as ultra-high-frequency tensegrity geodesic spheres. Nothing else.

Next Section: 1010.00

1010.00 **Prime Volumes**

1010.01 A prime volume has unique domains but does not have a nucleus.

1010.02 A prime volume is different from a generalized regenerative system. Generalized regenerative systems have nuclei; generalized prime volumes do not.

1010.03 There are only three prime volumes: tetrahedron, octahedron, and icosahedron. Prime volumes are characterized exclusively by external structural stability.

1010.10 **Domain and Quantum:** The unique insideness domain of a prime system is, in turn, a prime volumetric domain, which is always conceptually defined by the system's topological vertex-interconnecting lines and the areas finitely enclosed by those lines. (V + F = L + 2.) Prime volumetric domain provides space definition independent of size.

1010.11 Prime volumetric domain and prime areal domain together provide space conceptuality independent of size, just as the tetrahedron provides prime structural system conceptuality independent of size.

1010.12 Complex bubble aggregates are partitioned into prime volumetric domains by interiorly subdividing prime areal domains as flat drawn membranes.

1010.13 A prime volumetric domain has no volumetric nucleus. A prime areal domain has no planar nucleus. So we have *prime system volumetric domains and prime system areal domains* and linear interconnections of all vertexes—all with complete topological conceptual interpatterning integrity utterly independent of size.

1010.14 This frees conceptual-integrity comprehending and all the prime constituents of prime-pattern integrity, such as "volume," "area," and "line," from any special-case quantation. All the prime conceptuality of omnitopology is manifest as being a priori and eternally generalized phenomena. Thus *quantum* as prime-structural-system volume is eternally generalized, ergo, transcends any particulate, special-case, physical-energy quantation. Generalized quanta are finitely independent because their prime volumetric- domain-defining lines do not intertouch.

1010.20 **Nonnuclear Prime Structural Systems:** The domain of the tetrahedron is the tetrahedron as defined by four spheres in a tetrahedral, omniembracing, closest-packed tangency network. The domain of an octahedron is vertexially defined by six spheres closest packed in omnitriangular symmetry. The domain of an icosahedron is vertexially defined by 12 spheres omnicircumferentially intertriangulated and only circumferentially symmetrically triangulated in closest packing without a nucleus (in contradistinction to the center sphere of the vector equilibrium, whose 12 outer sphere centers define the vector equilibrium's 12 vertexes; all 13 of the vector equilibrium's spheres are intersymmetrically closest packed both radially and circumferentially).

1010.21 All of the three foregoing non-nuclear-containing domains of the tetrahedron, octahedron, and icosahedron are defined by the four spheres, six spheres, and spheres, respectively, which we have defined elsewhere (see Sec. 610.20, "Omnitriangular Symmetry: Three Prime Structural Systems") as omnitriangulated systems or as prime structural systems and as prime volumetric domains. There are no other symmetrical, non-nuclear-containing domains of closest-packed, volume-embracing, unit-radius sphere agglomerations.

1010.22 While other total closest-packed-sphere embracements, or agglomerations, may be symmetrical or superficially asymmetrical in the form of crocodiles, alligators, pears, or billiard balls, they constitute complexedly bonded associations of prime structural systems. Only the tetrahedral, octahedral, and icosahedral domains are basic structural systems without nuclei. All the Platonic polyhedra and many other more complex, multidimensional symmetries of sphere groupings can occur. None other than the three- and-only prime structural systems, the tetrahedron, octahedron, and icosahedron, can be symmetrically produced by closest-packed spheres without any interioral, i.e., nuclear, sphere. (See Secs. 532.40, 610.20, 1010.20 and 1011.30.)

1011.00 **Omnitopology of Prime Volumes**

1011.10 **Prime Enclosure:** Omnitopology describes prime volumes. Prime volume domains are described by Euler's minimum set of visually unique topological aspects of polyhedral systems. Systems divide Universe into all Universe occurring outside the system, all Universe occurring inside the system, and the remainder of Universe constituting the system itself. Any point or locus inherently lacks insideness. Two event points cannot provide enclosure. Two points have betweenness but not insideness. Three points cannot enclose. Three points describe a volumeless plane. Three points have betweenness but no insideness. A three-point array plus a fourth point that is not in the plane described by the first three points constitutes *prime enclosure.* It requires a minimum of four points to definitively differentiate cosmic insideness and outsideness, i.e., to differentiate macrocosm from microcosm, and to differentiate both of them from *here* and *now*.

1011.11 Systems are domains of volumes. One difference between a domain and a volume is that a domain cannot have an interior point, because if it did, it would be subject to more economical subdivision. For instance, the vector equilibrium is a system and has a volume, but it consists of 20 domains. A vector equilibrium is not a prime domain or a prime volume, because it has a nucleus and consists of a plurality of definitive volumetric domains. The vector equilibrium is inherently subdivisible as defined by most economical triangulation of all its 12 vertexes into eight tetrahedra and 12 quarter-octahedra, constituting 20 identically volumed, minimum prime domains.

1011.20 **Hierarchy of Nuclear Aggregations:** The prime nuclear aggregation of spheres around one sphere is the vector equilibrium. Vector equilibrium constitutes the prime nuclear group because it consists of the least number of spheres that can be closest packed omnitangentially around one nuclear sphere. The vector equilibrium provides the most volumetrically economical pattern of aggregation of 12 balls around a nuclear ball of the same diameter as the 12 surrounding balls; the 13th ball is the center. In other words, is the lowest possible number connected with a structurally stable triangulated nucleus, being omnitriangularly interconnected both radially and circumferentially.

1011.21 An octahedron is at minimum a prime system. Prime systems are generalized. To be realized experimentally in special-case time-space, the octahedron must consist of a high-frequency aggregate of octahedral and tetrahedral components. An octahedral system gains a nucleus with 19 balls, i.e., with 18 uniradius balls around one, as against the minimum nucleated (four-frequency) tetrahedral array of 35 balls, i.e., with 34 balls symmetrically around one. So the octahedron gains a nucleus at a lower frequency than does the tetrahedron.

1011.22 Whether at zero-frequency or multifrequency state, the icosahedron cannot have a tangentially contiguous, ergo statically structural, nuclear sphere of the same radius as those of its closest-packed, single, outer-layer array. It can only have a dynamically structured nucleus whose mass is great enough to impose critical-proximity central dominance over its orbitally icosahedrally arrayed, remotely co-orbiting constellation of concentrated energy events.

1011.23 The vector equilibrium has four hexagonally perimetered planes intersecting each other symmetrically at its center; while the octahedron has only three square- perimetered planes symmetrically intersecting one another at its center. The hexagon has room at its center for a uniradius circle tangent to each of the six circles tangent to one another around it; whereas the square does not have room for such a uniradius circle. Wherefore the minimal four-dimensional coordinate system of the vector equilibrium is the minimum inherently nucleated system. (This is why mathematical physics employing three- dimensional, XYZ coordination can only accommodate its experimental evidence of the atomic nucleus by amorphous mathematics.) Like the octahedron, the vector equilibrium also has eight triangular facets; while also explosively extroverting the octahedron's three square central planes, in two ways, to each of its six square external facets, thus providing seven unique planes, i.e. seven-dimensionality. And while the octahedron develops a nucleus at a lower number than does the tetrahedron—or more economically than a tetrahedron—it is indicated that the nuclear arrays are symmetrical and play very great parts in compound chemistry. (The cube develops a nucleus only at a relatively high frequency.) In each one of these, there may be hierarchies that identify the difference between organic and inorganic chemistries. Due to the fact that there are nuclear aggregations in symmetry to which all of our chemistries relate, we may find an organic and inorganic identification of the tetrahedral and octahedral nucleations. The nonnuclear, exclusively volumetric, single-layer, closest-packed, icosahedral aggregate may be identified with the electron "shells" of the compounding atoms.

1011.30 **Prime Tetra, Octa, and Icosa:** Prime means the first possible realization. It does not have frequency. It is subfrequency. One or zero are subfrequency. Interval and differentiation are introduced with two. Frequency begins with three—with triangle, which is the minimum cyclic closed circuitry.

1011.31 Three *linear* events have two intervals, which is the minimum set to invoke the definition frequency. But it is an "open" circuit. The circuit is closed and operative when the triangle is closed and the same three events produce three equi-intervals, rather than two. Equi-interval = "tuned." This is why wave-frequency relationships have a minimum limit and not an infinite series behavior.

1011.32 Frequency and size are the same phenomena. Subfrequency prime tetra, prime octa, and prime icosa are each constituted of only one edge module per triangular facet. While generalizably conceptual, the prime structural systems and their prime domains—linear, areal, and volumetric—are inherently subfrequency, ergo, independent of time and size.

1011.33 *Special case* always has frequency and size-time.

1011.34 *Generalization* is independent of size and time, but the generalization principle must be present in every special case of whatever magnitude of size or time.

1011.35 Prime tetrahedra and octahedra do not have nuclei. In contradistinction to prime tetrahedra and prime octahedra, some complex tetrahedra, complex octahedra, and complex cubes do have a nucleus. They do not develop structurally in strict conformity to closest packing to contain an internal or nuclear ball until additional closest-packed, uniradius sphere layers are added. For instance, the cubical array produced by nesting eight uniradius spheres in the center of the eight triangulated sphere arrays of the nuclear- balled vector equilibrium produces eight tetrahedra single-bondedly arrayed around a nuclear ball. Additional, and symmetrically partial, layers require identification as frequency of reoccurrence of concentric shell embracement. In contradistinction to the other two prime system domains, however, the icosahedron does not accommodate additional closest-packed sphere layers and never develops a static structural nucleus. The icosahedron's closest-packing capability is that of circumferential propagation of only one omni-intertriangulated uniradius sphere and can increase its frequency only as one shell and not as a nucleus.

1011.36 If the icosahedron does develop a further outward shell, it will have to discard its internal shell because the central angles of the icosahedron will not allow room for unit-radius spheres of two or more closest-packed omnitriangulated concentric shells to be constructed. Only one closest-packed shell at a time is permitted. Considered internally, the icosahedron cannot accommodate e- en one uniradius, tangentially contiguous, interior or nuclear sphere of equal radius to those of its closest-packed, uniradius, outer shell.

1011.37 Speaking externally, either "prime" or complex "frequency" tetrahedra and octahedra may interagglomerate with one another close-packingly to fill allspace, while icosahedron may never do so. The icosahedra may be face-associated to constitute an ultimately large octahedral structure. Icosahedra may also symmetrically build independent, closest-packed, tetrahedral arrays outwardly on each of their multi- frequenced, 20 triangular facets. Thus it is seen that the icosahedral closest packing can only grow inside-outedly, as does the vector equilibrium grow internally, i.e. inside- inwardly.

1011.38 While the regular icosahedron's radius is shorter in length than its external edge chords, the vector equilibrium has the same radius as each of its edge chords; which explains the vector equilibrium's tolerance of a nucleus and the icosahedron's intolerance of a nucleus.

1011.40 **Congruence of Vectors:** All vector equilibria of any frequency reveal vectorially that their radially disassociative forces always exactly and balancingly contain their circumferentially integrated—and therefore more embracing than internally disintegrating—forces as manifest by their vectorial edge chords. The vector equilibrium consists of four symmetrically interacting hexagonal planes. Each hexagon displays six radially disintegrative, independently operative, therefore uncompounded, central vectors and their equal-magnitude six, always cooperatively organized and compounded, circumferential chord vectors. Sum-totally, the four hexagons have 24 radial disintegrative vectors and 24 chordally integrative vectors, with the chordals occurring as four closed sets of six vectors each and the radials as four open sets of six vectors each. The planes of any two hexagons of the set of four intersect one another in such a manner that the radii of any two intersecting planes are congruent, while the chords are not. This paired congruency of the 24 radial-disintegrative vectors of the four hexagons reduces their visible number to 12. The 24 chordally integrative vectors remain separate and visible as 24 finitely closed in four embracing sets of six each.

1011.41 The phenomenon "congruence of vectors" occurs many times in nature's coordinate structuring, destructuring, and other intertransformings, doubling again sometimes with four vectors congruent, and even doubling the latter once again to produce eight congruent vectors in limit-transformation cases, as when all eight tetrahedra of the vector equilibrium become congruent with one another. (See Sec. 461.08.) This phenomenon often misleads the uninformed observer.

1011.50 **Instability of Vector Equilibrium:** If we remove the 12 internal, congruently paired sets of 24 individual radii and leave only the 24 external chords, there will remain the eight corner-interlinked, externally embracing triangles, each of which (being a triangle) is a structure. Between the eight triangular external facets of the vector equilibrium, there also occur six squares, which are not structures. The six square untriangulated faces are the external facets of six nonstructurally stabilized half-octahedra, each of whose four central triangular faces had been previously defined by the now removed 24 radially paired vectors of the vector equilibrium. A half-octahedron, to be stable, has to be complementingly square-face-bonded with its other half. The prime vector equilibrium has only these six half-octahedra, wherefore the circumferential instability of its six square faces invites structural instability. Thus deprived of its internal triangular structuring by removal of all its radial vectors, the vector equilibrium becomes disequilibrious.

1011.51 The prime vector equilibrium has a nucleus surrounded, close-packingly and symmetrically, by 12 uniradius spheres. (See Illus. 222.01.) As we add unit radius sphere layers to the prime vector equilibrium, the 12 balls of the first, or prime, outer layer become symmetrically enclosed by a second closest-packed, unit radius layer of 42 balls circumferentially closest packed. This initiates a vector equilibrium with modular edge and radius intervals that introduce system frequency at its minimum of two.[2]

(Footnote 2: The number of balls in the outer shell of the vector equilibrium = $10 F^2 + 2$. The number 42, i.e., F^2, i.e., $2^2 = 4$, multiplied by 10 with the additive 2 = 42.)

1011.52 The edge frequency of two intervals between three balls of each of the vector equilibrium's 24 outer edges identifies the edges of the eight outer facet triangles of the vector equilibrium's eight edge-bonded (i.e., double-bonded) tetrahedra, whose common internal vertex is congruent with the vector equilibrium's nuclear sphere. In each of the vector equilibrium's square faces, you will see nine spheres in planar arrays, having one ball at the center of the eight (see Illus. 222.01), each of whose eight edge spheres belong equally to the adjacent tetrahedra's outwardly displayed triangular faces. This single ball at the center of each of the six square faces provides the sixth sphere to stabilize each of the original six half-octahedra formed by the nuclear ball of the vector equilibrium common with the six half-octahedra's common central vertex around the six four-ball square groups showing on the prime vector equilibrium's surface. This second layer of 42 spheres thus provides the sixth and outermost ball to complete the six-ball group of a prime octahedron, thus introducing structural stability increasing at a fourth-power rate to the vector equilibrium.

1011.53 With the 42-ball layer added to the vector equilibrium, there is no ball showing at the center of any of the triangular faces of the vector equilibrium. The three- ball edges of the 42-ball vector equilibrium provide a frequency of two. Three spheres in a row have two spaces between them. These interconnecting spaces between the centers of area of the adjacent spheres constitute the vectorial interconnections that provide the energetic, or force, frequency of the described systems.

1011.54 Then we come to the next concentric sphere layer, which has 92 balls; its frequency is three, but there are four balls to any one edge. The edges are all common to the next facet, so we only have to credit the balls to one facet or another at any one time; however, we have to do it in total overall accounting, i.e., in terms of how many balls are sum-totally involved in each of the concentrically embracing layers.

1011.55 With the four-ball edge F3, for the first time, a ball appears in the center of each of the eight triangular facets. These central balls are *potential* nuclei. They will not become new vector-equilibrium nuclei until each potential nuclear sphere is itself surrounded by a minimum of two completely encompassing layers. These potential new nuclei (potentially additional to the as yet only one nucleated sphere at the center of the prime vector equilibrium) occur in the planar triangular facets of the vector equilibrium's eight tetrahedra, which, being tetrahedra, are structural-system integrities (in contradistinction to its six half-octahedra, which—until fortified by their sixth outer-vertex balls of the two-frequency vector equilibrium—were structurally unstable).

1011.56 Though there is one ball in the center of each of the eight triangular facets of the F^3 vector equilibrium, those balls are exposed on the outer surface of their respective tetrahedra and are not omnidirectionally and omnitangentially enclosed, as they would have to be to constitute a fully developed regenerative-system nucleus. Though outer- facetly centered (i.e., planarly central), those eight F^3, triangularly centered balls are not nuclei. To become nuclei, they must await further symmetrically complete, concentric, closest-packed, vector-equilibrium shell embracements which bring about a condition wherein each of the eight new potential nuclei are embraced omnidirectionally and omnitangentially in closest-packed triangulation by a minimum of two shells exclusively unique to themselves, i.e., not shared by any neighboring nuclei. The F^3 vector equilibrium's triangular facets' central surface-area balls are, however, the initial appearance in symmetrical, concentric, vector-equilibrium shell frequency growth of such potentially developing embryo nuclei. They are the first potential nuclei to appear in the progressive closest-packed, symmetrical, concentric layer enclosing of one prime regenerative system's primally nucleated vector equilibrium.

1011.57 But at F^3 we still have only *one true nuclear ball* situated symmetrically at the volumetric center of three layers: the first of 12, the next of 42, and the outer layer of 92 balls. There is only one ball in the symmetrical center of the system. This three-layer aggregate has a total of 146 balls; as noted elsewhere (see Sec. 419.05) this relates to the number of neutrons in Uranium Element #92.

1011.58 Any sphere is in itself a potential nucleus, but it has to have 12 spheres close- packingly and omni-intertangentially embracing it to become a prime nucleated, potentially regenerative system. To stabilize its six half-octahedra requires a second layer of 42 balls. The potentially regenerative prime nucleus can have the first F^0 layer of 12-around-one nucleus, and the next (F^2) layer of 42 around both the nucleus and the first layer, without any new potential nucleus occurring in either of those first two concentric layers. So the vector equilibrium is a *nuclear uniqueness* for the first layer of 12 and the next layer of 42, with no other potential nucleus as yet appearing in its system—in its exterior shell's structural triangular facets—to challenge its nuclear pristinity.

1011.59 While there is a ball in the center of the square faces at the two-frequency, 42-ball level, those square cross sections of half-octahedra are not stable structures. Those square-centered balls are literally structurally superficial, ergo they are *extra balls* that show up but are not structurally stable in any way. They may be released to further re- form themselves into four-ball, prime, tetrahedral, structural systems, or they may be borrowed away from the nuclear system by another nuclear system—as does occur in chemical combines—without damaging the borrowed-from system's structural integrity. The four balls that occur in the core of the square facets of the F^3, 92-ball shell are also borrowable extra balls.

1011.60 In the 92-ball, F^3 third shell, eight potential nuclei occur in the triangular facets. "Four" and "square" do not constitute a structural array. To be structural is to be triangulated. Four balls also occur in each of the square facets, whereas one ball had occurred in the center of each of the six square facets of the previous F^2, 42-ball layer. This means that at the F^3, 92-ball layer, there are five balls in each of the six square-face centers. These five will be complemented by one or more, thus to form six new, detachable, nonnucleated, prime octahedra in the F^4, 162-ball layer by a square group of nine balls in each of the six square facets of the vector equilibrium. The center ball of these nine will now join with the four balls of the F^3 layer and the one ball of the F^2 layer to form altogether a prime, closest-packed octahedron having no nucleus of its own.

1011.61 At the F^4, 162-ball layer, the eight potential nuclei occurring in the mid-triangle faces of the F^3 layer are now omnisurrounded, but as we have seen, this means that each has as yet only the 12 balls around it of the F^0 nuclear-development phase. Not until the F^5, 252-ball layer occurs do the eight potential second-generation nuclei become structurally enclosed by the 42-ball layer, which has as yet no new potential nuclei showing on its surface—ergo, even at the F^5 level, the original prime nucleus considered and enclosingly developed have not become full-fledged, independently qualified, regenerative nuclei. Not until F^6 and the 362-ball layer has been concentrically completed do we now have eight operatively new, regenerative, nuclear systems operating in partnership with the original nucleus. That is, the first generation of omnisymmetrical, concentric, vector equilibrium shells has a total of nine in full, active, operational condition. These nine, 8 + 1, may have prime identification with the eight operationally intereffective integers of arithmetic and the ninth integer's zero functioning in the prime behaviors of eternally self-regenerative Universe. We may also recall that the full family of Magic Numbers of the atomic isotopes modeled tetrahedrally occurs at the sixth frequency (see Sec. 995).

1011.62 The potential nucleated octahedra that were heralding their eventual development when the six prime (nonnucleated) octahedra occurred at the F^4 level do not develop to full threefold, concentric, shell embracement as operational nuclei for several levels beyond that which had produced the second-generation eight vector-equilibrium nuclear integrities. We become also intrigued to speculate on the possible coincidence of the prime patternings developing here in respect to the 2, 8, 8, 18, 18, etc., sequences . . . of the Periodic Table of the Elements.

1012.00 **Nucleus as Nine = None = Nothing**

1012.01 Nucleus as nine; i.e., non (Latin); i.e., none (English); i.e., nein (German); i.e., neuf (French); i.e., nothing; i.e., interval integrity; i.e., the integrity of absolute generalized octaval cosmic discontinuity accommodating all special-case "space" of space- time reality. (See Secs. 415.43 and 445.10.)

1012.10 **Positive-Negative Wave Pattern:** Both the gravitational and the radiational effects operate exclusively in respect to and through the nucleus, whose unique domains multiply in eighths. Completion of the absolute initial uniqueness of pattern evolution of the nucleus itself brings in the nine as nothingness. How does this happen?

1012.11 Let us take three balls arranged in a triangle. We then take two other uniradius tangent balls lying in the same plane and address them symmetrically to any one corner-ball of the first three so that we have two rows of three balls crossing one another with one ball centrally common to both three-ball lines; so that we have two symmetrically arrayed triangles with one common corner. Obviously the center ball—like a railway switch—has to serve alternately either one three-ball track or the other, but never both at the same time, which would cause a smash-up. If we do the same thing four-dimensionally for the eight tetrahedra of the vector equilibrium, we find that the nuclear center ball is accommodating any one or any pair of the eight tetrahedra and is interconnecting them all. Externally, the eight tetrahedra's 24 vertexes share 12 points; internally, their eight vertexes share one point. The common center ball, being two-in-one (unity two), can be used for a pulse or a space; for an integer or a zero. The one active nucleus is the key to the binary yes-no of the invisible transistor circuitry.

1012.12 As in the 92-ball, three-frequency vector equilibrium, there are four balls to an edge going point to point with a three-space, F^3, in between them. An edge of the four ball could belong either to the adjacent square or to the adjacent triangle. It cannot belong to either exclusively, and it cannot belong to them both simultaneously; it can function for either on modulated-frequency scheduling. It is like our chemical bonding, bivalent, where we get edge-to-common-edgeness.

1012.13 As shown in *Numerology* (Sec. 1223), when we begin to follow through the sequences of wave patterning, we discover this frequency modulation capability permeating the "Indig's" octave system of four positive, four negative, and zero nine. (See drawings section.)

Indigs of Numerology:

1 = + 1	10 = + 1	19 = + 1
2 = + 2	11 = + 2	20 = + 2
3 = + 3	12 = + 3	21 = + 3
4 = + 4	13 = +4	22 = + 4
5 = - 4	14 = - 4	23 = - 4
6 = - 3	15 = - 3	24 = - 3
7 = - 2	16 = - 2	25 = - 2

8 = - 1 17 = - 1 26 = - 1

9 = 0 18 = 0 27 = 0 Etc., etc.

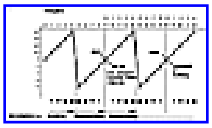


Fig. 1012.14A

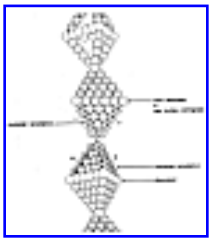


Fig. 1012.14B

1012.14 Applying the Indig-Numerology to the multiplication tables, this wave phenomenon reappears dramatically, with each integer having a unique operational effect on other integers. For instance, you look at the total multiplication patterns of the prime numbers three and five and find that they make a regular X. The foumess (= + 4) and the fiveness (= - 4) are at the positive-negative oscillation center; they decrease and then increase on the other side where the two triangles come together with a common center in bow-tie form. You find that the sequences of octaves are so arranged that the common ball can be either number eight or it could be zero or it could be one. That is, it makes it possible for waves to run through waves without having interference of waves. (See drawings section.)

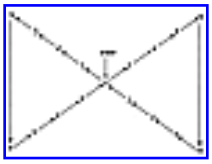


Fig. 1012.15

1012.15 Each ball can always have a neutral function among these aggregates. It is a nuclear ball whether it is in a planar array or in an omnidirectional array. It has a function in each of the two adjacent systems which performs like bonding. This is the single energy- transformative effect on closest-packed spheres which, with the arhythmical sphere → space → space → sphere → space → space—suggests identity with the neutron-proton interchangeable functioning.

1012.16 The vector equilibrium as the prime convergence-divergence, i.e., gravity- radiation nucleus, provides the nuclear nothingness, the zero point where waves can go through waves without interfering with other waves. The waves are accommodated by the zeroness, by the octave of four positive and four negative phasings, and by a nuclear terminal inside-outing and a unique pattern-limit terminal outside-inning. But there are two kinds of positives and negatives: an inside-outing and an arounding. These are the *additive twoness* and the *multiplicative twoness.* The central ball then is an inside-outness and has its poles so it can accommodate either as a zeroness a wave that might go around it or go through it, without breaking up the fundamental resonance of the octaves.

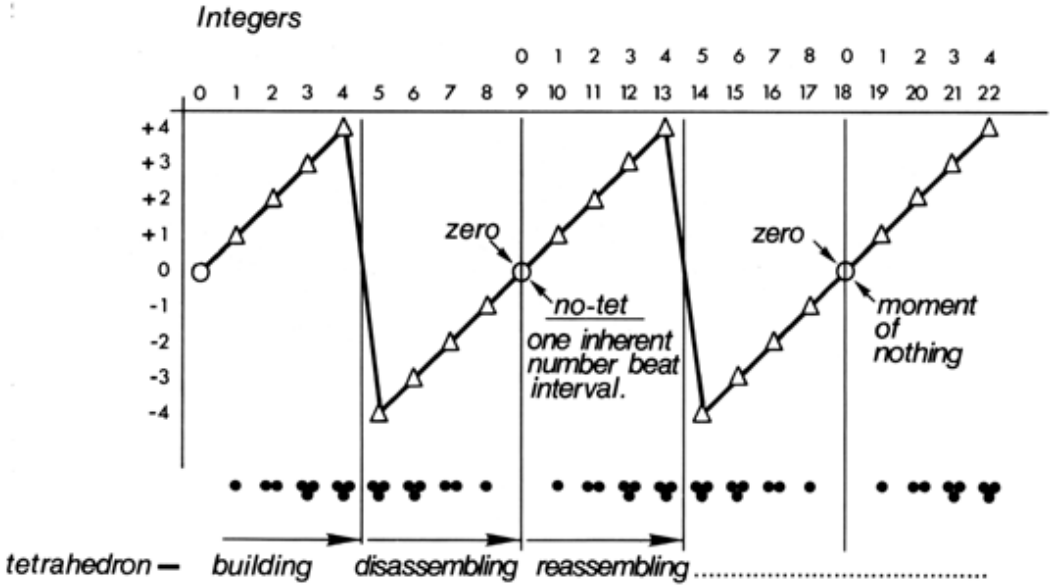


Fig 1012.14A Indig Octave System of Four Positive, Four Negative and Zero-Nine Wave Pattern of Experiential Number: This basic discontinuous wave disclosure is intimately related to inherent octavization through tension-chord halving discovered by the Pythagoreans, and the major-minor-mode "fifthing" obtained by tension-chord thirding of length. These inherent additive-subtractive, alternate pulsing effects of number produce positive waves, but *not continuously* as had been misassumed. Zero-or "No-tet, None, Nine" intrudes. Waves are discontinuous and confirm unit quantation, one tetrahedron inherently constituting the basic structural system of Universe. The star Sun's combining of four hydrogen atoms into helium atoms generates quanta radiation.

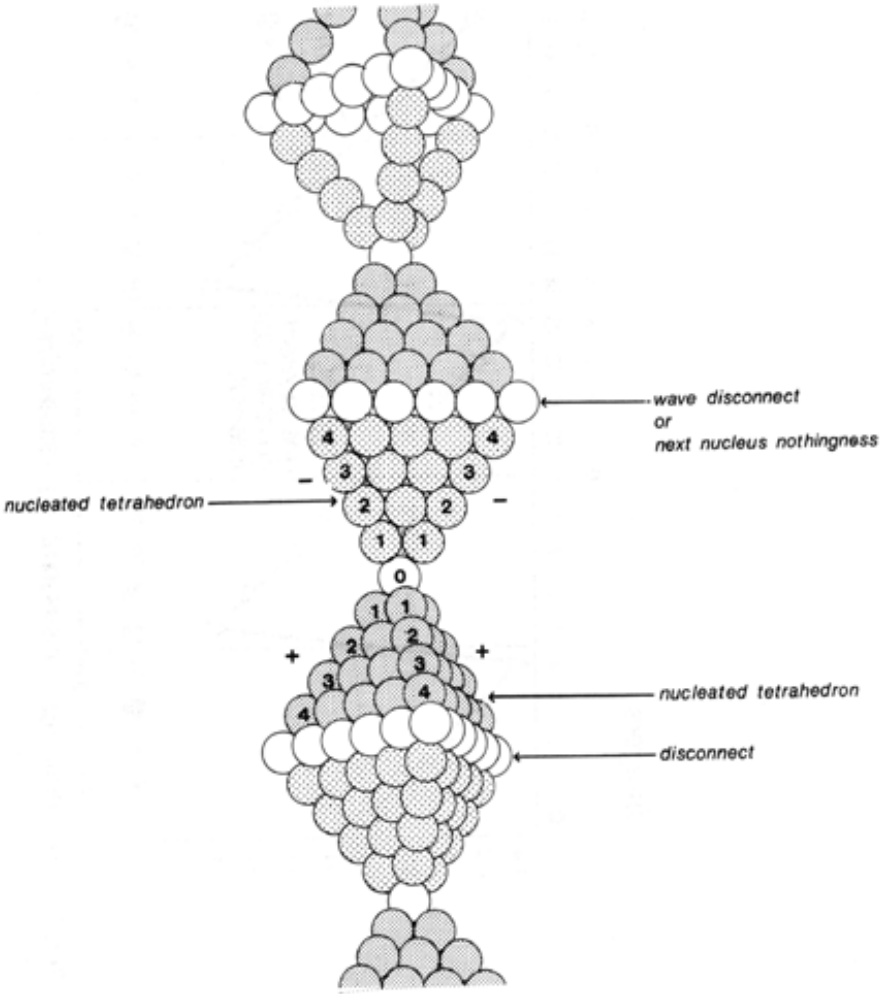


Fig 1012.14B Wave, Quanta, Indigs, Unity-Is-Plural Bow Ties: This works for any pair of the ten pairs of tetrahedra in the vector equilibrium, of which only four pairs are active at any one time. The bow-tie waves illustrate the importance of zero. They come into phase with one another and with physics and chemistry. (Note the "Wave Disconnect" or next-nucleus nothingness.)

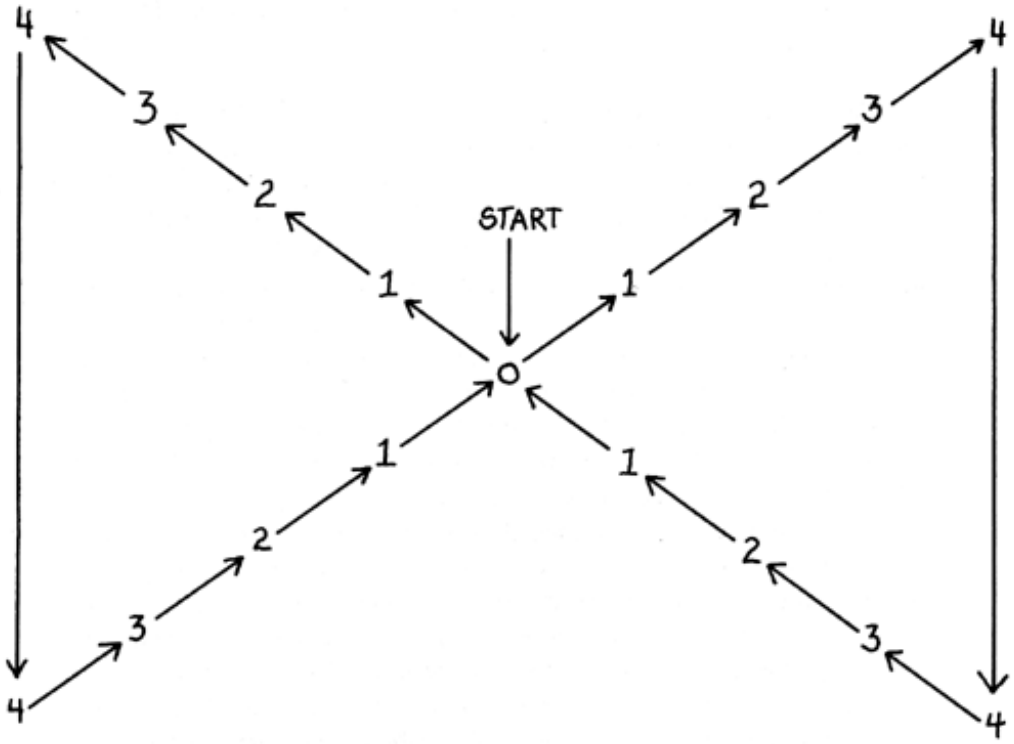


Fig 1012.15.

1012.20 **Pumping Model:** The center ball of a vector equilibrium is zero. The frequency is zero, just as in the first layer the frequency is one. So zero times ten is zero; to the second power is zero; plus two is two. So the center ball has a value of two. The significance is that it has its concave and its convex. It has both insideness and outsideness congruently. It is as far as you can go. You turn yourself inside out and go in the other direction again. This is a terminal condition.

1012.21 We have then a tetrahedron that has an external and an internal: a terminal condition. Gravity converts to radiation. This is exactly why, in physics, Einstein's supposition is correct regarding the conservation of Universe: it turns around at both the maximum of expansion and the minimum of contraction, because there is clearly provided a limit and its mathematical accommodation at which it turns itself inside out.

1012.22 You get to the outside and you turn yourself outside-in; you come to the center and turn yourself inside-out. This is why radiation does not go to higher velocity. Radiation gets to a maximum and then turns itself inwardly again—it becomes gravity. Then gravity goes to its maximum concentration and turns itself and goes outwardly, becomes radiation. The zero nineness-nucleus provides the means.

Next Section: 1012.30

1012.30 **Indestructibility of Tetrahedron:** We have here a pumping model of the vector equilibrium. It consists only of the vector lines of the system formed by 12 uniradius spheres closest packed around one sphere of the same radius. The interconnecting lines between those 13 spheres produce the pumping vector equilibrium model's skeleton frame. We have also removed the vector equilibrium's 12 internal double radii to permit the vector equilibrium system to contract; thus we have for the moment removed its nuclear sphere. Every vector equilibrium has eight tetrahedra with 12 common edges, a common central vertex, and 12 common exterior vertexes. Each tetrahedron of the eight has four planes that are parallel to the corresponding four planes of the other seven. Each of the vector equilibrium's eight tetrahedra has an external face perpendicular at its center to a radius developed outwardly from the nucleus. Each of the eight external triangular faces is interconnected flexibly at each of its three comers to one other of the eight triangles. It is found that the whole vector equilibrium external-vector framework can contract symmetrically, with the four pairs of the eight external triangles moving nontorquingly toward one another's opposite triangle, which also means toward their common nucleus. As they do so, each of the four pairs of exterior triangles approaches its opposite. When the eight separate but synchronously contracting tetrahedra diminish in size to no size at all, then all eight planes of the eight triangles pass congruently through the same nuclear center at the same time to form the four planes of the vector equilibrium. (See Sec. 623.)

1012.31 Because each of the eight triangles had converged toward one another as four opposite pairs that became congruent in pairs, we seemingly see only four planes going through the center in the model. There are, however, really eight planes passing through the same vector-equilibrium nuclear point at the same time, i.e., through the empty, sizeless nucleus.

1012.32 As the eight tetrahedra diminished in size synchronously, their edges became uniformly smaller at a velocity of the first power; their areas became smaller at a velocity of the second power; and their volumes became smaller at a velocity of the third power— which are three very different velocities. Finally, they all reached zero velocity and size at the same time. As they became smaller, however, there was no change in their respective foumess of faces; sixness of edges; foumess of vertexes; nor equilateralness; nor equiangularity. These are changeless constants. So what you see in the model is eight sizeless tetrahedra that became one empty, sizeless, congruent set, with all their mathematically constant tetrahedral characteristics unaltered, ergo, conceptually manifest as eternity.

1012.33 What we speak of as a point is always eight tetrahedra converged to no size at all. The eight tetrahedra have been brought to zero size and are abstracted from time and special case. They are generalized. Though the empty vector-equilibrium model is now sizeless, we as yet have the planes converging to intercept centrally, indicating the locus of their vanishment. This locus of vanishment is the nearest to what we mean by a point. The point is the macro-micro switchabout between convergence and divergence.

1012.34 We also have learned that a plurality of lines cannot go through the same point at the same time. Therefore, the eight perpendiculars to the centers of area of the triangle faces and the 12 lines that led to their 12 common outer vertexes, like the tetrahedra's volumes and areas, have come to common zero time-space size and can no longer interfere with one another. We find operationally, however, that there never was any paradoxical problem, such as Zeno's "never completable approach" concept, for we have learned of the fundamental torque or twist always present in all experientially explored system realization, and we find that as each team of opposite triangles apprehended the other just upon their nearing the center, each is whirled 180 degrees, or is "half spun" about, with its three corners never completely converging. Whereafter they diverge.

1012.35 Take three round rods of the same diameter and nest them together in parallel triangulation. They are now closest-possibly-packed together. Now slip a triangular-shaped ring tightly around them and glide it to their midlength point. Now twist the ends of the three in opposite directions; the ends will open outwardly from one another as triangles. Stand the group on one three-point tripod end with wires between those opposite ends to limit their spreading. But they could also have twisted clockwise for the half-spin. They could half-spin alternatively to produce whole-cycle coverage. We find that three lines converge to critical proximity, then twist, and spin around one another. This happens also with all six of the diameters (or all 12 of the radii) of the vector equilibrium. (An articulating model of this can be made with four sets of three stiff brass wires each, laying the four sets in parallel, closest-packed bunches and soldering together the three wire ends at one end of each of the four bunches; it will be found that their total of 12 free ends may be lead through one another's mid-girth in a symmetrically progressive manner, after which these led-through, four sets of ends may be respectively sprung together in sets of three and soldered together; which model then provides a number of very exciting intertransformabilities elucidating the vector equilibrium's significance.) In the vector equilibrium, the "whole cycles" are accomplished in four planes corresponding symmetrically to

one another as represented by the great-circle planes of the empty-state vector equilibrium or of its eight empty-state tetrahedra.

1012.36 Because the nuclear center of the vector equilibrium is also the generalized volumetric center of the spheres in the closest-packed condition, as well as of the spaces between the spheres, all of which correspond to all the vertexes (or all possible system convergences) of the isotropic vector matrix, we learn that all three vectorial lines of Universe can twist by one another producing half-spin, half-quantum, wave bulgings as they do without frustrating any form of intertransformative event development in Universe, and while also disclosing an absolute compatibility to, and elucidation of, wave- quanta behavior in generalized conceptuality.

1012.37 Reviewing the same phenomenon once again, we make further discovery of the utter interrelatedness of synergetic accommodation, as we find the half-spin "tepee" twist also turning the tetrahedron inside out. (See Sec. 621.20.) Here we find that the vector equilibrium, or the vector equilibrium's eight tetrahedra's external vertexes, all converged toward one another only to suddenly describe four half-great-circle spins as they each turned themselves inside out just before the convergence: thus accomplishing sizeless invisibility without ever coming into contact. Eternal interval is conserved. Thus the paradox of particle discontinuity and wave continuity is conceptually reconciled. (See Sec. 973.30.)

1013.00 **Geometrical Function of Nine**

1013.10 **Unity as Two: Triangle as One White Triangle and One Black Triangle**

1013.11 Fish fan their tails sideways to produce forward motion. Snakes wriggle sideways to travel ahead. Iceboats attain speeds of 60 miles per hour in a direction at right angles to wind blowing at half that speed. These results are all precessional.

1013.12 The minialtitude tetrahedron seen as a flattened triangle has a synergetic surprise behavior akin to precession. We can flip one simple white triangle over and find that the other side is black. One triangle must thus be considered as two triangles: the obverse and reverse, always and only coexisting almost congruent polar end triangles of the almost zerolong prism.

1013.13 Polarity is inherent in congruence.

1013.14 Every sphere has a concave inside and a convex outside. Convex and concave are not the same: concave reflectors concentrate energy; radiation and convex mirrors diffuse the radiant energy.

1013.15 Unity is plural and at minimum two. Unity does not mean the number one. One does not and cannot exist by itself.

1013.16 In Universe life's existence begins with awareness. No otherness: no awareness. The observed requires an observer. The subjective and objective always and only coexist and therewith demonstrate the inherent plurality of unity: inseparable union.

1013.20 Complementarity and Parity

1013.21 Physics tends to think of complementarity and parity as being the interrelationship characteristics of two separate phenomena. Complementarity was discovered half a century ago, while parity was first recognized only 20 years ago. In fact the non-mirror-imaged complementations are two aspects of the same phenomenon. The always-and-only-coexisting non-mirror-image complementations also coexist as inseparable plural unity.

1013.30 Eight Three-petaled Tetrahedral Flower Buds

1013.31 We can interconnect the three mid-edged points of an almost-zero-altitude tetrahedron, a thin-material triangle, thus subdividing a big triangle into four smaller similar triangles. We recall that the big triangle must be considered as two triangles; the obverse may be white and the reverse may be black. We can fold the three corner triangles around the three lines separating them from the central triangle, thereby producing two different tetrahedra. Folding the corner triangles under or over produces either a white tetrahedron with a black inside or a black tetrahedron with a white inside. Since the outside of the tetrahedron is convex and the inside is concave, there are two very real and separate tetrahedra in evidence. Eight faces (four black, four white) have been evolved from only four externally viewable triangles, and these four were in turn evolved from one (unity-is-plural) triangle—an almost-zero-altitude tetrahedral system or an almost-zero-altitude prismatic system.

1013.32 Both the positive and negative concave tetrahedra have four different black faces and four different white faces. We can differentiate these eight faces by placing a red, a green, a yellow, and a blue dot in the center of each of their respective four white inside faces, and an orange, a purple, a brown, and a gray dot in the center of each of their outside black triangles successively.

1013.33 Each of the two tetrahedra can turn themselves inside out as their three respective triangular corners rotate around the central (base) triangle's three edge hinges—thus to open up like a three-petaled flower bud. Each tetrahedron can be opened in four such different flower-bud ways, with three triangular petals around each of their four respective triangular flower-receptacle base faces.

1013.34 The four separate cases of inside-outing transformability permit the production of four separate and unique positive and four separate and unique negative tetrahedra, all generated from the same unity and each of which can rank equally as nature's simplest structural system.

1013.40 **Nine Schematic Aspects of the Tetrahedron**

1013.41 Every tetrahedron, every prime structural system in Universe, has nine separate and unique states of existence: four positive, four negative, plus one schematic unfolded nothingness, unfolded to an infinite, planar, neither-one-nor-the-other, equilibrious state. These manifest the same schematic "game" setups as that of physics' quantum mechanics. Quantum mechanics provides for four positive and four negative quanta as we go from a central nothingness equilibrium to first one, then two, then three, then four high-frequency, regenerated, alternate, equiintegrity, tetrahedral quanta. Each of the eight tetrahedral quanta also has eight invisible counterparts. (See Figs. 1012.14A-B, and 1012.15.)

1013.42 When the four planes of each of the eight tetrahedra move toward their four opposite vertexes, the momentum carries them through zerovolume nothingness of the vector equilibrium phase. All their volumes decrease at a third-power rate of their linear rate of approach. As the four tetrahedral planes coincide, the four great-circle planes of the vector equilibrium all go through the same nothingness local at the same time. Thus we find the vector equilibrium to be the inherent zero-nineness of fundamental number behavior. (See color plate 31.)

1013.50 **Visible and Invisible Tetrahedral Arrays**

1013.51 **Visibly Demonstrable: Physical**

Four white, three-petaled flowers 1 red base 1 green base 1 yellow base 1 blue base
Four black, three-petaled flowers 1 orange base 1 purple base 1 brown base 1 gray base

1013.52 Invisible But Thinkable: Metaphysical

Four white, three-petaled flowers 1 orange base 1 purple base 1 brown base 1 gray base
Four black, three-petaled flowers 1 red base 1 green base 1 yellow base 1 blue base

1013.60 **Quantum Jump Model**

1013.61 All of the triangularly petaled tetrahedra may have their 60-degree corners partially open and pointing out from their bases like an opening tulip bud. We may take any two of the 60-degree petaled tetrahedra and hold them opposite one another while rotating one of them in a 60-degree turn, which precesses it axially at 60 degrees, thus pointing its triangular petals toward the other's 60-degree openings. If we bring them together edge to edge, we will produce an octahedron. (Compare Sec. 1033.73.)

1013.62 The octahedron thus produced has a volume of four tetrahedra. Each of the separate tetrahedra had one energy quantum unit. We now see how one quantum and one quantum may be geometrically joined to produce four quanta. Another quantum jump is demonstrated.

1013.63 Each of the two tetrahedra combining to make the octahedron can consist of the eight unique combinations of the black and the white triangular faces and their four red, green, yellow, and blue center dots. This means that we have an octahedron of eight black triangles, one of eight white, and one of four white plus four black, and that the alternation of the four different color dots into all the possible combinations of eight produces four times 26—which is the 104 possible combinations.

1013.64 Where N = 8 and there are four sets of 8, the formula for the number of combinations is:

$$\frac{4(N^2 - N)}{2} \therefore \frac{4(64 - 8)}{2} = \frac{4 \times 56}{2} = 112$$

This result has a startling proximity to the 92 unique regenerative chemical elements plus their additional non-self-regenerative posturanium atoms.

Next Section: 1020.00

1021.10 **Convexity and Concavity of Tetrahedron**

1021.11 The outsides of systems are convex, and their insides are concave. While convexity diffuses radiation impinging upon it, concavity concentrates radiation impinging upon it; ergo, convexity and concavity are not the same.

1021.12 For every tetrahedron, there is one convex and one concave. Because the tetrahedron is inherently the minimum structural system of Universe, it provides the minimum omnicoexisting convexity and concavity condition in Universe.

1021.13 For every tetrahedron, there is an inside tetrahedron and an outside tetrahedron. For every convex spherical polyhedral geodesic system, there is a concave spherical polyhedral geodesic system. One cannot exist without the other either in special case or in sizeless eternal generalization. Spherical arrays and compound curvature begin with the tetrahedron.

1022.10 **Minimum Sphere**

1022.11 The transcendentally irrational constant pi (π) is irrelevant to spherical geodesic polyhedral array calculations because the *minimum sphere* is a tetrahedron. We have learned that a sphere as defined by the Greeks is not experimentally demonstrable because it would divide all Universe into outside and inside and have no traffic between the two. The Greek sphere as defined by them constituted the first and nondemonstrable perpetual-motion machine. Because there could be no holes in it, the Greek sphere would defy entropy. A sphere with no holes would be a *continuum* or a *solid*, which are physical conditions science has not found. We could dispense with all Universe outside the Greek sphere because Universe inside would be utterly conserved and eternally adequate to itself, independent of the rest of Universe outside.

1022.12 What we do have experimentally as a sphere is an aggregate of energy-event foci approximately equidistant in approximately all directions from one approximate energy-event focus. This is a system in which the most economical relationships between embracingly adjacent foci are the greatcircle chords, and not the arcs. This is why pi (π) is operationally irrelevant. Physics finds that nature always employs the most economical means. Being shorter, chordal distances are more economically traversed than are detouring arcs. All the chords between external points of systems converge with one another concavely and convexly, i.e., with the angles around each external point always adding to less than 360 degrees. They do not come together, as do radii in a plane, with 360 degrees around each point.

1022.13 The chords of an omnidirectional system always come together with concavity on one side and convexity on the other. The angles never add up to 360 degrees, as do those formed on a plane by lines converging radially upon a point. This is why the long-held working assumption of mathematics—that for an infinitesimal moment a sphere is congruent with the plane to which it is tangent—is invalid. Therefore, spherical trigonometry, with its assumption of 360 degrees around a point, is also invalid. Greek spheres cannot be scientifically demonstrated. Almost-spherical polyhedra are the nearest approximation. It can only be treated with as polyhedral—as an aggregate of points in which the most economical relationships are chords; ergo, geodesics .

1022.14 If you find all the connections between all the points, the system is omnitriangulated. A spherical polyhedron is a high-frequency geodesic polyhedron. Its symmetric base may be tetrahedral, octahedral, or icosahedral; but it may not be hexagonal, i.e., with angles adding to 360 degrees around each external point of the system. The sum of all the angles around all the external points of the superficially seeming spherical systems will always add up to 720 degrees less than the number of external vertexes when each is multiplied by 360 degrees.

1022.15 In every geodesic sphere, you can always take out 12 pentagons. These 12 pentagons each drop out one triangle from the hexagonal clusters around all other points. Assuming the dropped-out triangles to be equiangular, i.e., with 60-degree corners, this means that $60 \times 12 = 720°$, which has been eliminated from the total inventory of surface angles. You can always find 12 pentagons on spherically conformed systems such as oranges, which are icosahedrally based; or four triangles with 120-degree corners if the system is tetrahedrally based; or six squares where the system is octahedrally based.

1023.10 **Systematic Enclosure**

1023.11 If we get too semantically incisive, the reader may lose all connection with anything he has ever thought before. That might not be a great loss. But we assume that the reader can cope with his reflexes and make connections between the old words and new concepts with the new and more apt words. For example, since physics has found no continuums, we have had to clear up what we mean by a sphere. It is not a surface; it is an aggregate of events in close proximity. It isn't just full of holes: it doesn't have any continuum in which to have holes.

1023.12 The word *polyhedron* has to go because it says "many-sided," which implies a continuum. We don't even have the faces. Faces become spaces. They become intervals. They become nothing. The Einsteinian finite Universe—an aggregate nonsimultaneous Universe—is predicated only on the absolute finiteness of each local energy-event package and the logic that an aggregate of finites is itself finite.

1023.13 The spheric experience is simply an ultrahigh frequency of finite event occurrences in respect to the magnitude of the tuning perceptivity of the observer. (High frequency to the human may be low frequency to the mosquito.)

1023.14 If we get rid of the word *polyhedra*, then what word do we have in its place? A high-frequency, omnidirectional, spheric event system. Polyhedra are finite system enclosures. They are topologically describable, finite *system enclosures.* They are Universe dividers. They are not linear dividers, but omnidirectional Universe dividers dividing outside from inside, out from in. A mosquito has macro-micro cosmos system perceptivity at a different level from that of the whale's. Probably each observer organism's stature constitutes its spontaneous observational level of macro-micro subdividing: bigger than me; littler than me; within me; without me.

1023.15 We relinquish the word *polyhedra* to reemploy our new term *systematic enclosure,* which can be generalized to serve creatures of any size— i.e., a tetrahedron big enough for a mosquito or big enough for a whale. Faces are spaces, openings. The four vertexes plus four faces plus six lines of the tetrahedron must become four somethings plus four nothings plus six relations. We add convergence *to something* and divergence *to nothing*—completely independent of size. Since there are no "things," there is no "something." We are talking of an event in pure principle. We have events and no-events. Events: novents: and relationships. Nature employs only one or another of the most equieconomical relationships. The most economical relationships are geodesic, which means most economical relationships. Ergo we have events and novents: geodesics and irrelevance. These are the epistemological stepping-stones.

1023.16 The spheric experience is a high-frequency, omnidirectional complex of events and their relatedness. Since it is concerned with the most economical relatedness, we can also speak of it as a geodesic spherical experience. This is where the importance of chords comes in. A chord is abstract, yet tensive. A chord has pull: we would probably not think about the connections unless there was some pull between them. The function of the chords is to relate. The event is the *vertex.* The reaction is the *chord*, the pulling away. And the resultant is the inadvertent definition of the nothingness of the *areal and volumetric spaces.* The sequence is: Events; chords; no-events. No-events = novents. Areas do not create themselves; as with celestial constellations, they are incidental to the lines between the events. The faces are the bounding of nothingness. Areas and volumes are incidental resultants to finding the connections between events of experience.

1023.17 Not only can there be no awareness until there is otherness to be aware of, but there can be no *magnitude awareness* with only one otherness. You need two otherness experiences with an interval between them in order to have a sense of distance. (Otherwise, you might just be looking at yourself in a mirror.)

1023.18 You can have no sense awareness of shape with just one otherness or two othernesses. *Shape awareness* commences only with three othernesses where the relationship of three as a triangle has finite closure. Shape is what you see areally, and until there is closure, there is no area of otherness .

1023.19 Not until we have four othernesses do we have macrocosmic volumetric awareness. Four is required for substantive awareness.

1023.20 *System awareness* begins when we find the otherness surrounding us, when we are omnidirectionally enclosed. The volume sense is only from inside. From outside, four points can look like one point or they can look flat. Not until we turn a tetrahedron inside out do we have microcosmic awareness. Not until we swallow the otherness do we have microcosmic volumetric awareness. We become the outside. At first, we were just the inside. In the womb. In the womb, we had tactile, sensorial awareness of volumetric surroundment by the otherness, but no visual, aural, or olfactoral awareness of the otherness surroundment. The child develops otherness awareness only as outside volumetric surroundment within which he finally discovers *me* the observer, and *me's* hand.

1024.10 **What Is a Bubble?**

1024.11 What is a bubble? When oil is spilled on water—unfortunately, an increasing phenomenon—it spreads and spreads as a result of gravity pulling and thinning it out. It thins out because the molecules were piled on top of one another. Gravity is pulling it into single-molecule-thickness array. The individual molecules are mass-interattracted, but the attraction can be focused on the nearest molecules. Molecules can therefore be tensed and will yield in such a manner as to thin out their mass, which can be stretched as a sheet or stretched linearly—for each molecule holds on to only those other molecules within critical proximity.

1024.12 As one floating molecule is surrounded by six other floaters and the six are surrounded by 12, or the next perimeter of 18, pulling on one molecule distributes the pull to six, and the six distribute the pull to 12, and the 12 distribute the pull to 18, and therefore the original pull becomes proportionally reducible and the relative distance between the molecules varies from one surrounding hexagon to the next. This relative proximity brings about varying tension, which brings about varying density. Varying density, we learn in optics, brings about varying refraction of light frequency, ergo, of light as color, which accounts for the rainbow spectrum differentiating witnessed as sunlight strikes oil-covered waters. By passing light through clear plexiglass structural models, the structural strains as distributed throughout the plastic mass are visually witnessable by the red, orange, yellow, green, blue, violet rainbow spectrum.

1024.13 Comprehending the mass-attracted, intertensed integrity of molecules and atoms, witness how the blacksmith can heat his metals in the red-hot condition and hammer the metal into varying shapes, all permitted by the mass-interattraction of the atoms themselves and their geometrical, methodical yielding to rearrangement by forces greater than their local surroundment interattractions. The heating is done to accelerate the atoms' electrons to decrease the relative-proximity interattractiveness and accommodate the geometrical rearranging of the atoms. The cold metals, too, can be hammered, but the energy-as-heat facilitates the rearranging. When metals are reshaped, they do so only as the absolute orderly intertransformative geometry of closest packed atoms permits.

1024.14 Because the atoms and the molecules are subvisible in magnitude to man, he fails to detect the exquisite geometrical orderliness with which they yield to rearrangement while retaining the total interattractiveness occasioned by their initial aggregation within the critical limits of mass-attraction where the attractive force overcomes the individual orbiting integrity. The relative interattraction increases as the second power of the rate at which the interdistances diminish.

1024.15 The atomic proximity within the metals is of such a high order as to give high tensile strength, which is resistance to being pulled or put asunder. Exquisite magnitudes of interattractive proximities have nothing to do with pressure. The phenomenon is coherent density. Density is a pulling together. (The error of reflexing is here comparable to humans' misapprehending the wind's "blowing" when we know that it cannot blow; it can only be sucked.) Man is always thinking he can push things when they can only be pulled. Men are pushers. Women are attracters.

1024.16 These principles of interattractive strengths and orderly geometrical yielding to stresses are employed to a high degree in the manufacturing of thin transparent plastic sheets, such as all society is becoming familiar with as a use product.

1024.17 Children are familiar with bubble gum. They are accustomed to seeing the bubble blown until suddenly it becomes transparent. The membrane is yielding circumferentially and tensilely to the pressure differential between the outside atmosphere and the multiplying molecules of gas inside literally hitting the skin, trying to escape. When the molecules of the bubble gum have rearranged themselves in a geometrically orderly manner so as to get the isotropic-vector matrix trussing thinned down finally to a single layer, then it has become transparent. Between the finite Milky Way array, the atoms are in sufficient proximity to hold their single-layer triangulation array of hexagons within hexagons. In this condition, bubbles show the same color differentiation that reflects the tensile variations: what humans have learned to call surface-tension integrity.

1024.18 In the way children blow up small rubber balloons, you can almost see the layers of molecules yielding as if unfolding like an accordion, opening up angle after angle as the balloon yields to stretch. The child witnesses nature yielding to his own internal pressures as nature thins out the atomic and molecular arrangement with the most exquisite delicacy of uniform thickness throughout the stretching. The atoms and molecules distribute the load superbly and open up the many layers to one single layer with a dimensional accuracy inherent in the unique prime geometrical magnitudes of the nucleus-electron orbit frequencies differentiating one chemical element from the other in absolute spectroscopic detectability throughout the so-far-observed Universe. The dimensional integrities are topological and vectorial relative to all the characteristics with which synergetics is concerned.

1024.19 Even as a child blows his bubble gum, the manufacturer of plastic film first extrudes plastic wire; in its most plastic state, its end is conically pierced centrally while a machine blows air into the pierced core (cone) of the wire, which then yields in its absolute geometrical orderliness of intermolecular and interatomic integrities so that the intruded gas stretches the progressively pulled-around and conically intruded wire into a thin, monometrically single-molecule thickness—or a plurality of molecular thicknesses directly and geometrically proportional to the pressure. As the gas is introduced through the apex of the piercer of the wire (like a micro-cratered cone with a compressed air "volcano" erupting from within it), it stretches the wire into a bubble expanding at 180 degrees from the gas-introducing point; the now transparently thin-skinned bubble is led into and flatteningly gathered between metal rolls, which progressively close to flatten the bubble into a cylinder form until the whole cylinder of thin

film is cut, split, and finally opened up to a single film: the evenness of the bubble stretching has turned the skin of the cylinder into a single sheet. The consistency of the chemical aggregates that nature allows chemists to produce in various chemical situations provides varieties of thicknesses. Mylar polyester, for instance, is inelastic and permits no further yielding; it is not subject to secondary deformation —stretching—such as occurs with rubber. There eventually comes a limit of the orderly rearrangeability of the atomic and molecular structuring beyond which it will no longer flex and at which point it breaks, i.e., disconnects because exceeding its critical-proximity interattraction limits. The relative proximity of the atoms is far more exquisite than that of molecules.

1024.20 Children experience magnets geometrically as metal blocks with thickness, length, and breadth. The magnet blocks can hold together end to end, side to side, or even point to point. You can stand them on their sides as relatively structurally stable, like face- bonding. But they regain flexibility when edge-bonded, or even more so when point- bonded.

1024.21 The bubble gum, the wire film, or the balloon all display invisible pneumatics evenly distributing the tensive energy loads to produce films of uniform thickness. No man could hammer or roll a substance into such exquisite dimensional stability. The popular image has the blacksmith working his will on the semimolten metal, but it is not so. The great armorers and swordmakers found just the opposite; they discovered the way in which nature permits the metals to yield and still retain their integrity. Humans cannot see the rearrangements of mountain-reflecting lake waters in atomical and molecular "Between-the-Halves" marching maneuvers to halve at the state of ice; this was arrived at, however, in ever-orderly intertransforming, geometrical integrity, invisible-to-humans magnitude of perception and analysis.

1024.22 Man talks carelessly and ignorantly of such words as *chaos* ... *turbulence* ... *turmoil* ... and (the popular, modern) *pollution* ... where nothing but absolute order is subvisibly maintained by nature and her transformation arrangements unfamiliar to man. Universe does not have any pollution. All the chemistries of Universe are always essential to the integrity of eternal intertransformation and eternal self-regeneration.

Physicists invent nothing.

Chemists invent nothing.

... They find out what nature does from time to time and learn something of what her laws of rearrangement may be, and fortunate humans employ those rules to cooperate consciously with nature's evolution.

1024.23 All humans, endowed at birth with a billion capabilities beyond the knowledge of the parents, evolve in ways that are an utter mystery to them. The exquisite, myriadly endowed child employs that mysterious endowment and intuitionally apprehends itself as inventor of ways of using the orderly laws of Universe to produce tools, substances, and service integrities, to communicate and allow humans to participate in Universe's ever-transforming evolutionary events in an as yet preposterously meager degree, which has given rise to a nature-permitted variety of little humans on tiny planet Earth each becoming Mr. Big, with a suddenly mistaken sense of power over environmental transformations—participation in which permitted him to feel himself as a manager of inventories of logistical multiplicity which, at the most ignorant level, manifests itself as politically assured mandates and political-world gambling = gamboling = ideological warfare = national sovereignties = morally rationalizing public = body politic = individual nations as United Nations.

1024.24 Stress-producing metaphysical gas stretches and strains nature to yield into social-evolution conformations such as the gas-filled plastic tube of Universe. There is an a priori universal law in the controlled complexity that tolerates man's pressurized nonsense, as nature permits each day's seemingly new Universe of semifamiliarities, semiwonders, and semimystery, what humans might think of as history unfolding on this little planet. There is the Game of Cosmic History, in which Universe goes on approximately unaware of human nonsense while accommodating its omnilocal game- playing. Flies have their game. Mosquitoes have their game. Microbes have their game. Lion cubs have their game. Whatever games they may be playing, positive or negative, realistic or make-believe, all the games are fail-safe, alternate circuits, omniconsequential to eternally regenerative Universe integrity. It's all permitted. It all belongs.

1024.25 Only humans play "Deceive yourself and you can fool the world"; or "I know what it's all about"; or "Life is just chemistry"; and "We humans invented and are running the world." Dogs play "Fetch it" to please their masters, not to deceive themselves. The most affectionate of dogs do not play "Burial of our dead"—"Chemistry is for real." Only humans play the game of game of masks and monuments. Fictional history. Historical architecture. Crabs walk sideways; but only human society keeps its eyes on the past as it backs into its future. Madison Avenue aesthetics and ethics. Comic strips and cartoons ... truth emergent, laughing at self-deception ... momentary, fleeting glimpses of the glory, inadvertently revealed through faithful accuracy of observation— lucid conceptioning—spoken of as the music of the stars, inadequate to the mystery of integrity ...

All the poetry,.
all the chemistry,
all the stars,
... are permitted transformations of all the eternal integrity.

All the constants,
gravitational constant,
radiational constant,
Planck's constant,
... above all, mathematics, geometry, physics, are only manifests of the eternal mysteries, love, harmonic integrity beyond further words.

The isotropic vector matrix yields to palm trees and jellyfish as a complex of mathematical integrities. As one will always be to one other. But no other: no one. Other is four. No four—but whereas one has no relations; two have only one interrelationship; three have three interrelationships; but four have a minimum of six relationships synergetics. No insideness without four. Without four, no womb: no birth: no life ... the dawning awareness of the integrity of Universe. For humanity the only permitted infallibly predictable is the eternal cosmic integrity.

1025.10 **Closest Packing of Bubbles**

1025.11 Isolated bubbles are systematic spheric enclosures. Bubbles are convex and spheric because spheres accommodate the most volume with the least surface, and the pressure differential between inside and outside atmosphere makes them belly out. The enclosing "surfaces" of bubbles are in fact critical-proximity events that produce so-called "surface tension," which is, more accurately, single-molecule-thickness, omnitriangular, mass-interattracted atoms surrounding a gas whose would-be kinetically escaping molecules are larger than the intervals between the spherical membrane's atomic event proximities.

1025.12 Bubbles aggregate in the manner of closest-packed uniradius spheres but behave differently as they aggregate. Only the outer surfaces of the outermost bubbles in the aggregate retain their convex surfaces. Within the aggregate, all the bubbles' pressures become approximately uniform; therefore, relieved of the pneumatic pressure differential between insideness and outsideness, they contract from convex to approximately planar membranes. Here, what would have been spaces between the spheres become planar- bound system enclosures (polyhedra), as do also the corresponding concave octahedra and vector equilibria of hard-shell uniradius spheres in closest packing.

1025.13 Because the bubbles are rarely of unit radius, the closest-packed bubble "polyhedra," corresponding to the closest-packed spheres, disclose only multifrequency- permitted varieties of tensional membrane interfaceting. Yet the fundamental interrelatedness of the seemingly disorderly subdividing of bubble aggregates is elegantly identified with the absolute order of the isotropic vector matrix, in that all the internal polyhedra manifest 14 facets each, though a variety of polygonal shapes and sizes. This ness is also manifest in the closest interpacking of biological cells.

1025.14 The 14 internal facets correspond exactly with the vector equilibrium's 14 faces—eight triangular and six square—which 14-ness, in turn, is directly identifiable with the tetrahedron's sum total of topological aspects: 4 vertexes + 4 faces + 6 edges = 14; as may be experimentally demonstrated with high-frequency tetrahedra, each of whose four vertexes may be truncated, providing four additional triangular facets; and each of whose six edges may be truncated (most crystals have truncated edges), providing six additional rectilinear facets whose terminal ends will now convert the four previous triangular truncated corners into four hexagons. With high-frequency tetrahedra, each of the truncations can be accommodated at different lengths. The truncated tetrahedron's total of facets consisting of eight hexagons and six rectangles may be of a great variety of edge lengths, which variety tends to mislead the observer into thinking of the aggregate

as being disorderly.

1030.00 **Omniequilibrium**

1030.10 **Omniequilibrium of Vector Equilibrium:** I seek a word to express most succinctly the complexedly pulsative, inside-outing, integrative-disintegrative, countervailing behaviors of the vector equilibrium. "Librium" represents the degrees of freedom. Universe is *omnilibrious* because it accommodates all the every-time-recurrent, alternatively-optional degrees of equieconomical freedoms. Omniequilibrious means all the foregoing.

1030.11 The sphere is a convex vector equilibrium, and the spaces between closest- packed uniradius spheres are the concave vector equilibria or, in their contractive form, the concave octahedra. In going contractively from vector equilibrium to equi-vector- edged tetrahedron (see Sec. 460), we go from a volumetric 20-ness to a volumetric oneness, a twentyfold contraction. In the vector-equilibrium jitterbug, the axis does not rotate, but the equator does. On the other hand, if you hold the equator and rotate the axis, the system contracts. Twisting one end of the axis to rotate it terminates the jitterbug's 20-volume to 4-volume octahedral state contraction, whereafter the contraction momentum throws a torque in the system with a leverage force of 20 to 1. It contracts until it becomes a volume of one as a quadrivalent tetrahedron, that is, with the four edges of the tetrahedron congruent. Precessionally aided by other galaxies' mass-attractive tensional forces acting upon them to accelerate their axial, twist-and-torque-imposed contractions, this torque momentum may account for the way stars contract into dwarfs and pulsars, or for the way that galaxies pulsate or contract into the incredibly vast and dense, paradoxically named "black holes."

1030.20 **Gravitational Zone System:** There is no pointal center of gravity. There is a gravitational-zone-system, a zone of concentration with minimum-maximum zone system limits. Vertex is in convergence, and face is in divergence. Synergetics geometry precession explains radial-circumferential accelerational transformations.

1031.10 **Dynamic Symmetry**

1031.11 When we make the geodesic subdivisions of symmetrically omnitriangulated systems, the three corner angles increase to add up to more than 180 degrees because they are on a sphere. If we deproject them back to the icosahedron, they become symmetrical again, adding to exactly 180 degrees. They are asymmetrical only because they are projected out onto the sphere. We know that each corner of a two-frequency spherical icosahedron has an isosceles triangle with an equilateral triangle in the center. In a four- frequency spherical icosahedron there are also six scalenes: three positive and three negative sets of scalenes, so they balance each other. That is, they are *dynamically symmetrical.* By themselves, the scalenes are asymmetrical. This is synergy. This is the very essence of our Universe. Everything that you and I can observe or sense is an asymmetrical aspect of only sum-totally and nonunitarily-conceptual, omnisymmetrical Universe.

1031.12 Geodesic sphere triangulation is the high-frequency subdivision of the surface of a sphere beyond the icosahedron. You cannot have omnisymmetrical, equiangle and equiedged, triangular, system subdivisioning in greater degree than that of the icosahedron's 20 similar triangles.

1031.13 As we have learned, there are only three prime structural systems of Universe: tetrahedron, octahedron, and icosahedron. When these are projected on to a sphere, they produce the spherical tetrahedron, the spherical octahedron, and the spherical icosahedron, all of whose corner angles are much larger than their chordal, flat-faceted, polyhedral counterpart corners. In all cases, the corners are isosceles triangles, and, in the even frequencies, the central triangles are equilateral, and are surrounded by further symmetrically balanced sets of positive and negative scalenes. The higher the frequency, the more the scalenes. But since the positive and negative scalenes always appear in equal abundance, they always cancel one another out as dynamically complementarily equilateral. This is all due to the fact that they are projections outwardly onto a sphere of the original tetrahedron, octahedron, or icosahedron, which as planar surfaces could be subdivided into high-frequency triangles without losing any of their fundamental similarity and symmetry.

1031.14 In other words, the planar symmetrical is projected outwardly on the sphere. The sphere is simply a palpitation of what was the symmetrical vector equilibrium, an oscillatory pulsation, inwardly and outwardly—an extension onto an asymmetrical surface of what is inherently symmetrical, with the symmetricals going into higher frequency. (See Illus. 1032.12, 1032.30, and 1032.31.)

1031.15 What we are talking about as apparent asymmetry is typical of all life. Nature refuses to stop at the vector-equilibrium phase and always is caught in one of its asymmetric aspects: the positive and negative, inward and outward, or circumferentially askew alterations.

1031.16 Asymmetry is a consequence of the phenomenon time and time a consequence of the phenomenon we call afterimage, or "double-take," or reconsideration, with inherent lags of recallability rates in respect to various types of special-case experiences. Infrequently used names take longer to recall than do familiar actions. So the very consequence of only "dawning" and evolving (never instantaneous) awareness is to impose the phenomenon time upon an otherwise timeless, ergo eternal Universe. Awareness itself is in all these asymmetries, and the pulsations are all the consequences of just thought itself: the ability of Universe to consider itself, and to reconsider itself. (See Sec. 529.09.)

1032.00 **Convex and Concave Sphere-Packing Intertransformings**

1032.10 **Convex and Concave Sphere-Packing Intertransformings as the Energy Patterning Between Spheres and Spaces of Omni-Closest-Packed Spheres and Their Isotropic-Vector-Matrix Field:** When closest-packed uniradius spheres are interspersed with spaces, there are only two kinds of spaces interspersing the closest-packed spheres: the concave octahedron and the concave vector equilibrium. The spheres themselves are convex vector equilibria complementing the concave octahedra and the concave vector equilibria. (See Secs. 970.10 and 970.20.)

1032.11 The spheres and spaces are rationally one-quantum-jump, volumetrically coordinate, as shown by the rhombic dodecahedron's sphere-and-space, and share *sixness* of volume in respect to the same nuclear sphere's own exact *fiveness* of volume (see Secs. 985.07 and 985.08), the morphological dissimilarity of which render them one-quantumly disequilibrious, i.e., asymmetrical phases of the vector equilibrium's complex of both alternate and coincident transformabilities. They are involutionally-evolutionally, inward-outward, twist-around, fold-up and unfold, multifrequencied pulsations of the vector equilibria. By virtue of these transformations and their accommodating volumetric involvement, the spheres and spaces are interchangeably intertransformative. For instance, each one can be either a convex or a concave asymmetry of the vector equilibrium, as the "jitterbug" has demonstrated (Sec. 460). The vector equilibrium contracts from its maximum isotropic-vector-matrix radius in order to become a sphere. That is how it can be accommodated within

the total isotropic-vector-matrix field of reference.

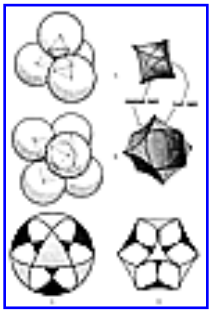


Fig. 1032.12

1032.12 As the vector equilibrium's radii contract linearly, in the exact manner of a coil spring contracting, the 24 edges of one-half of all the vector equilibria bend outwardly, becoming arcs of spheres. At the same time, the chords of the other half of all the vector equilibria curve inwardly to produce either concave-faced vector-equilibria spaces between the spheres or to form concave octahedra spaces between the spheres, as in the isotropic-vector-matrix field model (see Illus. 1032.12). Both the spheric aspect of the vector equilibrium and the "space" aspect are consequences of the coil-spring-like contraction and consequent chordal "outward" and "inward" arcing complementation of alternately, omnidirectionally adjacent vector equilibria of the isotropic-vector-matrix field.

1032.13 In a tetrahedron composed of four spheres, the central void is an octahedron with four concave spherical triangular faces and four planar triangular faces with concave edges. This can be described as a concave octahedron. In an octahedron composed of six closest-packed spheres, the central void is a vector equilibrium with six concave spherical square faces and eight triangular faces with concave edges: a concave vector equilibrium. The vector equilibrium, with edges arced to form a sphere, may be considered as a convex vector equilibrium. Illus. 1032.12D shows the vector equilibrium with arcs on the triangular faces defined by spheres tangent at vertexes: a concave vector equilibrium.

1032.20 **Energy Wave Propagation:** The shift between spheres and spaces is accomplished precessionally. You introduce just one energy action—push or pull—into the field, and its inertia provides the reaction to your push or pull; the resultant propagates the everywhere locally sphere-to-space, space-to-sphere omni-intertransformations whose comprehensive synergetic effect in turn propagates an omnidirectional wave. Dropping a stone in the water discloses a planar pattern of precessional wave regeneration. The local unit-energy force articulates an omnidirectional, spherically expanding, four-dimensional counterpart of the planar water waves' circular expansion. The successive waves' curves are seen generating and regenerating and are neither simultaneous nor instantaneous.

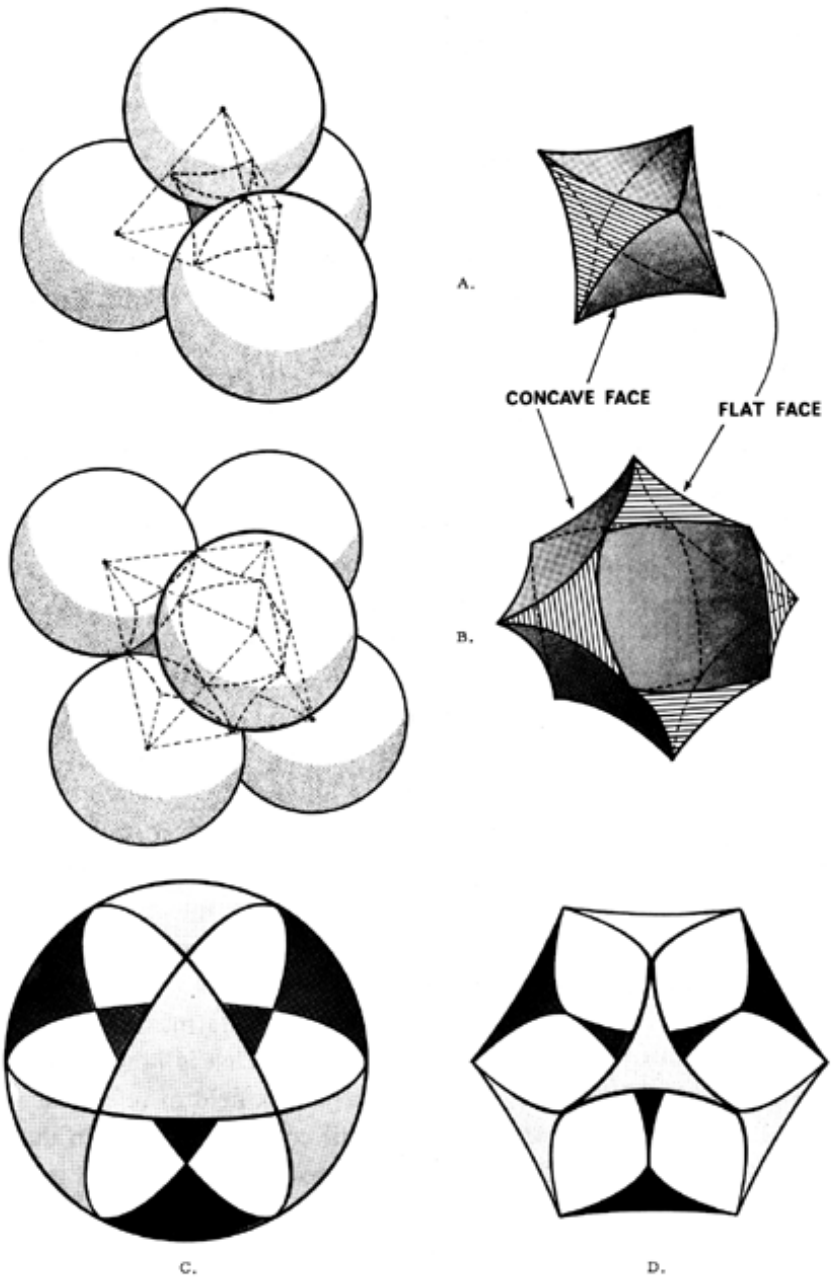


Fig. 1032.12 Convex and Concave Sphere Packing Voids:

A. In a tetrahedron composed of four spheres, the central void is an octahedron with four concave spherical triangular faces and four planar triangular faces with concave sides. This can be described as a "concave octahedron."
B. In an octahedron composed of six close-packed spheres, the central void is a vector equilibrium with six concave spherical square faces and eight triangular faces with concave sides: a "concave vector equilibrium."
C. The vector equilibrium with edges arced to form a sphere: a convex vector equilibrium.
D. The vector equilibrium with arcs on the triangular faces defined by spheres tangent at vertexes: a concave vector equilibrium.

1032.21 The only instantaneity is eternity. All temporal (temporary) equilibrium life- time-space phenomena are sequential, complementary, and orderly disequilibrious intertransformations of space-nothingness to time-somethingness, and vice versa. Both space realizations and time realizations are always of orderly asymmetric degrees of discrete magnitudes. The hexagon is an instantaneous, eternal, simultaneous, planar section of equilibrium, wherein all the chords are vectors exactly equal to all the vector radii: six explosively disintegrative, compressively coiled, wavilinear vectors exactly and finitely contained by six chordal, tensively-coil-extended, wavilinear vectors of equal magnitude.

1032.22 Physics thought it had found only two kinds of acceleration: linear and angular. Accelerations are all angular, however, as we have already discovered (Sec. 1009.50). But physics has not been able to coordinate its mathematical models with the omnidirectional complexity of the angular acceleration, so it has used only the linear, three-dimensional, XYZ, tic-tac-toe grid in measuring and analyzing its experiments. Trying to analyze the angular accelerations exclusively with straight lines, 90-degree central angles, and no chords involves pi (π) and other irrational constants to correct its computations, deprived as they are of conceptual models.

1032.23 Critical-proximity crimping-in of local wave coil-spring contractions of the Little System by the Big System reveals the local radius as always a wavilinear short section of a greater system arc in pure, eternal, generalized principle.

Next Section: 1032.30

Fig. 1032.30

1032.30 **Complementary Allspace Filling of Octahedra and Vector Equilibria:** The closest packing of concave octahedra, concave vector equilibria, and spherical vector equilibria corresponds exactly to the allspace filling of planar octahedra and planar vector equilibria (see Sec. 470). Approximately half of the planar vector equilibria become concave, and the other half become spherical. All of the planar octahedra become concave (see Illus. 1032.30).

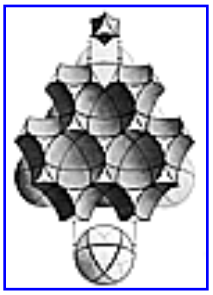


Fig. 1032.31

1032.31 Concave octahedra and concave vector equilibria close-pack together to define the voids of an array of closest-packed spheres which, in conjunction with the spherical vector equilibria, fill allspace. This array suggests how energy trajectories may be routed over great-circle geodesic arcs from one sphere to another, always passing only through the vertexes of the array—which are the 12 external vertexes of the vector equilibria and the only points where the closest-packed, uniradius spheres touch each other (see Illus. 1032.31).

1033.00 **Intertransformability Models and Limits**

[1033.00-1033.92 Involvement Field Scenario]

1033.010 **Generation of the Involvement Field in Which Synergetics Integrates Topology, Electromagnetics, Chemistry and Cosmology**

1033.011 Commencing with the experimentally demonstrated proof that the tetrahedron is the minimum structural system of Universe (i.e., the vectorially and angularly self-stabilizing minimum polyhedron consisting of four minimum polygons in omnisymmetrical array), we then discover that each of the four vertices of the tetrahedron is subtended by four "faces," or empty triangular windows. The four vertices have proven to be only whole-range tunable and point-to-able noise or "darkness" centers—which are primitive (i.e., as yet frequency-blurred), systemic somethings (see Secs. 505.65, 527.711, and 1012.33) having six unique angularly intersightable lines of interrelationship whose both-ends-interconnected six lines produce four triangular windows, out through which each of the four system-defining somethings gains four separate views of the same omninothingness of as-yet-untuned-in Universe. As subtunable systems, points

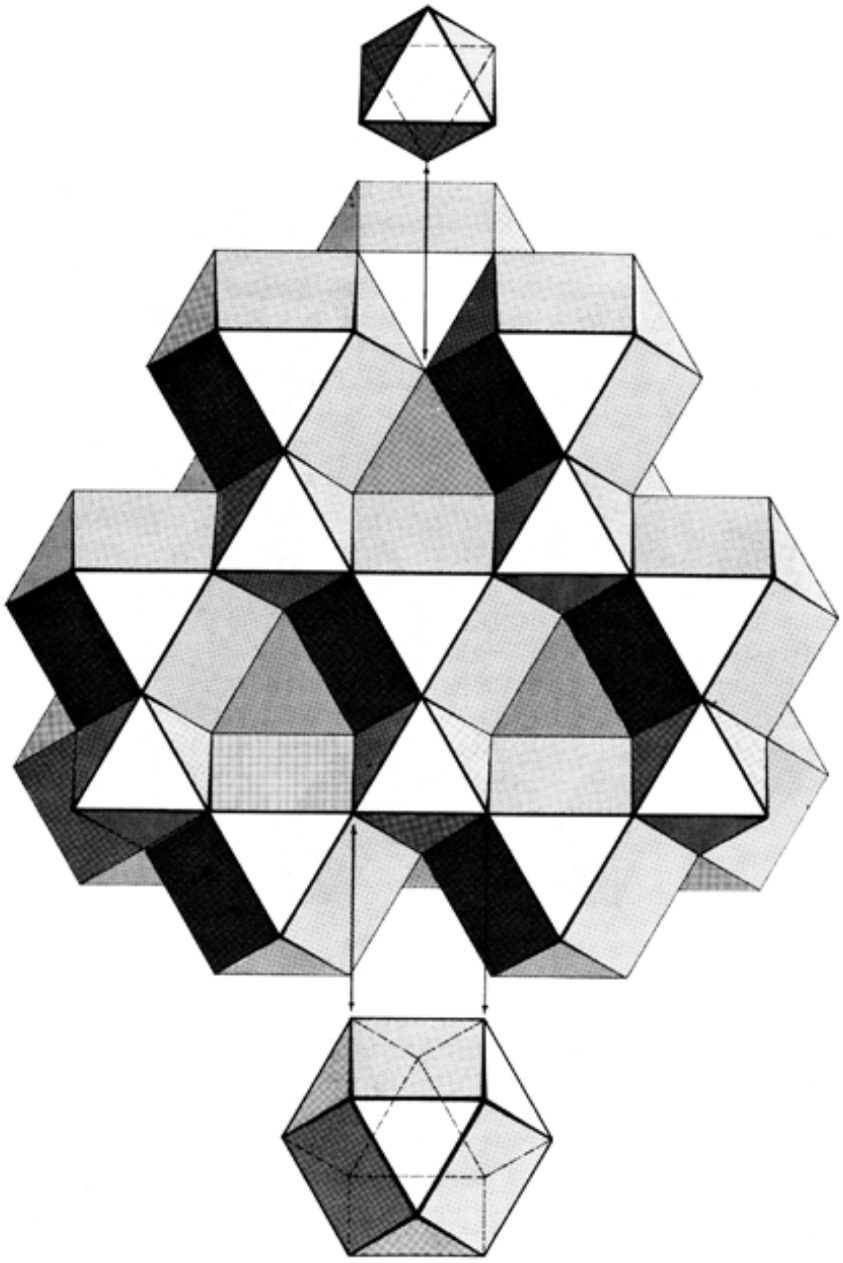


Fig. 1032.30 Space Filling of Octahedron and Vector Equilibrium: The packing of concave octahedra, concave vector equilibria, and spherical vector equilibria corresponds exactly to the space filling of planar octahedra and planar vector equilibria. Exactly half of the planar vector equilibria become convex; the other half and all of the planar octahedra become concave.

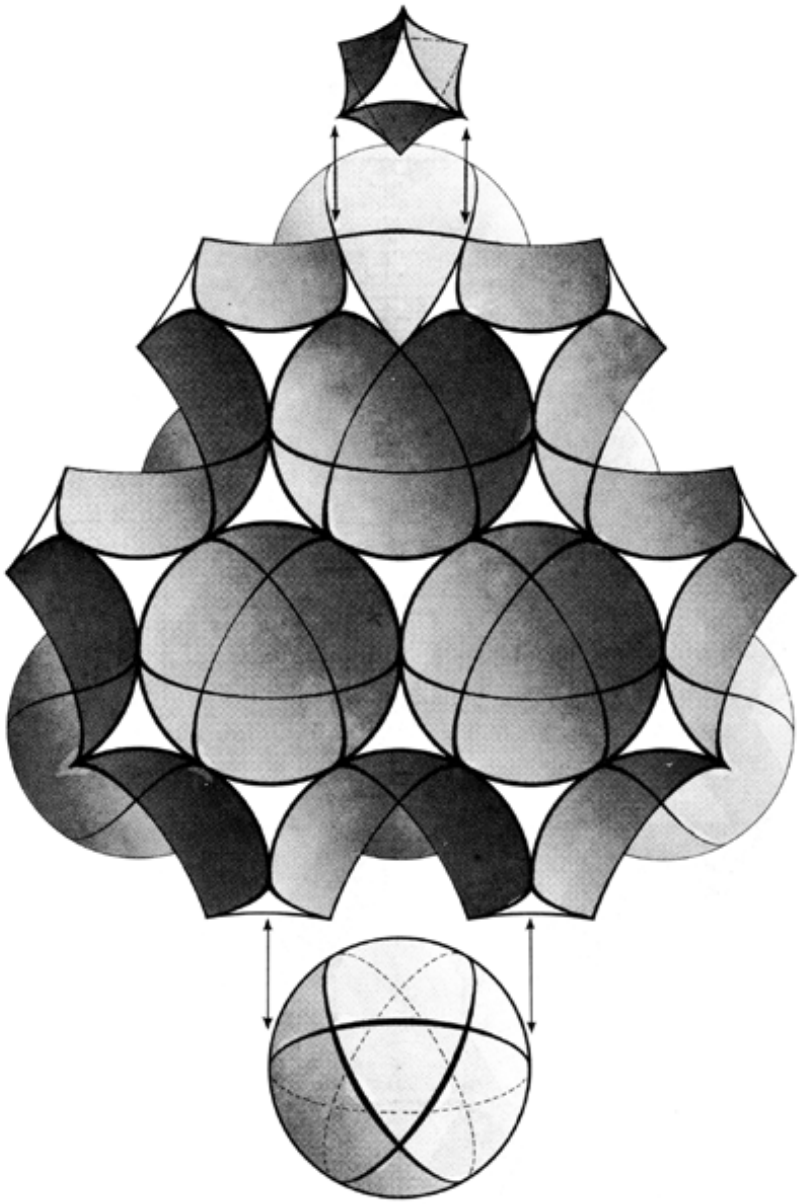


Fig. 1032.31 Concave Octahedra and Concave Vector Equilibria Define Spherical Voids and Energy Trajectories: "Concave octahedra" and "concave vector equilibria" pack together to define the voids of an array of close-packed spheres which in conjunction with the convex spherical vector equilibria fill allspace. This array suggests how energy trajectories may be distributed through great-circle geodesic arcs from one sphere to another always passing through the vertexes of the array, which are the vertexes of the vector equilibria and the points where the spheres touch each other.

are substances, somethings ergo, we have in the tetrahedron four somethings symmetrically arrayed against four nothingnesses. (Four INS versus four OUTS.)

1033.012 The four somethingnesses are mass-interattractively interrelated by six interrelationship tensors—each tensor having two other interconnected tensor restraints preventing one another and their four respective vertexial somethings from leaving the system. Like a three-rubber-banded slingshot, each of the four sets of three restraining, but in fact vertexially convergent, tensors not only restrains but also constrains their respective four *somethings* to plunge aimedly into-through-and-out their respectively subtended triangular windows, into the unresisting nothingness, and penetrating that nothingness until the stretchable limit of the three tensors is reached, whereat they will be strained into reversing the direction of impelment of their vertexial somethings. Thus we discovered the tetrahedron's inherent proclivity to repeatedly turn itself inside out, and then outside-out, and reverse. Thus the tetrahedron has the means to convert its tuned-in-ness to its turned- out-and-tuned-outness, which inherently produces the frequencies of the particular discontinuities of electromagnetic Universe.

1033.013 Because there are four symmetrically arrayed sets of nothingnesses subtending four somethings, there are four ways in which every minimum structural system in Universe may be turned inside out. Ergo, every tetrahedron is inherently eight tetrahedra, four outside-out and four inside-out: the octave system.

1033.014 We deliberately avoid the terms positive and negative and—consistent with experience—may use the words *active* and *passive* respectively for outside-out and inside- out. Active means "now in use"; passive means "not in use now."

1033.015 Since the somethings are the INS and the nothingness is OUT, outside-out and inside-out are experientially meaningful. There are inherently a plurality of different nothingness OUTS consisting of all the potential macro- and microranges of "presently untuned-in" systemic frequencies.

1033.016 Experientiality, which is always in time, begins with an observer and an observed—i.e., two somethings, two INdividuals—with the observed other individual only differentially perceivable against the omninothingness, the presently untuned-IN, ergo OUT. (The observer and the otherness may be integral, as in the complex individual—the child's hand discovering the otherness of its own foot, or the tongue-sense discovering the taste of the tactile-sensing thumb, or the outside thumb discovering the insideness of the mouth.)

1033.017 We have elsewhere reviewed the progressive tangential agglomeration of other "spherical" somethings with the otherness observer's spherical something (Secs. 411.01-08) and their four-dimensional symmetry's systemic intermotion blocking and resultant system's interlockage, which locking and blocking imposes total system integrity and permits whole-system-integrated rotation, orbiting, and interlinkage with other system integrities.

1033.018 Since we learned by experimental proof that our four-dimensional symmetry accommodates three axial freedoms of rotation motion (see the Triangular-cammed, In- out-and-around, Jitterbug Model, Sec. 465), while also permitting us to restrain[3] one of the four axes of perpendicularity to the four planes, i.e., of the INS most economically— or perpendicularly—approaching the tensor relationship's angularly planed and framed views through to the nothingness, we find that we may make a realistic model of the omniinvolvement field of all eight phases of the tetrahedron's self-intertransformability.

(Footnote 3: "Restrain" does not mean motionless or "cosmically at rest." Restrain does mean "with the axis locked into congruent motion of another system." Compare a system holding in relative restraint one axis of a four-axis wheel model.)

Fig. 1033.019

1033.019 The involvement field also manifests the exclusively unique and inviolable fourfold symmetry of the tetrahedron (see Cheese Tetrahedron, Sec. 623), which permits us always to move symmetrically and convergently each—and inadvertently any or all—of the four triangular window frames perpendicularly toward their four subtending somethingness-converging-point-to-able IN foci, until all four planes pass through the same threshold between INness and OUTness, producing one congruent, zerovolume tetrahedron. The four inherent planes of the four tensegrity triangles of Anthony Pugh's model[4]* demonstrate the nothingness of their four planes, permitting their timeless—i.e., untuned—nothingness congruence. (See Fig. 1033.019.) The tuned-in, somethingness lines of the mathematician, with their inherent self-interferences, would never permit a plurality of such lines to pass through the same somethingness points at the same time (see Sec. 517).

(Footnote 4: This is what Pugh calls his "circlit pattern tensegrity," described on pages 19-22 of his *An Introduction to Tensegrity* (Berkeley: University of California Press, 1976.)

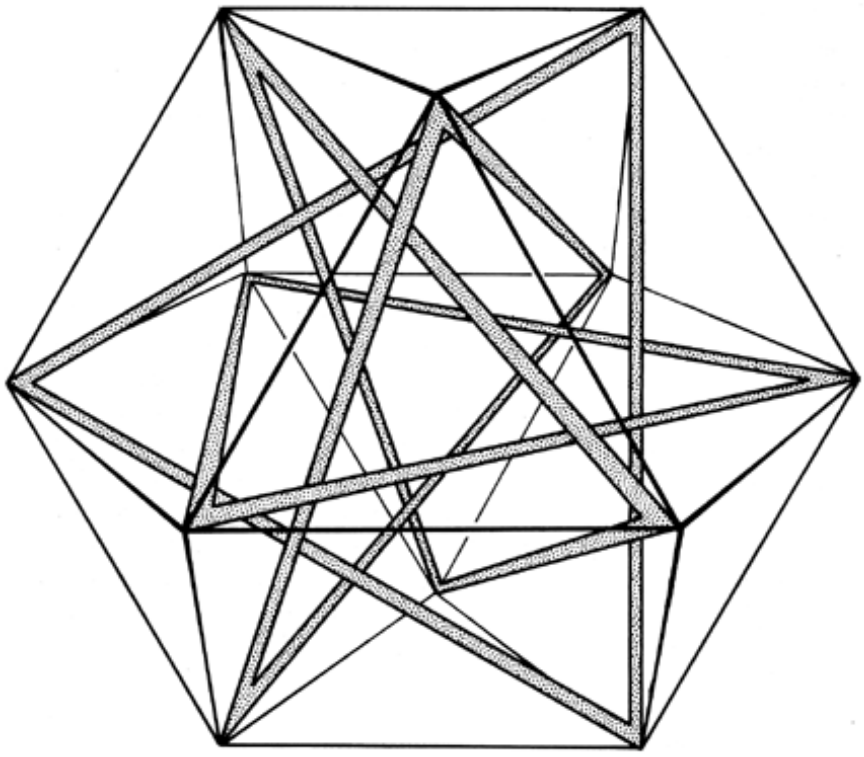


Fig. 1033.019 Circuit Pattern Tensegrity: In Anthony Pugh's model 12 struts form four interlocking but nontouching triangular circuits. The plane of each triangle of struts bisects the vector equilibrium which its vertexes define. Each triangle of struts is inscribed within a hexagonal circuit of tensors.

1033.020 **Four-triangular-circuits Tensegrity:** The four-triangular-circuits tensegrity relates to the four great circles of the vector equilibrium. The four great circles of the vector equilibrium are generated by the four axes of vector equilibrium's eight triangular faces. Each of the four interlocking triangles is inscribed within a hexagonal circuit of vectors—of four intersecting hexagonal planes of the vector equilibrium. These tensegrity circuits relate to the empty tetrahedron at its center. (See Secs. 441.021, 938.12, and 1053.804.)

1033.021 Our omniinvolvement tetrahedral-intertransformability, isotropic-vector- matrix-field of any given relative frequency can accommodate both the tetrahedron's most complexedly expansive-divergent domain and its most convergence-to-untuned- nothingness identification, while also maintaining the integrity of its inherent isolatability from both all otherness and all nothingness.

1033.022 The involvement field also identifies the unique cosmically inviolate environment domain of convergent-divergent symmetrical nuclear systems, i.e., the vector equilibrium's unique domain provided by one "external" octahedron (see Sec. 415.17), which may be modeled most symmetrically by the 4-tetravolume octahedron's symmetrical subdivision into its eight similar asymmetric tetrahedra consisting of three 90-degree angles, three 60-degree angles, and six 45-degree angles, whose 60-degree triangular faces have been addressed to each of the vector equilibrium's eight outermost triangular windows of each of the eight tetrahedra of the 20-tetravolume vector equilibrium.

1033.023 Any one triangular plane formed by any three of the vertexial somethings' interrelationship lines, of any one omnitriangulated tetrahedral system, of any isotropic vector matrix grid, can move in only four-degrees-of-freedom directions always to reach to-or-fro limits of vertexial convergences, which convergences are always zerovolume.

Next Section: 1033.030

1033.030 **Untenable Equilibrium Compulsion**

1033.031 In the 20-tetravolume vector equilibrium we have four passive and four active tetrahedra vertexially interconnected. The eight tetrahedra have a total of 32 vertexes. In the 20-tetravolume vector equilibrium each tetrahedron has three of its vertexial somethings outwardly arrayed and one vertexial something inwardly arrayed. Their 24 externally arrayed vertexes are *congruently paired* to form the 12 vertexes of the vector equilibrium, and their eight interior vertexial somethings are *nuclear congruent;* ergo, four-forcedly-more-vector-interconstrained than any of their externally paired vertexial something sets: an untenable equilibrium compulsion (UEC). (Compare Secs. 1012.11 and 1224.13.)

1033.032 The untenable equilibrium compulsion (UEC) inherently impels the nucleus toward and through any of the nucleus's eight externally subtended triangular windows, the three corners of each of which are two-tensor-restrained (six tensors per triangular window) by the gravitationally embracing, circumferentially closed tensors. This empowers the nuclear eightfold-congruent somethings to exit pulsatingly through the windows to a distance one-half that of the altitude of the regular tetrahedron, which is describable to the eight divergent points by mounting outwardly of the eight Eighth- Octahedra on each of the eight triangular window frames of the vector equilibrium, which thereby describe the cube of 24 tetravolumes (i.e., eight of the primitive, Duo-Tet- described cubes of three tetravolumes). These eight external pulsative points are inherently center-of-volume terminalled when nuclear systems are closest packed with one another. Thus we find the total nuclear domain of Universe to have a tetravolume of 24. When the vector equilibrium nucleus has no closest-packed-around-it, nucleated vector equilibrium systems, then the eightfold nuclear impelment works successively to expel its energies pulsatingly and radiantly through all eight of its windows.

1033.10 **Octave System of Polyhedral Transformations**

1033.101 The systematic outsideness is the macrountuned: the ultratunable. The systemic insideness is the micrountuned: the infratunable. The system is the discretely tuned-in conceptuality.

1033.102 The closest-packed spheres are simply the frequencies that are activated, that get into closest proximity as a continuum of the outsideness:

- the critical proximity spherical zone, which is fall-in-here or fall-in-there or independently in orbit for shorter or longer time spans;
- the boundary layer;
- the mass-interattractively tensioned (trampoline) field, which is as deeply near as any proximate systems can come to "tangency";
- the threshold zone of tuned-in but non-frequency-differentialed; when a system is at the threshold, it is non-frequency-modulated, hence only a point-to-able noise or gray, nondescript color.

1033.103 If there were a geometric outsideness and insideness, we would have a static geometrical Universe. But since the insideness and outsideness are the as-yet-untuned-in or no-longer-tuned-in wavelengths and their frequencies, they require only Scenario Universe, its past and future. Only the NOW conceptualizing constitutes a geometry—the immediate conceptual, special-case, systemic episode in a scenario of nonunitarily conceptual, nonsimultaneous, and only partially overlapping, differently enduring, differently magnituded, special-case, systemic episodes, each in itself a constellation of constellations within constellations of infra- or ultratunably frequenced, special case frequenced systems (Compare Sec. 321.05.)

1033.104 The isotropic-vector-matrix-field has an infinite range of electromagnetic tunings that are always multiplying frequency by division of the a priori vector equilibrium and its contained cosmic hierarchy of timeless-sizeless primitive systems' unfrequenced state. At maximum their primitive comprehensive domain is that of the six-tetravolume, 24-A-and-B-quanta-moduled, unfrequenced rhombic dodecahedron, the long axis of whose 12 diamond faces is also the *prime vector* length of the isotropic vector matrix. At primitive minimum the unfrequenced state is that of the six-A-and-B-quanta-moduled Syte. Both the maximum and minimum, primitive, greatest and least primitive common divisors of Universe may be replicatively employed or convergently composited to produce the isotropic vector matrix field of selectable frequency tunability, whose key wavelength is that of the relative length of the uniform vector of the isotropic vector matrix as initially selected in respect to the diameter of the nucleus of the atom.

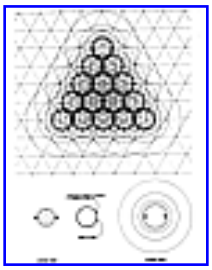


Fig. 1033.11

1033.11 Every electromagnetic wave propagation generates its own cosmic field. This field is a four-dimensional isotropic vector matrix that can be readily conceptualized as an aggregation of multilayered, closest-packed, unit-radius spheres. (See Fig. 1033.111A.) Unit-radius spheres pack tangentially together most closely in 60-degree intertriangulations. Atoms close-pack in this manner. The continuum of inherent outsideness of all systems enters every external opening of all closest-packed, unit-radius sphere aggregates, permeating and omnisurrounding every closest-packed sphere within the total aggregate. Between the closest-packed, unit-radius spheres the intervening voids constitute a uniform series of unique, symmetrical, curvilinear, geometrical shapes, and the successive centers of volumes of those uniform phase voids are uniformly interspaced— the distance between them being always the same as the uniform distances between adjacent closest-packed spheres.

Fig. 1033.111A

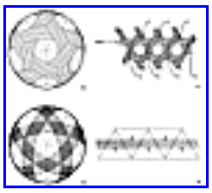


Fig. 1033.111B

1033.111 Each of the closest-packed, unit-radius spheres is itself a geodesic sphere, a spherical sieve with triangular openings: a tetra-, octa-, or icosasphere of some frequency of modular subdivision. (Compare the fallacy of the Greek sphere as described at Secs. 981.19, 1022.11-13, 1106.22, and 1107.21.) Wherefore, each of the closest-packed spheres is permeable by higher-frequency, shorter-wavelength, electromagnetic propagations; ergo, appropriately frequenced fields may pass through the isotropic vector matrix's electromagnetic field of any given wavelengths without interference. Not only does each closest-packed sphere consist of a plurality of varifrequenced vertices interconnected by chords that define the triangular sieve, but also these vertexial somethings are mass-interattractively positioned and have their own boundary layer (trampoline) cushions; ergo, they are never in absolute tangency.

1033.112 The isotropic vector matrix grid illustrates that frequency multiplication may be accomplished only by division. The unit-radius spheres of the isotropic vector matrix electromagnetic fields close-pack in four planes of symmetry, permitting four-dimensional electromagnetic wavebands. The three-way, spherical, electromagnetic, basketry interweaving is illustrated at Fig. 1033.111B. There are six great-circle equators of the six axes formed by the 12 vertices of the spherical icosahedron. The centers of area of the spherical triangles thus formed describe the terminals of the electromagnetic waveband widths. The widths of the bands of frequency tunability are determined by the truncatability of the spherical icosahedron's six bands as they run between the centers of area of the adjacent triangles.

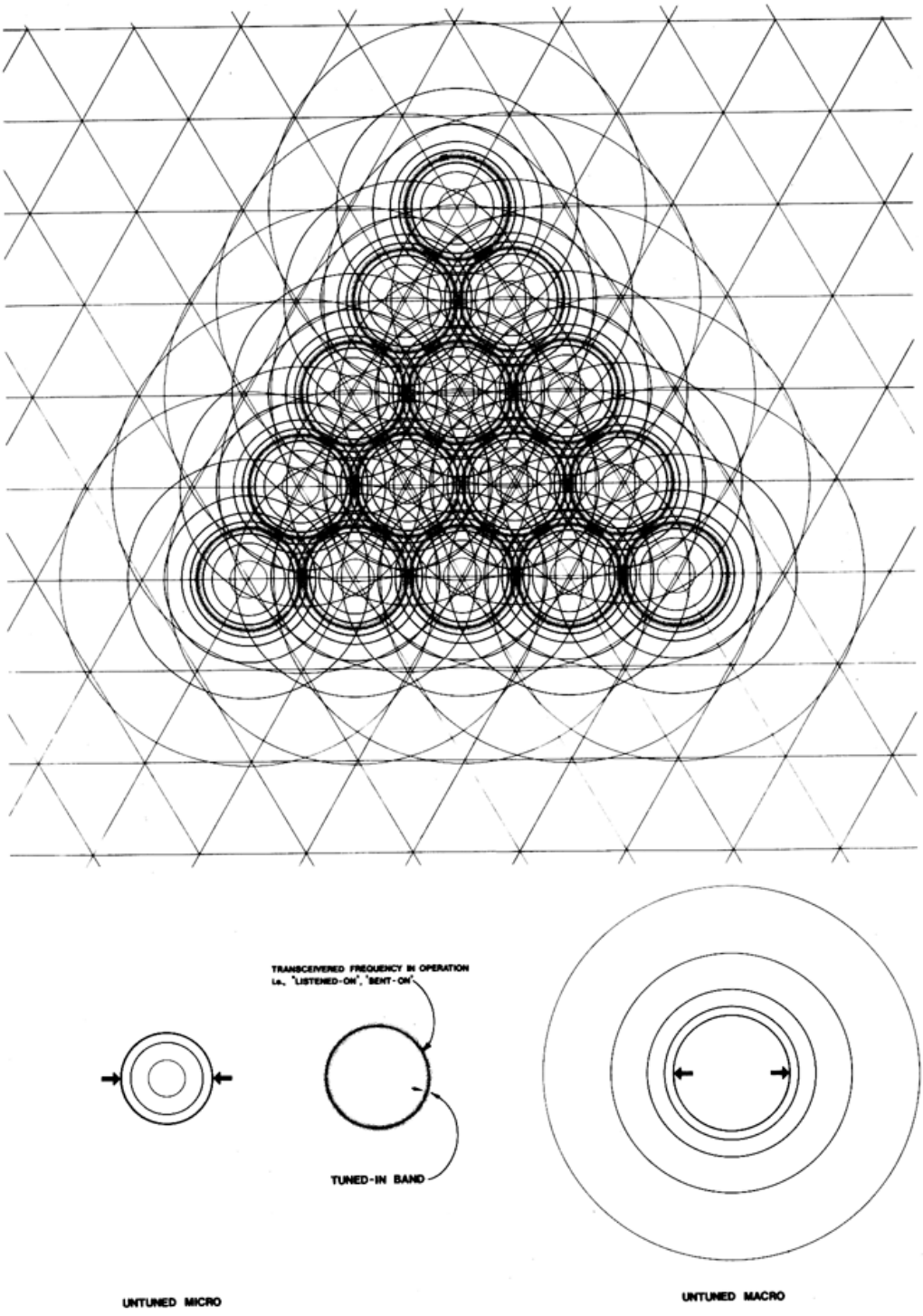


Fig. 1033.11 Electromagnetic Field of Closest-packed spheres: This figure represents one of the four planes of symmetry of the closest-packed unit-radius spheres, of the isotropic vector matrix. Between the untuned macro and the untuned micro is the transceivered frequency operation of the tuned-in and transmitted information.

Fig. 1033.111A Photograph of Southeast Asian Reed Sphere Woven on Three-way Grid.

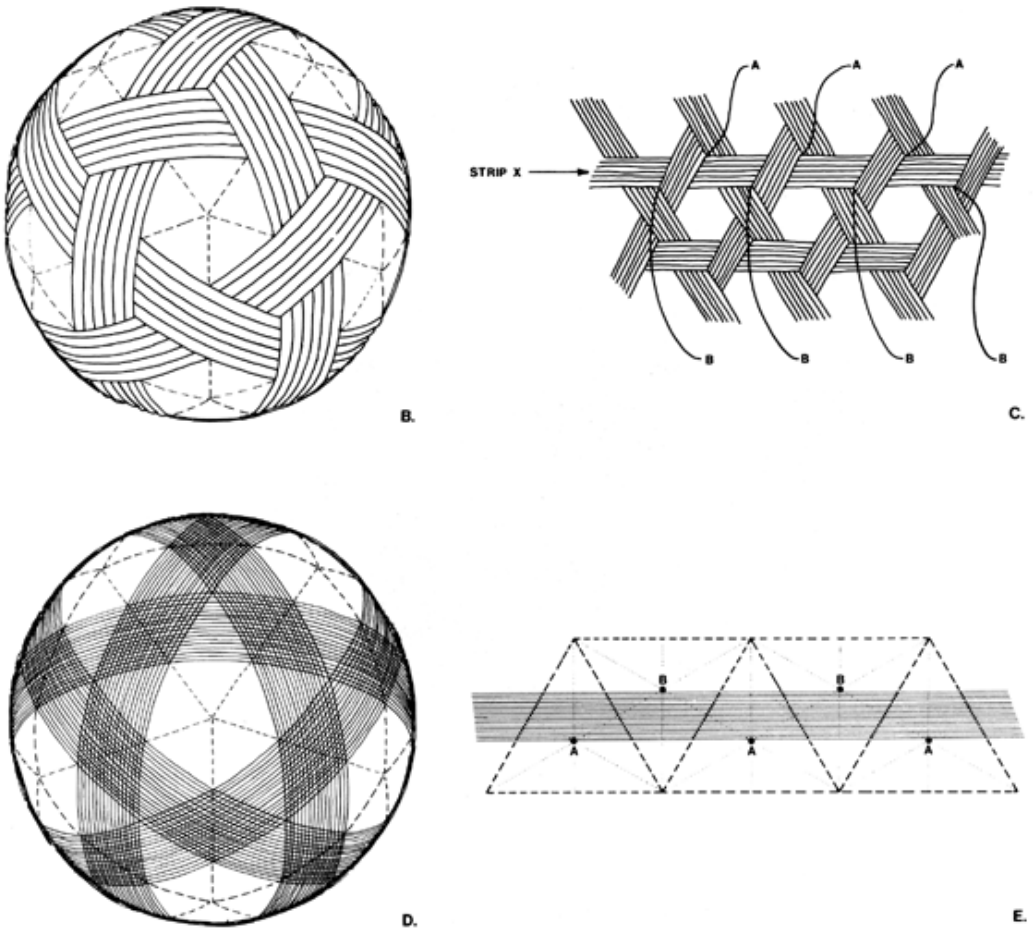


Fig. 1033.111 B-D:
B. Diagram of three-way grid sphere.
C. Band widths of frequency tunability.
D. Six great circle band widths of spherical icosahedron.
E. Centers of volumes of tetrahedra are control matrix for electromagnetic band widths.

1033.113 Note that the centers of area of the adjacent spherical triangles are alternately staggered so as to define a broad path within which the electromagnetic waveband is generated.

1033.120 **Click-stop Subdivisioning**

1033.121 In synergetic geometry we witness the transformation of all spheres into their local complementary inter-void domains as the local inter-void domains transform into closest-packed, unit-radius spheres. (See Fig. 1032.31.) The multifrequenced tetrahedral, octahedral, and icosahedral geodesic subdivisioning of spherical projections of the primitive polyhedral systems describes how the complex interbonding of substances occurs; it is further described by the varying radii of the closest-packed spheres and the complex of isotropic vector matrixes required to accommodate the varying radii as well as their ultra- and infrapermeating: this elucidates the resonance of substances as well as the unique electromagnetic frequencies of chemical elements. Here is the grand synergetic nexus integrating electromagnetics, chemistry, and topology.

1033.122 Synergetics arouses human awareness of the always-and-only-co-occurring, non-tuned-in cosmic complementations of our only-from-moment-to-moment systematically tuned-in conceptionings. Synergetics' always symmetrical, complementarily expanding and contracting intertransformings disclose a succession of "local way stations." Progressive arrival at these convergent-divergent "way station" states discloses a succession of immediately neighboring, larger-to-smaller, symmetrical polyhedra of diminishingly numbered topological characteristics, which all together constitute a cosmic hierarchy of symmetrical, rationally volumed, most primitive, pattern-stabilization states. Superficially the states are recognizable as the family of Platonic polyhedra.

1033.123 Throughout the convergent phase of the transformation continuum, all the vertices of these successive Platonic forms and their intertransformative phases are always diminishingly equidistant from the same volumetric center. The omnisymmetrical contraction is accommodated by the angular closing—scissor-hinge-wise—of immediately adjacent edges of the polyhedra. The vertices of each of these intertransforming symmetric states, as well as their intermediate transforms, are always positioned in a sphere that is progressively expanding or contracting—depending on whether we are reading the cosmic hierarchy as energetic volumes from 1 to 24 or from 24 to 1.

1033.124 As the originally omnisymmetrical, 20-tetravolume vector equilibrium of 12 vertices, 14 faces, and 24 vector edges shrinks its vertex-described spherical domain, it may receive one quantum of energy released entropically by some elsewhere-in-Universe entropic radiation, as most frequently occurring when octahedra of matter are precessed and the octahedron's tetravolume 4 is reduced to tetravolume 3 (see Octahedron as Conservation and Annihilation Model, Sec. 935), the tetrahedron thus annihilated being one quantum lost entropically without any alteration of the Eulerean topological characteristics as an octahedron. Since each quantum consists of six vector edges that can now be entropically dispersed, they may be syntropically harvested by the 20-tetravolume vector equilibrium, and, constituting one quantum of energy, they will structurally stabilize the shrinking 20-tetravolume vector equilibrium → 4-tetravolume octahedron system in the intermediate symmetrical form of the icosahedron. As the icosahedron of 12 vertices, 20 faces, and 30 edges (24 + 6) shrinks its spherical domain, it can do so only by compressing the one energy quantum of six syntropically captured vector edges into the six vertical somethings of the octahedron, thereby allowing 12 faces to unite as six—all the while the icosahedron's ever-shrinking spherical surface pattern alters uniformly, despite which its topological inventory of 12 vertices, 14 faces, and 24 edges remains constant until the simultaneous moment of vertex, face, and edge congruence occurs. Simultaneously each of the paired vertices and edges—as well as the six compressed vector edges—now appears as one; and each of the congruent pairs is now topologically countable only as one in this instance as the six vertices, eight faces, and 12 edges of the suddenly realized octahedron of tetra-volume 4.

1033.125 The simultaneous vanishing of the previously shuttling and lingering topological characteristics from the previously stable icosahedral state, and the instant appearance of the next neighboring state—the octahedron, in its simplest and completely symmetrical condition—is what we mean by a "click-stop" or "way station" state.

1033.126 Assessing accurately the "click-stop" volumes of the intertransformative hierarchy in terms of the volume of the tetrahedron equaling one, we find that the relative tetravolumes of these primitive polyhedra—when divergent—are successively, 1, 2 1/2, 3, 2^2, 5, 6, 20, 24, and then—converging—from 24, 20, 6, 5, 2^2, 3, 2 l/2, 1. These omnirational, whole-number, "click-stop" volumes and their successive topological characteristic numbers elegantly introduce—and give unique volumetric shape to—each of all of the first four prime numbers of Universe: 1, 2, 3, 5. (Compare Sec. 100.321.)

1033.127 These click-stop, whole-tetravolumed, symmetrical geometries have common centers of volume, and all are concentrically and intersymmetrically arrayed within the rhombic dodecahedron. In this concentric symmetric array they constitute what we call the *cosmic hierarchy* of primitive conceptuality of thought and comprehension. Intuitively hypersensitive and seeking to explain the solar system's interplanetary behaviors, Johannes Kepler evolved a concentric model of some of the Platonic geometries but, apparently frustrated by the identification of volumetric unity exclusively with the cube, failed to discover the rational cosmic hierarchy—it became the extraordinary experience of synergetics to reveal this in its first written disclosure of 1944.

1033.128 It is visually manifest both between and at the "click-stop" states that the smooth intertransforming is four-dimensional, accommodated by local transformations around four axes of system symmetry. The systems' vertices always remain spherically arrayed and describe a smooth, overall-spheric-continuum-contraction from the largest to the smallest tune-in-able-by-the-numbers system states occurring successively between the beyond-tune-in-able system ranges of the macronothingness and the beyond-tune-in-able micronothingness.

Next Section: 1033.180

1033.180 **Vector Equilibrium: Potential and Primitive Tetravolumes**

1033.181 The potential activation of tetravolume quantation in the geometric hierarchy is still subfrequency but accounts for the doubling of volumetric space. The potential activation of tetravolume accounting is plural; it provides for nucleation. Primitive tetravolume accounting is singular and subnuclear.

1033.182 When the isolated single sphere's vector equilibrium of tetravolume 2 l/2 is surrounded by 12 spheres to become a nuclear sphere, the vector equilibrium described by the innermost-economically-interconnecting of the centers of volume of the 12 spheres comprehensively and tangentially surrounding the nuclear sphere—as well as interconnecting their 12 centers with the center of the nuclear sphere—has a tetravolume of 20, and the nuclear group's rhombic dodecahedron has a tetravolume of 48.

1033.183 The tetravolume-6 rhombic dodecahedron is the domain of each closest- packed, unit-radius sphere, for it tangentially embraces not only each sphere, but that sphere's proportional share of the intervening space produced by such unit-radius-sphere closest packing.

1033.184 When the time-sizing is initiated with frequency^2, the rhombic dodecahedron's volume of 6 is eightfolded to become 48. In the plurality of closest- packed-sphere domains, the sphere-into-space, space-into-sphere *dual* rhombic dodecahedron domain has a tetravolume of 48. The total space is 24—with the vector equilibrium's Eighth-Octahedra extroverted to form the rhombic dodecahedron. For every space there is always an alternate space: This is where we get the 48-ness of the rhombic dodecahedron as the macrodomain of a sphere:

$$2\ 1/2 \times 8 = 20$$

$$6 \times 8 = 48$$

1033.185 The 12 spheric domains around one nuclear sphere domain equal 13 rhombic dodecahedra—nuclear 6 + (12 × 6) = tetravolume 78.

1033.192 **Table: Prime Number Consequences of Spin-halving of Tetrahedron's Volumetric Domain Unity**

	Tetravolumes:	*Great Circles:*
Vector Equilibrium As Zerovolume Tetrahedron:	0 = +2 l/2, -2 l/2, -2 l/2, +2 l/2, (with plus-minus limits differential of 5) ever-	4 complete great circles, each fully active
eternally congruent intro-extrovert domain	inter-self-canceling to produce zerovolume tetrahedron	
Tetra: eternally incongruent	+ 1 (+ 1 or -1)	6 complete great circles, each being 1/3 active, vector components
Octa:	2 (2 × 2 = 4)	2 congruent (1 positive, negative) sets of 3
eternally congruent yet nonredundant, complementary positive-negative duality		great circles each; i.e., a total of 6 great circles but visible only as 3 sets
Duo-Tet Cube:	3 "cube"	6 great circles 2/3 active
intro-extrovert tetra, its vertexially defined cubical domain, edge-outlined by 6 axes spun most-economically-interconnected edges of cube		
Rhombic Triacontahedron: 1 × 2 × 3 × 5 = 30	5 "sphere" both statically and dynamically the most spheric primitive system	15-great-circle-defined, 120 T Modules

Rhombic Dodecahedron:	6 closest-packed spheric domain	12 great circles appearing as 9 and consisting of 2 congruent sets of 3 great circles of octa plus 6 great circles of cube
Vector Equilibrium: nuclear-potentialed	20 (potential)	4 great circles describing 8 tetrahedra and 6 half-octahedra

1033.20 **Table: Cosmic Hierarchy of Primitive Polyhedral Systems:** The constant octave system interrelationship is tunable to an infinity of different frequency keys:

		Active Tetravolumes
Always and only co-occurring	Convergent Tetrahedron (Active: now you see it)	
	Divergent Tetrahedron (Passive:now you don't)	
	Infratunable microcosmic zero (Four great-circle planes as zerovolume tetrahedron)	0
	Convergent-divergent tetrahedron, always and only dynamically coexisting, unity is plural and at minimum two: active or passive	1

	Vector-diameter vector equilibrium: congruently 2 1/2 convergent and 2 1/2 divergent		2 1/2
The Eight Tunable	Duo-tet Cube, start-tetra geodesic cubic domain: 1 1/2 passive and 1 1/2 active		3
Octave "Notes"	Octahedron as two passive tetra and two active tetra		4
	Vector-radius rhombic triacontahedron		5+
	Rhombic dodecahedron		6
	Vector-radius vector equilibrium		20
	Vector equilibrium plus its external octahedron		24
	Sphere-into-space-space-into-sphere dual rhombic dodecahedron domain		48
	Ultratunable macrocosmic zero	(Four great-circle planes as zerovolume vector equilibrium)	0

1033.30 **Symmetrical Contraction of Vector Equilibrium: Quantum Loss**

1033.31 The six square faces of the vector equilibrium are dynamically balanced; three are oppositely arrayed in the northern hemisphere and three in the southern hemisphere. They may be considered as three—alternately polarizable—pairs of half- octahedra radiantly arrayed around the nucleus, which altogether constitute three whole "internal" octahedra, each of which when halved is structurally unstable—ergo, collapsible—and which, with the vector equilibrium jitterbug contraction, have each of their six sets of half-octahedra's four internal, equiangular, triangular faces progressively paired into congruence, at which point each of the six half-octahedra—ergo, three quanta—has been annihilated.

1033.32 In the always-omnisymmetrical progressive jitterbug contraction the vector equilibrium—disembarrassed of its disintegrative radial vectors—does not escape its infinite instability until it is symmetrically contracted and thereby structurally transformed into the icosahedron, whereat the six square faces of the half-octahedra become mildly folded diamonds ridge-poled along the diamond's shorter axis and thereby bent into six ridge-pole diamond facets, thus producing 12 primitively equilateral triangles. Not until the six squares are diagonally vectored is the vector equilibrium stabilized into an omnitriangulated, 20-triangled, 20-tetrahedral structural system, the icosahedron: the structural system having the greatest system volume with the least energy quanta of structural investment—ergo, the least dense of all matter.

1033.33 See Sec. 611.02 for the tetravolumes per vector quanta structurally invested in the tetra, octa, and icosa, in which we accomplish—

Tetra = 1 volume per each quanta of structure

Octa = 2 volume per each quanta of structure

Icosa = 4 (approximate) volume per each quanta of structure

1033.34 This annihilation of the three octahedra accommodates both axial rotation and its linear contraction of the eight regular tetrahedra radiantly arrayed around the nucleus of the vector equilibrium. These eight tetrahedra may be considered as four—also alternately polarizable—pairs. As the axis rotates and shortens, the eight tetra pair into four congruent (or quadrivalent) tetrahedral sets. This omnisymmetrically accomplished contraction from the VE's 20-ness to the quadrivalent octahedron of tetravolume-4 represents a topologically unaccounted for—but synergetically conceptualized— annihilation of 16 tetravolumes, i.e., 16 energy quanta, 12 of which are synergetically accounted for by the collapse of the three internal octahedra (each of four quanta); the other four-quanta loss is accounted for by the radial contraction of each of the VE's eight tetrahedra (eight quanta) into the form of Eighth-Octahedra (each of a tetravolume of 2—ergo, $8 \times 1/2 = 4$ = a total of four quanta.

1033.35 The six new vector diagonals of the three pairs of opposing half-octahedra become available to provide for the precession of any one of the equatorial quadrangular vectors of the half-octahedra to demonstrate the intertransformability of the octahedron as a conservation and annihilation model. (See Sec. 935.) In this transformation the octahedron retains its apparent topological integrity of $6V + 8F = 12E + 2$, while transforming from four tetravolumes to three tetravolumes. This tetrahelical evolution requires the precession of only one of the quadrangular equatorial vector edges, that edge nearest to the mass-interattractively precessing neighboring mass passing the octahedron (as matter) so closely as to bring about the precession and its consequent entropic discard of one quantum of energy—which unbalanced its symmetry and resulted in the three remaining quanta of matter being transformed into three quanta of energy as radiation.

1033.36 This transformation from four tetravolumes to three tetravolumes—i.e., from four to three energy quanta cannot be topologically detected, as the Eulerean inventory remains $6V + 8F = 12E + 2$. The entropic loss of one quantum can only be experimentally disclosed to human cognition by the conceptuality of synergetics' omnioperational conceptuality of intertransformabilities. (Compare color plates 6 and 7.)

1033.40 **Asymmetrical Contraction of Vector Equilibrium: Quantum Loss**

1033.41 The vector equilibrium contraction from tetravolume 20 to the tetravolume 4 of the octahedron may be accomplished symmetrically (as just described in Sec. 1033.30) by altogether collapsing the unstable six half-octahedra and by symmetrical contraction of the 12 radii. The angular collapsing of the 12 radii is required by virtue of the collapsings of the six half-octahedra, which altogether results in the eight regular tetrahedra being concurrently reduced in their internal radial dimension, while retaining their eight external equiangular triangles unaltered in their prime-vector-edge lengths; wherefore, the eight internal edges of the original tetrahedra are contractively reduced to eight asymmetric tetrahedra, each with one equiangular, triangular, external face and with three right-angle- apexed and prime-vector-base-edged internal isosceles-triangle faces, each of whose interior apexes occurs congruently at the center of volume of the symmetrical octahedron—ergo, each of which eight regular-to-asymmetric-transformed tetrahedra are now seen to be our familiar Eighth-Octahedra, each of which has a volume of l/2 tetravolume; and since there are eight of them ($8 \times 1/2 = 4$), the resulting octahedron equals tetravolume-4.

1033.42 This transformation may also have been accomplished in an alternate manner. We recall how the jitterbug vector equilibrium demonstrated the four-dimensional freedom by means of which its axis never rotates while its equator is revolving (see Sec. 460.02). Despite this axis and equator differentiation the whole jitterbug is simultaneously and omnisymmetrically contracting in volume as its 12 vertexes all approach their common center at the same radial contraction rate, moving within the symmetrically contracting surface to pair into the six vertices of the octahedron—after having passed symmetrically through that as-yet-12-vectored icosahedral stage of symmetry. With that complex concept in mind we realize that the nonrotating axis was of necessity contracting in its overall length; ergo, the two-vertex-to-two-vertex-bonded "pair" of regular tetrahedra whose most-remotely-opposite, equiangular triangular faces' respective centers of area represented the two poles of the nonrotated axis around which the six vertices at the equator angularly rotated—three rotating slantwise "northeastward" and three rotating "southeastward," as the northeastward three spiraled finally northward to congruence with the three corner vertices of the nonrotating north pole triangle, while concurrently the three southeastward-slantwise rotating vertices originally situated at the VE jitterbug equator spiral into congruence with the three corner vertices of the nonrotating south pole triangle.

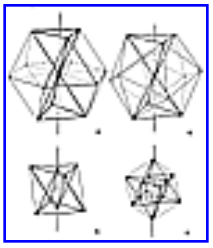


Fig. 1033.43

1033.43 As part of the comprehensively symmetrical contraction of the whole primitive VE system, we may consider the concurrent north-to-south polar-axis contraction (accomplished as the axis remained motionless with respect to the equatorial motions) to have caused the two original vertex-to-vertex regular polar tetrahedra to penetrate one another vertexially as their original two congruent center-of-VE-volume vertices each slid in opposite directions along their common polar-axis line, with those vertices moving toward the centers of area, respectively, of the other polar tetrahedron's polar triangle, traveling thus until those two penetrating vertices came to rest at the center of area of the opposite tetrahedron's polar triangle—the planar altitude of the octahedron being the same as the altitude of the regular tetrahedron. (See Figs. 1033.43 and 1033.47.)

1033.44 In this condition they represent the opposite pair of polar triangles of the regular octahedron around whose equator are arrayed the six other equiangular triangles of the regular octahedron's eight equiangular triangles. (See Fig. 1033.43.) In this state the polarly combined and—mutually and equally—interpenetrated pair of tetrahedra occupy exactly one-half of the volume of the regular octahedron of tetravolume-4. Therefore the remaining space, with the octahedron equatorially surrounding their axial core, is also of tetravolume-2—i.e., one-half inside-out (space) and one-half inside-in (tetracore).

1033.45 At this octahedron-forming state two of the eight vertices of the two polar- axis tetrahedra are situated inside one another, leaving only six of their vertices outside, and these six—always being symmetrically equidistant from one another as well as equidistant from the system center—are now the six vertices of the regular octahedron.

1033.46 In the octahedron-forming state the three polar-base, corner-to-apex-connecting-edges of each of the contracting polar-axis tetrahedra now penetrate the other tetrahedron's three nonpolar triangle faces at their exact centers of area.

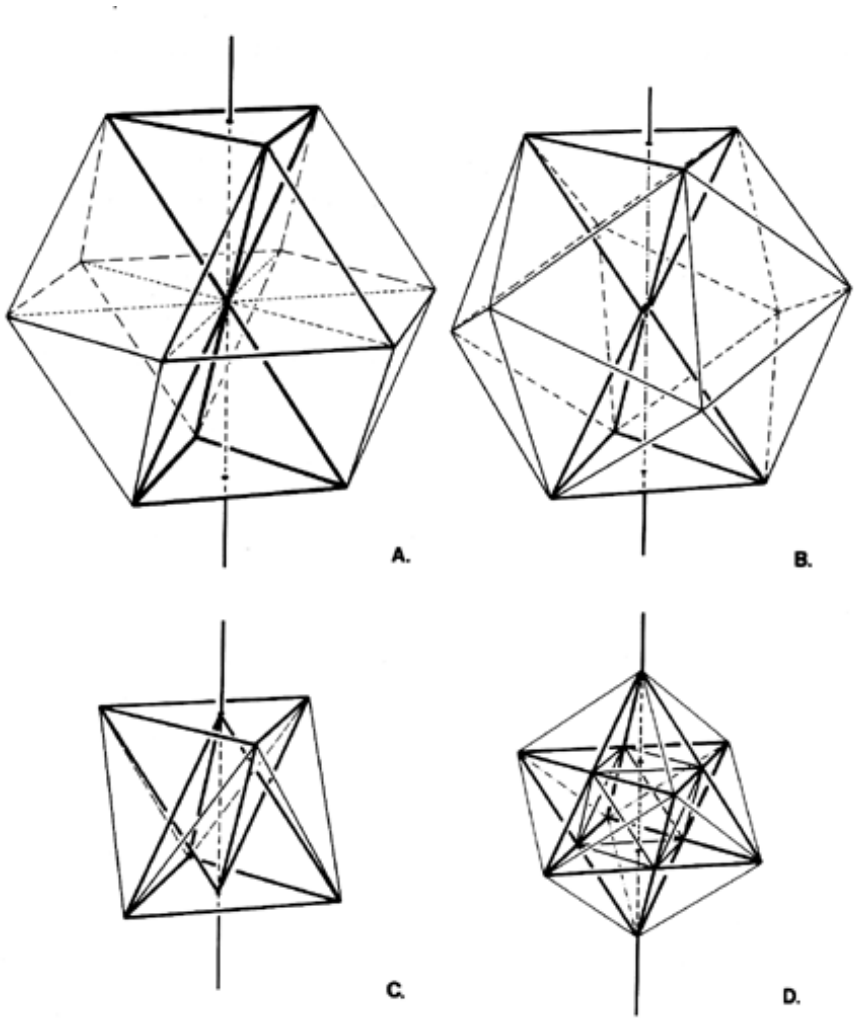


Fig. 1033.43 Two Opposite-Paired Tetrahedra Interpenetrate in Jitterbug Contraction: As one axis remains motionless, two polar-paired, vertex-joined tetrahedra progressively interpenetrate one another to describe in mid-passage an octahedron, at C, and a cube-defining star polyhedron of symmetrical congruence at D. (Compare Fig. 987.242A.)

1033.47 With this same omnisymmetrical contraction continuing—with all the external vertices remaining at equal radius from the system's volumetric center—and the external vertices also equidistant chordally from one another, they find their two polar tetrahedra's mutually interpenetrating apex points breaking through the other polar triangle (at their octahedral-forming positions) at the respective centers of area of their opposite equiangular polar triangles. Their two regular-tetrahedra-shaped apex points penetrate their former polar-opposite triangles until the six mid-edges of both tetrahedra become congruent, at which symmetrical state all eight vertices of the two tetrahedra are equidistant from one another as well as from their common system center. (See Fig. 987.242A.)

1033.48 The 12 geodesic chords omniinterconnecting these eight symmetrically omniarrayed vertices now define the regular cube, one-half of whose total volume of exactly 3-tetravolumes is symmetrically cored by the eight-pointed star core form produced by the two mutually interpenetrated tetrahedra. This symmetrical core star constitutes an inside-in tetravolume of l 1/2, with the surrounding equatorial remainder of the cube-defined, insideout space being also exactly tetravolume 1 1/2. (See Fig. 987.242A.)

1033.490 In this state each of the symmetrically interpenetrated tetrahedra's eight external vertices begins to approach one another as each opposite pair of each of the tetrahedra's six edges—which in the cube stage had been arrayed at their mutual mid- edges at 90 degrees to one another—now rotates in respect to those mid-edges—which six mutual tetrahedra's mid-edge points all occur at the six centers of the six square faces of the cube.

1033.491 The rotation around these six points continues until the six edge-lines of each of the two tetrahedra become congruent and the two tetrahedra's four vertices each become congruent—and the VE's original tetravolume 20 has been contracted to exactly tetravolume 1.

1033.492 Only during the symmetrical contraction of the tetravolume-3 cube to the tetravolume- 1 tetrahedron did the original axial contraction cease, as the two opposing axis tetrahedra (one inside-out and one outside-out) rotate simultaneously and symmetrically on three axes (as permitted only by four-dimensionality freedoms) to become unitarily congruent as tetravolume-1—altogether constituting a cosmic allspace- filling contraction from 24 to 1, which is three octave quanta sets and 6 × 4 quanta leaps; i.e., six leaps of the six degrees of freedom (six inside-out and six outside-out), while providing the prime numbers 1,2,3,5 and multiples thereof, to become available for the entropic-syntropic, export-import transactions of seemingly annihilated—yet elsewhere reappearing—energy quanta conservation of the eternally regenerative Universe, whose comprehensively closed circuitry of gravitational embracement was never violated throughout the 24 → 1 compaction.

1033.50 **Quanta Loss by Congruence**

1033.51 **Euler's Uncored Polyhedral Formula:**

$$V + F = E + 2$$

Vector Equilibrium	12 + 14 = 24 + 2
Octahedron	6 + 8 = 12 + 2
Tetrahedron	4 + 4 = 6 + 2

1033.52 Although superficially the tetrahedron seems to have only six vector edges, it has in fact 24. The sizeless, primitive tetrahedron—conceptual independent of size—is quadrivalent, inherently having eight potential alternate ways of turning itself inside out— four passive and four active—meaning that four positive and four negative tetrahedra are congruent. (See Secs. 460 and 461.)

1033.53 The vector equilibrium jitterbug provides the articulative model for demonstrating the always omnisymmetrical, divergently expanding or convergently contracting intertransformability of the entire primitive polyhedral hierarchy, structuring as you go in an omnitriangularly oriented evolution.

1033.54 As we explore the interbonding (valencing) of the evolving structural components, we soon discover that the universal interjointing of systems—and their foldability—permit their angularly hinged convergence into congruence of vertexes (single bonding), vectors (double bonding), faces (triple bonding), and volumetric congruence (quadri-bonding). Each of these multicongruences appears only as one vertex or one edge or one face aspect. The Eulerean topological accounting as presently practiced—innocent of the inherent synergetical hierarchy of intertransformability—accounts each of these multicongruent topological aspects as consisting of only one of such aspects. This misaccounting has prevented the physicists and chemists from conceptual identification of their data with synergetics' disclosure of nature's comprehensively rational, intercoordinate mathematical system.

1033.55 Only the topological analysis of synergetics can account for all the multicongruent—doubled, tripled, fourfolded—topological aspects by accounting for the initial tetravolume inventories of the comprehensive rhombic dodecahedron and vector equilibrium. The comprehensive rhombic dodecahedron has an initial tetravolume of 48; the vector equilibrium has an inherent tetravolume of 20; their respective initial or primitive inventories of vertexes, vectors, and faces are always present—though often imperceptibly so—at all stages in nature's comprehensive 48 → 1 convergence transformation.

1033.56 Only by recognizing the deceptiveness of Eulerean topology can synergetics account for the primitive total inventories of all aspects and thus conceptually demonstrate and prove the validity of Boltzmann's concepts as well as those of all quantum phenomena. Synergetics' mathematical accounting conceptually interlinks the operational data of physics and chemistry and their complex associabilities manifest in geology, biology, and other disciplines.

1033.60 **Primitive Dimensionality**

1033.601 Defining frequency in terms of interval requires a minimum of three intervals between four similar system events. (See Sec. 526.23.) Defining frequency in terms of cycles requires a minimum of two cycles. Size requires time. Time requires cycles. An angle is a fraction of a cycle; angle is subcyclic. Angle is independent of time. But angle is conceptual; angle is angle independent of the length of its edges. You can be conceptually aware of angle independently of experiential time. Angular conceptioning is metaphysical; all physical phenomena occur only in time. Time and size and special-case physical reality begin with frequency. Pre-time-size conceptuality is *primitive* conceptuality. Unfrequenced angular topology is primitive. (See Sec. 527.70.)

1033.61 Fifth Dimension Accommodates Physical Size

1033.611 Dimension begins at four. Four-dimensionality is primitive and exclusively within the primitive systems' relative topological abundances and relative interangular proportionment. Four-dimensionality is eternal, generalized, sizeless, unfrequenced.

1033.612 If the system is frequenced, it is at minimum linearly five-dimensional, surfacewise six-dimensional, and volumetrically seven-dimensional. Size is special case, temporal, terminal, and more than four-dimensional.

1033.613 Increase of relative size dimension is accomplished by multiplication of modular and cyclic frequencies, which is in turn accomplished only through subdividing a given system. Multiplication of size is accomplished only by agglomeration of whole systems in which the whole systems become the modules. In frequency modulation of both single systems or whole-system agglomerations asymmetries of internal subdivision or asymmetrical agglomeration are permitted by the indestructible symmetry of the four- dimensionality of the primitive system of cosmic reference: the tetrahedron—the minimum structural system of Universe.

1033.62 Zerovolume Tetrahedron

1033.621 The primitive tetrahedron is the four-dimensional, eight-in-one, quadrivalent, always-and-only-coexisting, inside-out and outside-out zerovolume whose four great- circle planes pass through the same nothingness center, the four-dimensionally articulatable inflection center of primitive conceptual reference.

1 tetrahedron =	zerovolume
1 tetrahedron =	$1^{\text{alternately-in-and-out 4th power}}$
1 tetrahedron =	$1^{1/2\text{-and-l/2 8th power}}$
|><|=	the symbol of equivalence in the converging-diverging intertransforms
Tetrahedron = 1^4	|><| (<-This is the preferred notation for the four-dimensional, inside-out, outside-out, balanced mutuality of tetra intertransformability.)
	0 Zerovolume Tetra & VE
4 great circles =	Tetra & VE
3 great circles =	Octa
6 great circles =	Duo-tet Cube
12 great circles =	Rhombic Dodecahedron

1033.622 Thus the tetrahedron—and its primitive, inside-out, outside-out intertransformability into the prime, whole, rational, tetravolume-numbered hierarchy of primitive-structural-system states—expands from zerovolume to its 24-tetravolume limit via the *maximum-nothingness* vector-equilibrium state, whose domain describes and embraces the primitive, nucleated, 12-around-one, closest-packed, unit-radius spheres. (See cosmic hierarchy at Sec. 982.62.)

Next Section: 1033.63

1033.63 **Prefrequency and Initial Frequency Vector Equilibrium**

1033.631 The primitive tetrahedron has four planes of symmetry—i.e., is inherently four-dimensional. The cosmic hierarchy of relative tetravolumes (Sec. 982.62) is primitive, four-dimensional, and unfrequenced.

1033.632 The primitive micro vector equilibrium is inherently prefrequency and is a priori tetravolume 0. The primitive macro vector equilibrium is inherently prefrequency and is a priori tetravolume 20. We also have the primitive, prefrequency, nuclear vector equilibrium of 2 1/2 active and 2 1/2 passive phases, and the primitive, nucleated, closest- packed-about vector equilibrium of 20. The nucleated vector equilibrium of frequency^2 has a tetravolume of 160, arrived at as follows:

> 2-frequency volume inherently 8 × primitive inherent 2 l/2-ness of nuclear VE = 8 × 2 l/2 = 20
>
> 2-frequency volume inherently 8 x primitive inherent 20-ness of nucleated VE 2^3 = 8, 8 × 20 = 160
>
> $2^5 \times 5$, where the fifth dimension introduces time and size.

1033.633 Compare Section 1053.84 and Table 1053.849.

1033.64 **Eightness Dominance**

1033.641 The quanta involvement sum of the polar pairings of octahedra would be dominant because it consists of 12 Quarter-Octahedra (i.e., 12 - 8 = 4) = involvement dominance of four, whereas eight is the equilibrious totality vector of the 4|><|4: since the eightness is the interbalancing of four, the 12 - 8's excess four is an unbalanced four, which alone must be either the outside-out or the inside-out four; ergo, one that produces the maximum primitive imbalance whose asymmetric proclivity invites a transformation to rectify its asymmetry. (Compare Sec. 1006.40.)

1033.642 Thus the off-balance four invites the one quantum of six vectors released by the precessed octahedron's one-quantum "annihilation"—whose entropy cannot escape the Universe.

1033.643 The vector-equilibrious maximum nothingness becomes the spontaneous syntropic recipient of the energy quantum released from the annihilation phase of the transformation.

1033.65 **Convergent-divergent Limits**

1033.651 Vector equilibrium is never a shape. It is either a tetravolume 0 nothingness or a tetravolume 20 nothingness. The only difference between space nothingness and matter somethingness is vector equilibrium.

1033.652 Primitive, unfrequenced vector equilibrium is both the rationally interstaged, expansive-contractive, *minimum* 0, 1, 2, 3, 4, 5, 6 -> to 20 to *maximum* 0, as well as the cosmic-resonance occupant of the minimum and maximum event void existing between the primitive, systematic somethingnesses.

1033.653 The vector equilibrium has four inside-out and four outside-out self-intercancelation, *eight*-congruent, zerovolume tetrahedra, as well as *eight* centrally single- bonded tetrahedra of maximum zerovolume expansion: both invoke the cosmically intolerable vacuum voids of macro-micro-nothingness essential to the spontaneous capture of one quantum's six vectors, which—in the VE's maxi-state—structurally contracts the VE's 20-ness of spatial Universe nothingness into the 20-ness of icosahedral somethingness, just as the octa-annihilated quantum provides the always-eight-in-one, outside-out tetrahedron to fill the inside-out "black hole" tetravoid.

1033.654

	Symmetrical Tetra:		*Asymmetrical Tetra:*
VE:	8	(+12=)	20
Icosa:	|><|		20

1033.655 In the octahedron as the maximum conservation and quantum-annihilability model of substance (Sec. 935) the precessing vector edge of the entropic octahedron drops out 1 tetra; 1 tetra = 6 vectors = 1 quantum of energy which—as the entropically random element of radiation's nonformedness—may be effortlessly reformed by reentering the vector equilibrium to produce the icosahedron and thus to form new substance or matter.

1033.656 The vector equilibrium has 24 external vector edges: inserting the quantum set of six more makes 30 external edges whose omniintertriangulation resolves as the 30- edged icosahedron. The six added edges are inserted as contractive diagonals of the six square faces of the vector equilibrium . The contracted 30 edges = 5 energy quanta. Icosahedron = tetravolume-5 . Icosahedron is the least dense of all matter.

1033.657 As we approach absolute zero, taking all the energy out of the system,[5] the chemical elements of which the apparatus parts consist each have unique atomic-frequency temperatures that are inherently different. This is evident to anyone who, within the same room temperature, has in swift succession touched glass, plastic, leather, or whatever it might be. Therefore, as in cryogenics we approach absolute zero (for the whole system's average temperature), the temperature of some of the elemental components of the experiment go through to the other side of zero, while others stay on this side—with the whole aggregate averaging just short of right on absolute zero. As a consequence of some components going through to the other side of zero, some of the most extraordinary things happen, such as liquids flowing in antigravity directions. This is the inside-out Universe.

(Footnote 5: See Secs. 205.02, 251.02, 427.01, and 443.02.)

1033.658 When the "black hole" phenomenon is coupled with the absolute-zero phenomenon, they represent the special-case manifests of synergetics' macro-micro- generalization extremes—i.e., both mini-maxi, zero-nothingness phases, respectively.

1033.659 Here are both the macro- and micro-divergence-convergence-limits in which the four-dimensional transformative and conversion behaviors are quite different from the non-scientifically-demonstrable concept of arbitrary cutoffs of exclusively one-dimensional infinity unlimits of linear phenomena. The speed of four-dimensional light in vacuo terminates at the divergent limit. The gravitational integrity of inside-out Reverse Universe becomes convergently operative at the macrodivergence limits.

1033.66 **Terminal Reversings of Evolution and Involution**

1033.661 In selecting synergetics' communication tools we avoid such an unresolvable parallel-linear word as *equals.* Because there are neither positive nor negative values that add or detract from Universe, synergetics' communication also avoids the words *plus* and *minus.* We refer to *active and passive* phases. Parallel equivalence has no role in an alternatively convergent-divergent Universe. *Inflection* is also a meaningless two- dimensional linear word representing only a shadow profile of a tetrahelical wave.

1033.662 In four-dimensional conversion from convergence to divergence—and vice versa—the terminal changing reverses evolution into involution—and vice versa. Involution occurs at the system limits of expansive intertransformability. Evolution occurs at the convergent limits of system contraction.

1033.663 The macro-micro-nothingness conversion phases embrace both the maximum-system-complexity arrangements and the minimum-system-simplicity arrangements of the constant set of primitive characteristics of any and all primitive systems. A single special case system embraces both the internal and external affairs of the single atom. A plurality of special case systems and a plurality of special case atoms may associate or disassociate following the generalized interrelationship laws of chemical bonding as well as of both electromagnetics and mass-interattractiveness.

1033.664 Primitive is what you conceptualize sizelessly without words. Primitive has nothing to do with Russian or English or any special case language. My original 4-D convergent-divergent vector equilibrium conceptualizing of 1927-28[6] was primitive |><| Bow Tie: the symbol of intertransformative equivalence as well as of complementarity:

convergence |><| divergence
|><| Also the symbol of syntropy-entropy,
and of wave and octave,
-4, -3, -2, -1,
+1, +2, +3, +4

1033.665 Minimum frequency = two cycles = 2 × 360°.

Two cycles = 720° = 1 tetra = 1 quantum of energy.
Tetrahedron is the minimum unity-two experience.

1033.666 The center or nuclear sphere always has two polar axes of spin independent of surface forming or intertransforming. This is the "plus two" of the spheric shell growth around the nucleus. $NF^2 + 2$, wherefore in four primitive cosmic structural systems:

Tetra =	$2F^2 + 2$		1
Octa =	$4F^2 + 2$		2
		$2 + 2$	F^2
Duo-tet Cube =	$6F^2 + 2$		3
Icosa =	$10F^2 + 2$		5

1033.70 **Geometrical 20-ness and 24-ness of Vector Equilibrium**

1033.701 The maximum somethingness of the VE's 20-ness does not fill allspace, but the 24-tetravolume Duo-tet Cube (short name for the double-tetrahedron cube) does fill allspace; while the tetravolume-4-ness of the exterior octahedron (with its always-potential one-quantum annihilability) accommodates and completes the finite energy-packing inventory of discontinuous episodic Physical Scenario Universe.

1033.702 The three interior octahedra are also annihilable, since they vanish as the VE's 20-ness contracts symmetrically to the quadrivalent octahedron jitterbug stage of tetravolume 4: an additive 4-tetravolume octahedron has vanished as four of the VE's eight tetrahedra (four inside-out, four outside-out) also vanish, thereby demonstrating a quanta-annihilation accomplished without impairment of either the independent motion of the system's axial twoness or its convergent-divergent, omniconcentric symmetry.

1033.703 The four of the 24-ness of the Duo-tet Cube (which is an f^2 cube: the double tetrahedron) accounts for the systemic four-dimensional planes of four-dimensional symmetry as well as for the ever-regenerative particle fourness of the quark phenomena characterizing all high-energy-system-bombardment fractionability.

1033.704 $24 \times 4 = 96$. But the number of the self-regenerative chemical elements is 92. What is missing between the VE 92 and the f^2 Duo-tet Cube's 96 is the fourness of the octahedron's function in the annihilation of energy: $92 + 4 = 24 \times 4 = 96$. The four is the disappearing octa set. The 24 is the second-power 24 unique indig turnabout increment. (See Fig. 1223.12.)

1033.71 We have three expendable interior octa and one expendable exterior octa. This fact accommodates and accounts both the internal and external somethingness-to- nothingness annihilations terminally occurring between the $1 \rightarrow 20 \rightarrow 1 \rightarrow 20$ at the macroinvolution and microevolution initiating nothingness phases, between which the total outside-out $1 \rightarrow 20$ quanta and the total inside-out $20 \rightarrow 1$ quanta intertransformabilities occur.

1033.72 The final jitterbug convergence to quadrivalent tetravolume-1 outside-out and tetravolume-1 inside-out is separated by the minimum-nothingness phases. This final conversion is accomplished only by torquing the system axis to contract it to the nothingness phase between the three-petal, triangular, inside-out and outside-out phases. (See Secs. 462.02, 464.01 and 464.02.)

1033.73 **The Quantum Leap:** Between the maximum nothingness and the minimum nothingness we witness altogether five stages of the 4-tetravolume octa vanishment in the convergent phase and five such 4-tetravolume octa growth leaps in the divergent phase. These five—together with the interior and exterior octa constitute seven octa leaps of four quanta each. The f^2 of the inherent multiplicative two of all systems provides the *eighth fourness: the* quantum leap. (Compare Sec. 1013.60.)

1033.74 It requires 24-ness for the consideration of the total atomic behavior because the vector equilibrium is not allspace-fillingly complete in itself. It requires the exterior, inside-out, invisible-phase, eightway-fractionated, transformable octahedron superimposed on the VE's eight equiangular, triangular faces to complete the allspace-filling, two- frequency Duo-tet Cube's eight symmetrically arrayed and most-economically interconnected corners' domain involvement of 24 tetravolumes.

1033.741 The VE's involvement domain of 24 symmetrical, allspace-filling tetravolumes represents only one of the two alternate intertransformation domains of closest-packed, unit-radius spheres transforming into spaces and spaces intertransforming into spheres: ergo, it requires 48-tetravolumes to accommodate this phenomenon. To allow for each of these 48-tetravolume domains to accommodate their respective active and passive phases, it requires 96-tetravolumes. F^2 tetravoluming, which is as yet primitive, introduces an allspace-filling, symmetrical cube of 192-tetravolumes as an essential theater of omniatomic primitive interarrayings.

1033.75 The total primitively nucleated Duo-tet Cube's double-tetra unique increment of allspace filling is that which uniquely embraces the whole family of local Universe's. nuclearly primitive intertransformabilities ranging through the 24 → 1 and the 1 → 24 cosmic hierarchy of rational and symmetrical "click-stop" holding patterns or minimum-effort self-stabilization states.

1033.76 The Duo-tet Cube (the maxicube) occurring between micronothingness and macronothingness shows how Universe intertransformably accommodates its entropic- syntropic energy-quanta exportings and importings within the two-frequency, allspace- filling minireality of special-case Universe. Thus the entropic-syntropic, special-case Physical Universe proves to be demonstrable within even the most allspace-crowding condition of the VE's maximum-something 20-ness and its exterior octahedron's even- more-than-maximum-something 4-tetravolume nothingness.

1033.77 This 24-ness is also a requisite of three number behavior requirements as disclosed in the min-max variabilities of octave harmonics in tetrahedral and VE cumulative closest-packing agglomerations at holistic shell levels as well as in all second- powering "surface" shell growths, as shown in three different columns in Fig. 1223.12.

1033.80 **Possible Atomic Functions in Vector Equilibrium Jitterbug**

1033.81 There can be nothing more primitively minivolumetric and omnisymmetrically nucleatable than 12 unit-radius spheres closest packed around one such sphere, altogether conformed as the vector equilibrium as produced in multiplication only by division. We can multiply our consideration by endlessly dividing larger into smaller and smaller, ever more highly frequenced, closest-packed spheres. Conversely, the icosahedron is the configuration of nonnucleated, omnisymmetric, unit-radius spheres closest packed circumferentially around a central space inadequate to accommodate one such unit-radius sphere. The icosahedron may be identified as the miniconfiguration of the electron function as well as the second most volumetric, initial, convergent-divergent transformation, with only the vector equilibrium being greater.

1033.82 The 20 triangular faces of the icosahedron may be considered as 10 pairs of regular tetrahedra interpenetrating as internal vertexes. The energetic functions of these 10 pairs (as described in Secs. 464 and 465) are a four-dimensional evolution like the triangles rotating in the cube, generating the double tetrahedra in the process. But according to synergetics' topological accounting it is necessary to extract one pair of double tetrahedra for the axis of spin: this leaves eight pairs of double tetra. 10—2=8 is the same fundamental octave eightness as the eight Eighth-Octahedra that convert the eight triangular corners of the VE to the involvement domain of the nucleated cube.

1033.83 At the outset of the VE jitterbug evolution there are two polar vertical-axis triangles—if the top one points away from you, the bottom one on the table points toward you. Without itself rotating, this active-passive, triangularly poled, vertical axis permits the jitterbug evolution to rotate its equatorial components either clockwise or counterclockwise, providing for the production of two different icosahedra—an active pair and a passive pair. But since there are four VE axes that can be jitterbugged in the same manner, then there are potentially eight different icosahedra to be generated from any one vector equilibrium.

1033.84 It could be that the eight paired tetrahedra are the positrons while the eight icosahedra are the electrons. Comprehension involves all four axes available.

1033.90 **Spheres and Spaces**

1033.91 How can an object move through water, which is a noncompressible substance? It does so by the intertransformability of spheres becoming spaces and spaces becoming spheres. (See Sec. 1032.) This is one of the ways in which the octahedron annihilation works in allspace-filling accommodation of local transformative events. The vector equilibrium and the eight Eighth-Octahedra on the triangular facets combine to produce the primitively nucleated cube.

1033.92 The octahedron annihilation model is uniformly fractionated and redeployed eight ways to function structurally as eight asymmetric tetrahedra at the eight corners of the vector equilibrium in an intertransformable manner analogous to the one-quantum- annihilating octahedron which—in Eighth-Octahedra increments—complements the 0 → 24-tetravolume vector equilibrium furnished with eight corners.

1040.00 **Seven Axes of Symmetry**

1041.00 **Superficial Poles of Internal Axes**

1041.01 There are only three topological axes of crystallography. They are:

Spin of diametrically opposite vertexes

Spin of diametrically opposite mid-edges = Three topological types of axes

Spin of diametrically opposite centers of face ares

1041.10 **Seven Axes of Truncated Tetrahedron**

1041.11 The prime generation of the seven axes of symmetry are the seven unique perpendiculars to the faces of the seven possible truncations of the tetrahedron:

4 original faces

4 triangular truncated vertexes

6 quadrilateral truncated edges

---

14 faces of the truncated tetrahedron, which produce seven unique pairs of parallel faces whose axes, perpendicular to their respective centers of area, generate the seven axes of symmetry. (See Secs. 100.103-.05 and Fig. 1041.11.)

1041.12 The seven unique axes of the three unique sets (4 + 4 + 6) producing the 14 planes of the truncated tetrahedron are also identifiable with:

— the 14 planes that bound and enclosingly separate all biological cells;

— the 14 facets interbonding all bubbles in the bubble complexes; and

— the 25 and 31 unique planes generated by the seven sets of foldable great circles, which are the only such foldably unbroken sets (i.e., the 3, 4, 6, and 12 sets of the vector equilibrium and the 6, 10, and 15 sets of the icosahedron).

1041.13 Various high frequencies of modular subdividings of the tetrahedron produce a variety of asymmetrical truncatabilities of the tetrahedron. The dynamics of symmetry may employ any seven sets of the 56 foldable-greatcircle variations of planar orientation. Thus it follows that both the biological cell arrays and the bubble arrays display vast varieties of asymmetries in their 14 enclosing planes, so much so that this set of interidentifiability with the 14 topological characteristics of the tetrahedron, the prime structural system of Universe, has gone unnoticed until now. (See Sec. 1025.14)

1042.00 **Seven Axes of Symmetry**

1042.01 Whatever subdivisions we may make of the tetrahedra, octahedra, and icosahedra, as long as there is cutting on the axes of symmetry, the components always come apart in whole rational numbers, for this is the way in which nature chops herself up.

1042.02 The four sets of unique axes of symmetry of the vector equilibrium, that is, the 12 vertexes with six axes; the 24 mid-edges with 12 axes; and the two different centers of area (a) the eight centers of the eight triangular areas with four axes, and (b) the six centers of the six square areas with three axes—25 axes in all—generate the 25 great circles of the vector equilibrium. These are the first four of the only seven cosmically unique axes of symmetry. All the great circles of rotation of all four of these seven different cosmic axes of symmetry which occur in the vector equilibrium go through all the same 12 vertexes of the vector equilibrium (see Sec. 450).

1042.03 The set of 15 great circles of rotation of the 30 mid-edge-polared axes of the icosahedron, and the set of 10 great circles of rotation of the icosahedron's mid-faces, total 25, which 25 altogether constitute two of the three other cosmic axes of symmetry of the seven-in-all axes of symmetry that go through the 12 vertexes of the icosahedron, which 12 represent the askewedly unique icosahedral rearrangement of the 12 spheres of the vector equilibrium. Only the set of the seventh axis of symmetry, i.e., the 12-vertex- polared set of the icosahedron, go through neither the 12 vertexes of the icosahedron's 12 corner sphere arrangement nor the 12 of the vector equilibrium phase 12-ball arrangement. The set of three axes (that is 12 vertexes, 30 mid-edges, and 20 centers of area) of the icosahedron produce three sets of the total of seven axes of symmetry. They generate the 25 twelve-icosa-vertex-transiting great circles and the six nontransiting great circles for a total of the 31 great circles of the icosahedron. These are the last three of the seven axes of symmetry.

1042.04 We note that the set of four unique axes of symmetry of the vector equilibrium and the fifth and sixth sets of axes of the icosahedron all go through the 12 vertexes representing the 12 spheres either (a) closest-packed around a nuclear sphere in the vector equilibrium, or (b) in their rearrangement without a nuclear sphere in the icosahedron. The six sets of unique cosmic symmetry transit these 12 spherical center corner vertexes of the vector equilibrium and icosahedron; four when the tangential switches of the energy railway tracks of Universe are closed to accommodate that Universe traveling; and two sets of symmetry when the switches are open and the traveling must be confined to cycling the same local icosahedron sphere. This leaves only the seventh symmetry as the one never going through any of those 12 possible sphere-to- sphere tangency railway bridges and can only accommodate local recycling or orbiting of the icosahedron sphere.

1042.05 The seven unique cosmic axes of symmetry describe all of crystallography. They describe the all and only great circles foldable into bow ties, which may be reassembled to produce the seven, great-circle, spherical sets (see Secs. 455 and 457).

Vector Equilibrium	*Axes of Symmetry*	
(squares) 3	#1	
(triangles) 4	#2	
(vertexes) 6	#3	
(midedges) 12	#4	

25*		all go through the same 12 vertexes of vector equilibrium and icosahedron
Icosahedron		
(faces) 10	#5	
25*		
(midedges) 15	#6	
(vertexes) 6	#7	

31		

25
31

56

1043.00 **Transformative Spherical Triangle Grid System**

1043.01 All the great circles of all the seven axes of symmetry together with all great- circle-trajectory interactions can be reflectively confined and trigonometrically equated with only one of the icosahedral system's 120 similar right-spherical triangles (of 90, 60, and 36 degrees, in contradistinction to the right-planar triangle of 90-, 60-, and 30-degree corners). (See Sec. 905.60.) The rational spherical excess of six degrees (of the icosahedron's 120—60 plus and 60 minus—similar tetrahedral components) is symmetrically distributed to each of the three central and three surface angles of each of the 120 tetrahedral components of the spherical icosahedron.

1043.02 This sixness phenomenon tantalizingly suggests its being the same transformative sixness as that which is manifest in the cosmically constant sixfoldedness of vectors of all the topological accountings (see Secs. 621.10 and 721); and in the sixness of equieconomical alternative degrees of freedom inherent in every event (see Sec. 537.10); as well as in the minimum of six unique interrelationships always extant between the minimum of four "star events" requisite to the definitive differentiation of a conceptual and thinkable system from out of the nonunitarily conceptual but inherently finite Universe, because of the latter's being the aggregate of locally finite, conceptually differentiable, minimum-system events (see Secs. 510 and 1051.20).

1044.00 **Minimum Topological Aspects**

[1044.00-1044.13 Minimum Topology Scenario]

1044.01 **Euler + Synergetics:** The first three topological aspects of all minimum systems—vertexes, faces, and edges—were employed by Euler in his formula V + F = E + 2. (See Table 223.64 and Sec. 505.10.) Since synergetics' geometry embraces nuclear and angular topology, it adds four more minimum aspects to Euler's inventory of three:

vertexes	
faces	EULER
edges	
angles	
insideness & outsideness	SYNERGETICS
convexity & concavity	
axis of spin	

1044.02 Euler discovered and developed the principle of modern engineering's structural analysis. He recognized that whereas all statically considered objects have a center of gravity, all dynamically considered structural components of buildings and machinery—no matter how symmetrically or asymmetrically conformed— always have a uniquely identifiable *neutral axis of gyration.* Euler did not think of his topology as either static or dynamic but as a mathematically permitted abstraction that allowed him to consider only the constant relative abundance of vertexes, faces, and edges isolated within a local area of a nonsystem. (The local consideration of the constant relative abundance of vertexes, faces, and edges applies to polyhedra as well as to cored- through polyhedra.)

1044.03 Euler's analysis failed to achieve the generalization of angles (whose convergence identified his corners), the complementary insideness and outsideness, and the convexity-concavity of all conceptual experience. Being content to play his mathematical game on an unidentified surface, he failed to conceive of systems as the initial, all-Universe separators into the tunably relevant, topologically considered set. Euler's less-than-system abstraction also occasioned his failure to identify the spin axis of any and all systems with his axis of gyration of physical objects; thus he also failed to realize that the subtraction of two vertexes from all systems for assignment as polar vertexes of the spin axis was a failure that would necessitate the "plus two" of his formula V + F = E + 2.

1044.04 Any and all conceptuality and any and all think-about-ability is inherently systemic (see Secs. 905.01-02). Systemic conceptuality and think-about-ability are always consequent only to consideration. Consideration means bringing stars together so that each star may be then considered integrally as unity or as an infrasystem complex of smaller systems.

1044.05 A system consists at minimum of four star events (vertexes) with four nothingness window facets and six lines of unique four-star interrelationships. As in synergetics' 14 truncation faces, Euler's three aspects result in 14 cases:

4 vertexes + 4 faces + 6 edges = 14 cases.

1044.06 Synergetics further augments Euler's inventory of three topological aspects (14 cases) with six additional and primitively constant topological aspects:

- *4th aspect* (12 cases): the 12 unique, trigonometrically integral, intercovariant vertex angles of the minimum system.

- *5th aspect* (two cases): ultravisible macrocosmic rest-of-Universe outsideness and infravisible rest-of-Universe insideness separated by the considered system; the insideness is all the integral otherness, and the outsideness is the as-yet-unconsidered irrelevance otherness.

- *6th aspect* (two cases): the multiplicative twoness of the divergent convexity and convergent concavity; there are two manifestations of *multiplicative twoness*, (a) and (b) (see Secs. 223.05-09), both of which make unity plural and at minimum two: (a) the always and only inseparable and co-occurring concavity and convexity of all systems, and (b) the always and only inseparable convergence to and divergence from system center.

— *7th aspect* (two cases): the additive twoness of the two vertexes always extracted from the system's total inventory of vertexes to serve as the poles of the system's neutral axis of spin.

— *8th aspect:* the sum of the angles externally surrounding the vertexes of any system will always equal 720 degrees less than the number of external vertexes of the system multiplied by 360 degrees.

— *9th aspect:* the sum of the angles around all the external vertexes of any system will always be evenly divided by 720 degrees, which is the angular description of one tetrahedron.

1044.07 The total of nine minimum topological aspects consists of three from Euler (14 cases) plus synergetics' inventory of six additional aspects, with 12 angular cases and six nuclear cases for a total of 18 synergetics cases. The 14 Euler cases and the 18 synergetics cases provide a total of 32 minimum topological cases.

1044.08 Topological analysis permits the generalization of all structuring in Universe as systemic.

1044.09 What we speak of as substance—a planet, water, steam, a cloud, a speck, or a pile of dust—always has both insideness and outsideness. A substance is a single system or a complex of neighboring interbonded or critical-proximity systems. Substances have inherent insideness "volumes."

1044.10 An Earthian observer can point in a describable compass direction and a describable angle of elevation toward the location in the sky where the contrails of two differently directioned jet air transports traveling at different altitudes appear to him to cross one another. Because they are flown at different altitudes, the "to-him" crossing does not mean that they touch one another; it is simply a moment when their two separate trajectories are nearest to one another. What the observer points to is a "nearest-to-one- another" moment. The observer points to an interrelationship event, which is not part of either contrail considered only by itself. This directionally identifiable interrelationship event is known as a "fix." (See Sec. 532.02.)

1044.11 The four corner fixes of an environmental tetrahedron may be pointed toward with adequate communicability to visually inform others of a specific tetrahedral presence. This is accomplished as follows: Two sky fixes must have a most economical linear interrelatedness but no insideness. Three sky fixes define a triangle between whose three edge-defining, interrelationship lines is described a plane that has no altitude—ergo, no insideness. Then the triangle described by the three sky fixes plus the position of the observer on the ground altogether describe the four corners of a tetrahedron that has six lines of observably inductable interrelatedness defining four triangular planes that observably divide all Universe into the included insideness and the excluded outsideness.

1044.12 One fix does not have insideness. Two fixes define a no-insideness linear relationship. Three fixes define a no-insideness plane. Four fixes define an insideness- including and outsideness-excluding tetrahedron, which is the minimum cosmic system and which cannot have less than 32 unique and differentially describably generalized cases of the nine irreducible-in-number unique topological aspects of the minimum system, but which in special frequenced cases may have more.

1044.13 Although not enumerated topologically (because unconsidered and because nonsimultaneously considerable) there are—in addition to the nine aspects and 32 cases— two additional ultimate conceptual aspects of the complementary macro- and microremainder of the physical Universe: all the as-yet-undiscovered—ergo, unconsidered—special cases as an epistemographic complementary to all the as-yet- undiscovered—ergo, unconsidered—generalized principles.

Next Section: 1050.00

1050.00 **Synergetic Hierarchy**

1050.10 **Synergy of Synergies:** We have the concept of synergy of synergies. Precession is not predicted by mass attraction. Chemical compounds are not prophesied by the atoms. Biological protoplasm is not predicted by the chemical compounds. The design of the elephant or the tree and their unwitting essential respiratory-gas conversion interexchanging is not predicted by the protoplasm. There is nothing about an elephant that predicts islanded star galaxies. As we get into larger and larger systems, the total system is never predicted by its lesser system's components.

1050.11 We know that there is DNA and RNA, any one genetic code of which dictates both a species and within it an individual or special-case formulation. DNA-RNA codes do not explain *why* the protoplasm could produce either an elephant, pine tree, or daisy. They elucidate only *how*. What we call *viral steerability* as produced by the DNA- RNA codes is simply our familiar and generalized *angle-frequency design control.*

1050.12 DNA-RNA angle- and frequency-modulated designs are composed exclusively of four unique chemical constituents that operate as guanine and cytosine; and as thymine and adenine: inseparable but reversible tandem pairs. The first pair occur as GC or CG. The second pair occur as TA or AT. The DNA-RNA codes may be read in any sequence of those constituents, for instance, as CG - CG - CG - GC - TA - AT - GC - TA - TA - TA - AT CG - CG - GC, etc. (See Sec. 932.)

1050.13 We know the codes, but we do not know the "how come" of their producing an elephant. The complementarity of the holisticness of these special-case individuals balances out. An elephant does walk. Elephants are successful designs. We have no evidence of biological species that are inherently incomplete designs. In the hierarchy of hierarchies of synergies, Universe is the unpredicted behavior of any of its sublevel synergetics. We must start our synergetic analysis at the level of Universe and thereafter with [he known behavior of the greatest whole and the known behavior of some of its parts, then proceed as permitted mathematically to discover its unknown parts. We have the Greek triangle with its known 180 degrees of angle; which together with the knowledge of the magnitude of any two sides and their included angle, or of any two angles and their included side, etc., permit us to discover the magnitude of the balance of the triangle's six

parts. Or, using trigonometry, if we know the magnitude of any two parts, we can ferret out the others.

1050.20 **Trigonometry:** The way we were taught in school about fractions leads to inconsistency. We were taught that fractions can be multiplied, divided, added, and subtracted only when the fractions consisted of identical entities. We could not divide three elephants by four oranges. However, trigonometry introduced functions—which are fractions or ratios, e.g., the sine, cosine, tangent, cotangent, and so forth. Contradicting our earlier lessons about fractions, these trigonometric fractions do mix together angles and edges of spherical triangles. This inconsistency could have been avoided by starting our geometry with spherical trigonometry. We would recognize that what we call a great circle arc or "edge" is indeed a central angle of the sphere. We would learn that we have central and external angles. We would spontaneously see that plane geometry derived from solid geometry and is an oversimplification of localized and superficial aspects of systems. This brings us back to angle and frequency modulation, i.e., outward, inward, and circumferentially around, complementary angle and frequency oscillations and pulsations and the congruence of the linear and angular frequency modulations. By teaching children plane geometry before teaching them spherical trigonometry, society became harnessed with a mathematical contradiction wherein trigonometry deliberately ratioed edge *lines* with *angles*—which clearly seemed to be forbidden by arithmetical fractions' law. Single lines are seemingly very different from angles, because angles involve *two* (convergent) *lines.* If, however, instead of starting elementary education with unrealistic, linear, one-dimensional arithmetic; and then going on to two-dimensional plane geometry; and thence to three-dimensional cubes; and thence to spherical trigonometry ... if we instead start synergetically with whole systems such as spherical trigonometry, we altogether avoid the concept of an edge and instead learn that the arc-defined edges of spherical triangles are the central angles of the sphere; wherefore both the arc edges and corners are angles, ergo ratioable. Now, having both surface *angles* and central *angles*, we discover that spherical trigonometry is always dealing with whole tetrahedra whose interior apexes are always at the center of the spherical system; and three of whose triangular faces are the great-circle plane triangles hidden within the spheric system; and whose fourth triangular face is always the arc-chord surface triangle of the sphere. These central- and surface-angle understandings are fundamental to transformational thinking, which deals with the falling-inward and precessing-outward proclivities.

1050.30 **Simplest Trigonometric Solutions: Sequence to Accompany Poster in color plate 1.**

1050.31 Stones may be broken into ever smaller stones, but they cannot be broken into no stones. They may be broken into gravel and the gravel into dust and the dust separated into crystals that are too small to be seen except through a lensed microscope; or they may be further broken apart into atoms that can be seen only through electron field microscopes. But the stones cannot be broken into nothingnesses—only into somethings. And somethings are always systems.[7]

(Footnote 7: The energy of the blow that breaks them asunder entropically releases the energy that previously bound together the atoms of the separate somethings. Disassociative energy is radiant—entropic; associative energy is something-forming—syntropic.)

1050.32 As the stones break, they have cleavage faces. They break into irregular polyhedra that are complex or simplex geometrically definable systems, each of which always has an inherent insideness and outsideness. The number of faces—hedra—of polyhedra cannot be reduced to less than four: the tetrahedron. The number of sides— gons—of a polygon cannot be reduced to less than three: the triangle. The minimum polyhedron of Universe is the tetrahedron, which requires a minimum of three triangles surrounding each of its four corners, whose four corners are omniinterconnected with a minimum of six edges that discretely outline the four triangular (minimum polygon) faces.

1050.33 Make the "V for Victory" sign with two adjacent fingers. The V is visual. The V is a specifically visible angle. The angle is an angle independent of the length of the fingers—that is, independent of the length of the sides of the angle. Angles, triangles, and tetrahedra are conceptual pattern integrities independent of size. Angles are always and only fractional parts of whole circles (of 360 degrees). Likewise, triangles are always and only components of a priori whole physical polyhedral systems (or of a plurality of whole polyhedral systems) each of 720 degrees (or whole multiples of 720 degrees) of angles surrounding all the external vertexes describing those systems. Only triangles produce structural stability. Only triangles produce pattern stability. The omnitriangulated tetrahedron is the minimum structural system of Universe.

1050.34 Drawing or scribing are physical operations executed upon a physical system. Triangles can be drawn or scribed or traced or trajectoried only upon or within an a priori physical system, or defined by a constellation of three physical systems within a greater a priori system.

1050.35 There are six and only six different but always orderly intercovarying geometrical characteristics or integral parts of all triangles: three surface-angle corners A, B, and C, and three sides a, b, and c. In reality these sides are always the central angles of the scribed-upon system and they are only evidenced by their surface-arc lines.

1050.36 Individual angular values or the relative interrelationships or interratios or functions of these parts hold true independent of the size of the triangle. This is to say that an equiangular triangle is equiangular and humanly conceptual independent of the size of any of our special case triangular experiences. The four most useful of these functions and their symbols are:

sine = *sin* tangent = *tan*

cosine = *cos* cotangent = *cot*

1050.37 The science that measures the respective angle magnitudes of the six ever- orderly intercovarying angles of triangles is called *trigonometry.* All of the geometrical interrelationships of all triangles—spherical or planar—are discoveringly calculated by the same trigonometry because plane triangles are always very small spherical triangles on very large spheric systems such as high-frequency symmetric polyhedra. A circle is a spherical triangle each of whose three corner angles is 180 degrees.

1050.38 To find the value of all the central angles (sides) and surface (corner) angles of any spherical triangle, we can always start by dropping a perpendicular from any vertex of that triangle upon its opposite side—making it into two "right" triangles. In order to discover all six angular values of a given triangle it is necessary to know—in addition to knowing the 90-degree corner—the surface- or central-angular values *of any other two* of the to-be-solved triangle's five other parts: A, B, a, b, c. Many mathematicians have devised strategic formulas for coping with trigonometric solutions, most of them involving plus or minus quadrant symbols that invite errors of calculation.

1050.39 To make the trigonometry of the sea captain's celestial navigation as simple and foolproof as possible the mathematician Lord Napier (1550 1667)[8] evolved the following diagrams and procedures. To avoid what is known in navigation as "the 180- degree error"—going in exactly the opposite direction from that which will get you where you want to go—Napier arranged the five non-90-degree "parts" of a triangle in a five- segment "clock."

(Footnote 8: Napier was the first to use the decimal point; he also invented logarithms for numbers. His mathematical ingenuity contributed greatly to the attainment of world ocean supremacy by the East India Company and the Royal Navy.)

1050.40 Napier had two equally simple ways to solve trigonometric problems without plus or minus symbols, provided that any two of the non-90-degree angles are known at the outset. His superscript ^{c} means that A^{c}, c^{c}, B^{c} are the 180-degree complements of A, c, B. For instance, $A^{c} + A = 180°$, wherefore *sin* A^{c} *= cos A; or tan* c^{c} *= cot c, etc.*

1050.41 First we check-mark the two "known-in-advance" non-90-degree parts on Napier's five-segment clocklike pattern. It is clear that the two already-knowns are always either divided from one another or are side by side. In Napier's Case One the two knowns are side by side in the clock: Napier calls this the case of *Opposites.* Opposite Case see Rule 1 chosen unknown for first solution.

1050.42 In Case Two the two knowns are separated from one another in the clock: Napier calls this the case of *Adjacents.* Adjacent Case see Rule 2 first unknown to be solved.

1050.43 Napier's two easily remembered rules are:

Rule 1. The sine of any unknown part *theta* is equal to the product of the cosines of the two known *opposite* parts. This is written as:
unknown's angle *theta's sin = cos · cos* of its two known *opposite parts.*

Rule 2. The sine of any unknown part is equal to the product of the tangents of its two known *adjacent* parts. This is written as:
unknown angle *theta's sin = tan · tan* of its two known *adjacent* parts.

1050.44 Next we employ the appropriate formula with the known cosine or tangent values. Next we must remove the superscript ^{c} of the complementaries, if any, by substituting cosines for sines, sines for cosines, tangents for cotangents, and cotangents for tangents.

Example: When the equation as first written is

$$\sin b = \cos c^{c} \cdot \cos b^{c}$$

the equation must be rewritten

$$\sin b = \sin c \cdot \sin b;$$

or if the equation first reads

$$\sin A^{c} = \tan c \cdot \tan b,$$

it must be rewritten as

$$\cos A = \cot c \cdot \tan b$$

before going on to intermultiply the functions of the two knowns whose product will be the function value of the previously unknown angle theta. The angle values of the newly found knowns may be in any table of trigonometric functions or may be "remembered" by computers. When the value is found for an angle's function (sin, cos, tan, cot), its specific angular value may also be read out of the tables.

1051.00 **Circumference and Leverage**

1051.10 **Complementarity of Circumferential Oscillations and Inward and Outward Pulsations:** We have demonstrated circumferential complementarity, the circumferential twoness of systems such as the northern and southern hemispheres of our Earth. There is also concave inward and convex outward complementarity, inward and outward twoness. As a consequence, there are also circumferential skew oscillations *and* inward and outward pulsations.

1051.20 **Central and External Angles of Systems:** The tetrahedral integrity of internal (central) angles and external (surface) angles of systems permits the integration of the topological and quantum hierarchies. It is exciting that the three internal radii give us three edges of the tetrahedron's six edges; while the arc chords give us the three other of the tetrahedron's six relationships; and the center of the spheric system and the surface triangle's three corner-vertexes give us the four-vertex-events having the inherent six system relationships; which six are our coincidentally six-positive, six-negative, equieconomical vectorial freedoms (see Sec. 537.10). The central angles gives us what we call the chords of the central-angle arcs. Thus all-system-embracing geodesic lines are expressible in angular fractions of whole circles or cycles.

1051.30 **The Circumferential Field:** The inward-outward complementations of the system are represented by great-circle arcs on the system's surface, whose existence is in reality that of the central angles of the system which subtend those external arcs and create the arc cyclic-duration "lengths." Areal definition of the circumferential—ergo, surface— complementations and their oscillations occur as the surface angles at the vertexes of the system's external mapping.

1051.40 **Angular Functionings of Radiation and Gravity:** The differences between the central angles' and surface angles' functionings are identifiable with radiational and gravitational functionings. Radiation identifies with central angles. Radiation is outwardly divergent. Gravity identifies with the three surface angles' convergent closure into the surface triangle's finite perimeter. Gravity is omniembracing and is not focusable. Gravity is Universe-conservingly effective in its circumferential coherence.

1051.50 **Leverage:** The principle of leverage is employed in shears, nutcrackers, and pliers. The longer the lever arms, the more powerful the pressure applied between the internal central angles of the nutcracker's lever arms. We can make an illuminating model of our planet Earth if we think of it as a spherical bundle of nutcrackers with all their fulcrums at the center of the sphere and all the radii of the sphere acting as the lever arms of the pincers. The whole bunch of pincers have a common universal fulcrum at the common center. The farther out we go on the radial lever arms, the less effort is required to squeeze the ends together to exert nutcracking pressure at the center. If we go around the sphere-embracing circumference progressively tying up the ends of the levers together, we find that it takes very little, local, surface effort tensively between any two surface points to build up excruciatingly powerful, central-compression conditions. The bigger the model, the easier it is to tie it up; ever more delicate an exterior web will hold it

together.

1051.51 Look at the relative distance of the atom and its outside electron orbit. The atom's electron field may be equivalent to our magnetic field around this Earth. This elucidates the electromagnetic field of Earth as a world-around, circumferential- embracement field operating ephemerally on the outer ends of 4,000-mile-long levers.

1051.52 Identifying the surface-angle chordings with gravity, we comprehend why it is that as we get deeper and deeper within our Earth, with the pressure continually increasing as we get deeper, we see that the increasing gravitational-compression effect is due to the circumferential containment. The external containment web is always getting hold of the outermost ends of the centrally pinching levers. With this leverage effect, the farther out you go, the more advantage you have and the more powerful work you can do with that lever. Leverage effectiveness increases toward the center, ergo the increasing pressure that we identify with gravity. But it has this circumferential aspect.

1051.53 There is a tendency to misinterpret the increasing pressures occurring inwardly of Earth as "deadweight," i.e., only as a radiationally-inward force, but it must be realized that the "weight" is omnidirectional compression. The gravitational intermass- attraction is progressively augmented, as we go radially outward, by the circumferential mass-interattraction of the relative abundance of elemental atoms, which increases at the second-power rate of the radial-distance outwardly from the Earth's center; and as the pressures bring about ever closer presence of the atoms to one another, there is also an additional second-power exponential gain which results in r^2 varying as $\textit{proximity}^2 = P^4$, where P = relative compressive force. The surface chordal-angle magnitudes multiplied by radius to the second power produce the relative magnitude of network leverage-advantage resulting in the relative increase in pressure as you go inward toward Earth's center. This is exciting because we now comprehend that gravity is a circumferentially operative force and not a radial force, with precession bringing about the 90-degreeness.

1051.54 Remembering Newton's law of gravity, wherein the relative interattractions are directly proportional to the product of the masses increased by the second power of the distances between the respective mass centers, we realize that doubling the size of a sphere brings about an eightfold multiplication of the circumferential mass-interattraction. In effect, we have a network of chordal cables tensively intertriangulating the progressively outmost ends of the spherical nutcracker bundle with circumferential turnbuckles continually tightening the surface-triangulated tensional embracement network. This means that the pressures being exerted internally are proportional to the fourth power of the relative radial depth inward of Earth's surface.

1051.55 The surface-embracement leverage-advantage of the sphere operating at the fourth power can always overmatch the total volumetric gaining rate as only the third power of radial (frequency), linear gain, as the second-power interproximity attractiveness is further multiplied by the second-power, radial-lever-arm, advantage gains.

1052.00 **Universal Integrity**

1052.10 **Second-Power Congruence of Gravitational and Radiational Constants:** The relative mass-energy content magnitude of a polyhedral system is arrived at by multiplying the primitive, frequency-zero, a-priori-state volume (relative to the tetrahedron-equals-one) of the geometric, concentric, structural system's hierarchy, by the second power of the (both minimum and maximum) limit linear velocity of all classes of radiation when unfettered in a vacuum; i.e., multiplying initial volume by the terminal rate at which a spherical wave's outermost, unique-event-distinguishability progressively and omniexpansively occurs, as expressed in terms of the second power of relative frequency of modular subdivision of its initially-occurring, polyhedral system's radius; ergo as manifest in Einstein's equation $E = Mc^2$. Energy equals a given mass with its relative mass-energy compactedness tighteningly modified by the velocity of energy-as-radiation intertransformability potential (not just linearly, but omnidirectionally); ergo as a potentially ever-expansively enlarging spherical wave's outermost-event, one-radial- wavelength-deep surface; ergo second power of system frequency (because wave surfaces grow omni-outwardly as of the second power of the radial, linear frequency) rate of gain. (See Secs. 231.01, 251.05, 529.03 and 541.)

1052.20 **Spherical Field:** As already discovered (see Sec. 964), physics' discovery of universally-multifrequenced, periodic-event-discontinuity *outness* (in complementation to equally frequenced, event-occurrence *in-ness*) is inherent in the always-experientially- verifiable, wave-duration frequency, photon-quantum phenomena; wherefore synergetics had to redefine both volumes and surfaces in terms of *dense* (high-frequency) aggregates of only pointally-positionable, energy events' geometrical formulations, with spherical "surfaces" being in operational reality a dense, outermost, single-photon-thick, "cloud" layer, everywhere approximately equidistant in all directions from one approximately- locatable event center. For this reason the second-power exponential rate of area gain is not to be identified with a continuum, i.e., with a continuous system, but only with the high-frequency outermost layer population aggregate of energy-event points. With numbers of photons and wave frequency per primitive volume, the relative concentration of given masses are determinable.

1052.21 Isaac Newton discovered the celestial gravitation interrelationship and expressed it in terms of the second power of the relative distance between the different masses as determined by reference to the radius of one of the interattracted masses. The gravitational relationship is also synergetically statable in terms of the second power of relative frequency of volumetric quanta concentrations of the respectively interattracted masses. Newton's gravitational constant is a radially (frequency) measured rate of spherical surface contraction, while Einstein's radiational constant is a radial (frequency) rate of spherical expansion. (See Secs. 960.12, 1009.31 and 1052.44.)

1052.30 **Gravitational Constant: Excess of One Great Circle over Edge Vectors in Vector Equilibrium and Icosahedron:** Pondering on Einstein's last problem of the Unified Field Theory, in which he sought to identify and explain the mathematical differentiations between electromagnetics and gravity—the two prime attractive forces of Universe—and recalling in that connection the conclusion of synergetics that gravity operates in spherical embracement, not by direct radial vectors, and recalling that electromagnetics follows the high-tension convex surfaces, possibly the great-circle trunk system of railroad tracks (see Secs. 452 and 458); led to pondering, in surprise, over the fact that the vector equilibrium, which identifies the gravitational behaviors, discloses 25 great circles for the vector equilibrium in respect to its 24 external vector edges, and the icosahedron, which identifies the electron behaviors of electromagnetics, discloses 31 great circles in respect to its 30 external vector edges.

1052.31 In each case, there is an excess of one great circle over the edge vectors. Recalling that the vector edges of the vector equilibrium exactly equal the radial explosive forces, while the icosahedron's 30 external edges are longer and more powerful than its 30 radial vectors, yet each has an excess of one great circle, which great circles must have two polar axes of spin, we encounter once more the *excess two* polar vertexes characterizing all topological systems, and witness the excess of embracingly cohering forces in contradistinction to the explosively disintegrative forces of Universe.

1052.32 **Possibility of Rational Prime Numbers in High-energy Physics Experiments:** In recent years the experiments of the physicists, notably at the European Nuclear Research Center (CERN), seem to provide increasing confirmation of the similarities in the behaviors of electromagnetic and gravitational forces—as well as in the bonding and radioactive effects of the atomic nucleus (see Sec. 646.10). The ultimate definition of a Unified Field Theory becomes tantalizingly nearer at hand. The results and findings of the physicists' experiments should be examined in the light of synergetics' models, especially the vector equilibrium, and the comprehensive isotropicity which derives from closest-sphere-packing and provides omnirational accounting for radial and circumferential coordination. This kind of examination might account for some of the energetic behaviors of the newly described mass particles—leptons and hadrons, quarks and antiquarks—in which the second-power of their masses displays simple whole-number relationships.

1052.33 In synergetics the number of spheres on the outer surface of symmetrically complete VE aggregations is equal to two plus two times frequency to the second power times five—the prime number that is the key to the respective masses of both the VE and Icosa. The equation of prime number inherency of symmetrical structural systems ($2NF^2 + 2$; see Sec. 223.03) could be considered as describing a Unified Field Theory in which the number of vertexes (crossings or events) can be regarded as abstractions from the total field corresponding to a scenario of limited conceptuality. (Compare Secs. 419.10-20.)

1052.350 **Microsystems**

1052.351 A point is always a microsystem or a plurality of microsystems—ergo, at minimum one tetrahedron.

1052.352 A line is a relationship between any two microsystems.

1052.353 A tetrahedron is defined topologically by four conceptually locatable microsystems interconnected by six interrelationship lines whose 12 ends are oriented to corner-converge in four groups of three lines each; these lines terminate in one of four infratunable microsystem corners, whose at-minimum-of-three-other corner-defining microsystems lie outside in the tune-in-able tetrahedron defined by the six lines. (See Sec. 505.83.)

1052.354 The tetrahedron is the minimum *tunable* system. A point-to-ability is a tuned-in tetra. Each tuned-in tetra consists of four corners, each of which is an infratunable tetrasystem.

1052.355 The threeness of the quarks shows up at the three minimum convergent lines around each vertex of the minimum system consisting of only six lines.

1052.356 Topological components of systems and their infra-tune-in-able corner-vertex-locating infratunable systems ad infinitum do not and cannot exist independent of systems.

1052.357 The above describes the tunability of corners and is explanatory of the ever- reappearing quarks that disclose the primitive characteristics of all systems, which always—to any one human observer listening at any one tuning-in time—consist of infra- or ultratunable systems ad infinitum.

1052.360 **Mite as Model for Quark**

1052.361 Proofs must proceed from the minimum whole system to Universe and the differentiation-out of Universe of the special case conceptual system. Proofs must start from the minimum something that is the minimum structural system. All geometrical and numerical values derive from fractionation of the whole.

1052.362 At the maximum limit of the rational cosmic hierarchy of primitive structural systems we have the 120 similar and symmetrical T Quanta Module tetrahedra that agglomerate symmetrically to form the triacontahedron. (See Sec. 986.) At the minimum limit of the hierarchy are the separate A, B, and T Quanta Modules, and at the minimum limit of allspace-filling— ergo, of all Universe structuring—we have the three-module mites consisting each of two A and one B Modules.

1052.363 The mites are the quarks. The two energy-holding A Quanta Modules and the one energy-dispersing B Quanta Module of which the mite is composited exactly correspond with the plus-two, minus-one characteristics model of the three-separate-entity functions of the quark. (See Secs. 262.04 and 262.05.)

1052.40 **Vector Equilibrium and Icosahedron: Ratio of Gravitational and Electromagnetic Constants:** The vector equilibrium and the icosahedron are the same initial twentyness. But the icosahedron is always in either a positive limit or a negative limit phase of its, only-pulsatingly attained, first-degree structural self-stabilization in the asymmetric transformation of the vector equilibrium, which alternating pulsations are propagated by the eternally opposed, radiant-attractive, always dualistic, inter-self- transformable potential of ideally conceptual unity of Universe.

1052.41 The icosahedral phase of self-structuring is identifiable uniquely with the electron, whose mass relationship to the proton is as 1:18.51, whereas the icosahedron's volume is to the vector equilibrium's volume as 20:18.51. In this connection it is significant that the vector equilibrium's plural unity is 20, ergo we may say the relationship is as unity: 18.51.

1052.42 The number of icosahedral electrons is always equal to the number of protons that are in the vector equilibrium's idealized form of the same surface layer phenomenon.

1052.43 The nonnucleated icosahedron can and does maintain only one single, one- wave-deep, external layer of omnicircumferentially, omni-intertriangularly tangent, closest-packed, unit-radius, spherically conformed, energy-event packages; while the vector equilibrium is both radially and omnicircumferentially, omnitriangularly closest packed, i.e., in maximum, intertangential, mass-interattractiveness nucleated concentration.

1052.44 Reminiscent of electron proclivities, the icosahedron displays the same surface number of spherically conformed, energy-event packages and its only-one-wavelength-deep, single, outer sphere layer array is omnitriangulated, while the vector equilibrium's surface is arrayed two-fifths in triangulation and three-fifths in open, unstable, square tangency. As spherical agglomerates decrease in radius—as do the vector equilibria's contract to the icosahedral phase—their sphere centers approach one another, and Newton's mass-interattraction law, which shows a second-power gain as the interproximities are halved, imposes an intercoherence condition whereby as their overall system radius decreases, their circumferential mass-interattractions increase exponentially as r^2, where r = radius of the system. (See Sec. 1052.21.)

1052.50 **Syntropy and Entropy**

[1052.50-1052.71 Physical Periodicities Scenario]

1052.51 **Meshing and Nonmeshing:** We know from the scientifically proven knowledge derived from physical experiments that local physical systems are continually losing energy, though they may be concurrently importing or inhibiting energies. This constant energy loss is the dominant characteristic of entropy. Due to each of the local Universe system's unique complex of chemical-element periodicities the energies that are given off in an orderly manner appear to be disorderly harmonics in respect to the unique harmonic complexes released by other systems. The timings between different energies leaving different systems, like any two different-sized mechanical gears, may not necessarily mesh or synchronize with the timings of energies leaving other systems that they encounter, which encountered energy events also may be separately orderly in themselves.

1052.52 The special-case regenerative system itself may attain maximum orderliness while being acted upon by externally distributive forces. Often the reason that systems do not synchronize is that they derive from different complexes of chemical elements. Since every one of the interorbiting cosmic system's elements has its unique frequencies, the wave frequencies of the orbiting systems are like the peaks and valleys of gear teeth whose peak-and-valley perimeters have latch-key-like irregularities. We have gears that rarely interlock and must consequently remain only superficially tangent to one another. Hence they take up more room than they would if they had meshed. The centers of the two meshing gears are nearer to one another than are the centers of the same two gears when their teethed perimeters are not meshed. When meshed, they are more powerfully intermass-attracted than when nonmeshed. (See Secs. 263.02 and 522.36.)

1052.53 Gears of equal weight and of the same material might have very many little teeth or relatively few big teeth in each of their great-circle cycles. The frequencies being given off entropically do not expand in planes or lines; they expand omnidirectionally as a complex of differently timed radial spirals. As the omnispheric gears fail to mesh, they employ ever more space, and therefore we realize a physically entropic Universe that is everywhere locally broadcasting its disorderly information to our sensorial receptors. Thus it seems—to short-term, local observation—that the aggregate discards of entropically released energies of the various localities of the physical Universe are expanding and even further expending energies in an increasingly disorderly manner. The syntropic births and growths escape our attention, for they inherently withhold or withdraw information regarding their ultimately syntropic cosmic resolution of apparent disorders—a resolution withheld from Earthian observers who are preoccupied with hindsight and dismayed by the obvious only-initially-entropic disorders. But fundamental complementarity requires that there be other localities and phases of Universe wherein the Universe is reconvening, collecting, and condensively contracting in an increasingly orderly manner as complementary regenerative conservation phases of Universe thus manifesting comprehensive transitions from disorder to order, from entropy to syntropy.

1052.54 **Order and Disorder:** Birth and Growth: Entropy is locally increasing disorder; syntropy is locally increasing order. Order is obviously the complement, but not mirror-image, of disorder.[9] Local environments are forever complexedly altering themselves due to the myriad associative and disassociative interpatterning options of syntropy and entropy, with an overall cosmic syntropic dominance insured by an overall local entropic dominance. (See the "Principle of Universal Integrity" at Sec. 231.) Universe is a vast variety of frequency rates of eternally regenerative, explosive, entropic vs implosive, syntropic pulsation systems. Electromagnetic radiant energy is entropic; gravitational energy is syntropic.

(Footnote 9: See "Principle of Irreversibility" at 229.10)

1052.55 Both entropy and syntropy are operative in respect to planet Earth's biospheric evolution. Wherever entropy is gaining over syntropy, death prevails; wherever syntropy is gaining over entropy, life prevails.

1052.56 Entropy is decadent, putrid, repulsive, disassociative, explosive, dispersive, maximally disordering, and ultimately expansive. Syntropy is impulsive, associative, implosive, collective, maximally ordering, and ultimately compactive. Entropy and syntropy intertransform pulsively like the single rubber glove (see Sec. 507). There is an entropic, self-negating, momentary self: there is also the no-time, nondimensionable eternity of mind. Dimensioning is apprehensible only within temporal relativity. Time is experienced in our relative duration lags and gestation rates as well as in the unique frequency interrelatedness of the electromagnetic spectrum events and novents. Every time we experience the novent disconnects of momentary annihilation into eternity, naught is lost. Mind deals only with eternity—with eternal principles. What is gained to offset any loss is the residual, observational lags in accuracy inherent and operative as cognition and the relativity of awareness that we call life. (See Secs. 638.02 and 1056.20.)

1052.57 The life-propagating syntropy-entropy, birth-to-death transformations constitute the special case realizations of the complex interactive potentials of all the eternal, abstract, dimensionless, nonsubstantial, generalized principles of Universe, interplayed with the absolute "if-this-then-that" integrity of plural cosmic unity's intercomplementarity. The death and annihilation discontinuities occur as eternal generalization intervenes between the special case, "in-time," relative intersizing of the realizations.

1052.58 **Pattern Sorting and Observing:** When we are able to observe for long enough periods of time, however, we find all the gears of Universe eventually meshing, though not simultaneously. The next periodic meshing of any two of the gears might take a thousand years—or 28 l/2 years—or 17 seconds. The important phenomenon to note is that there are great varieties of periods of nonmeshing which altogether make the physically observed totality appear to take up ever more room, and anywhere within this expansiveness the locally predominant events occurring within short spans of time appear to be omnidisorderly. When we compound that realization with the now-known millionfold greater span of electromagnetic reality and the lesser span of direct-sense ranging of the human organism, we begin to comprehend how readily humanity falls into the trap of dismay, fear, and negativism in general. Impatience engenders further myopically disorderly incrementation of information receipts. Those who are impatient for the receipt of the next news broadcasts are only beguiled by negative information. That is what myopia looks for. Chronic shortsightedness spontaneously seeks and tunes in only the broadcast entropy. Syntropy incasts, in contradistinction to entropic broadcast. Syntropy can be apprehended only through *overall* or comprehensive review of the totally recalled information of long-term experience.

1052.59 Man has no experimental data to suggest that energy is ever created or destroyed. Though our own overall experience leads us to the discovery of cyclic events that return upon themselves, the local, momentary, physical events seem to be giving off energy and taking up more room despite our own syntropic attempts to reestablish local order. Entropy is defined as the law of increase of the random element. But our experience in physical exploration also reveals to us that every pattern phenomenon has its complementary which is rarely a mirror-image and is most frequently invisible. As the complementary has the effect of cosmic integrity balancing, we realize there must be unseen syntropic events of Universe that are always reordering the environment. Syntropy is the law of elsewhere-importing and always-orderly regrouping of the entropic exportings of all dying systems. Aging and death here engender birth and growth elsewhere. (See Sec. 1005.611.)

Next Section: 1052.60

1052.60 **Physical Limit and Metaphysical Absolute**

1052.61 This leads us to comprehension of the significance of life on Earth. On this cosmic-energies-importing planet we find life impounding those energies, taking random receipts of cosmic radiation from the stars— more importantly the Sun—and through photosynthesis converting it into organized molecular structures. We find the biologicals making ever more intricately orderly patterns: the little seed becoming a big, superbly organized structural process, a tree, rearranging all its energy receipts from Universe in a beautiful and orderly way. And among the living we find humans and humans' minds reviewing the many brain-recorded, special case experiences and from time to time discovering generalized relationships interexisting between and coordinating the separate special-case phenomena. In pure principle these generalized principles—such as gravity— are operative and hold true throughout all experiences. The history of humanity revolves around humans' discovering these principles. Humans also in due course discover principles that encompass a plurality of principles. Humanity trends toward ever greater understanding of the significance of principles, each of which, in order to be principles, must be inherently eternal. The discovery of principles occurs only with patience. Patience is long-wave tuning and is the antithesis of impatience, which is exclusively short-wave tuning. The discovery of great principles inherently requires a periodicity of adequate increments of time. Only through the thought stimulation of discovered and periodically repeated patterns of interrelatedness can mind's discovery of generalized principles occur.

1052.62 Physical Universe expands, and as its observed components and aggregates of components are found to be larger and larger, their relative operating velocities increase to cope with their greater and greater orbital travel distances. But there seems to be a constant limit velocity of all disintegrative, entropic energy as manifest by the speed of all types of electromagnetic radiation when measured linearly in a vacuum tube. All the various types of radiation—ultraviolet, radio wave, and X-ray—reach speeds of about 000 miles per second, which is also 700 million miles per hour, which incidentally is a million times the speed of sound. These measurements inspired much of Einstein's exploratory thought. But we note that since light and all other radiation is entropic—ergo, concomitantly disintegrative—there is a *constant limit* of disorderliness. Here nature turns about and becomes more orderly. There is also a constant limit of orderliness; this absolute turnaround condition is that of the primitive hierarchy. We discuss this elsewhere (Sec. 440) as the limits of pattern aberration in respect to the vector equilibrium, i.e., to the absolute or zerophase of

generalized nuclear systems' orderliness. Whereas the physical disintegrates entropically to a limit of velocity and disorder, the metaphysically operative mind displays a reverse pattern to that of physical entropy, wherewith to define lastingly the mind seeks the orderliness of the principles that are discovered. As the human definitions can never be perfect, the metaphysical mind of humans can only amplify and simplify the human statement of the comprehensive orderliness discovered and periodically reconfirmed by further experiences.

1052.63 From time to time humans learn a little more about a principle, but greater familiarity does not change the principles themselves. As further observation becomes more comprehensive and refined, the statement of the principle becomes ever more incisive and ever less frequently modified and improved. Since the principle itself is eternally changeless, the more accurately it is defined, the more unchangeable is the definition. The word *truth* is applicable to an earnestly attempted statement of any observed or recollected special case experience. Recollection of a plurality of truths may lead to discovery of a generalized principle intercoordinating the special case experiences. Recollection of truths leads toward discovery of generalized principles. Thus we find the metaphysical definitions of human minds tending to become ever more enduring as human mind trends toward the only absolute perfection, which is the eternal integrity of the omniinteraccommodation of all principles.

1052.64 Thus do words evolve and accumulate to fill the dictionaries as humans discover mutually shared conceptions regarding their common experiences, each of which requires unique and incisive means of identification and communicability. That all humans, always starting naked, helpless, and ignorant, have through the ages so truthfully identified over a hundred thousand experiences each of which is so unique as to deserve—indeed require—a uniquely identifying word, and that humans, despite their propensity to withhold agreement upon any mutual convention, have agreed upon some hundred thousand more or less common words and upon many more hundreds of thousands of scientific words, constitutes the greatest extant memorial in testimony of the supra-ethnic and transgeneration growth of the means of human communication, common understanding, and ultimate integration of all human concern and ever more effectively informed coordination of all human initiatives.

(1052.641 Vitamin D from Sunlight is essential to humans because calcium is essential to the human bone structure. Humans synthesize vitamin D through the action of the Sun's ultraviolet rays on the skin. This biochemical function is a zoological counterpart of botanical photosynthesis. But vitamin D is one of those vitamins of which humans can have an overdose. In warmer climes, where vitamin D from the Sun is adequate or excessive, humans' subconsciously functioning organisms employ their chemical-process options to develop Sunlight filters in the skin consisting of darker and darker pigments that prevent excessive absorption of radiation and avoid the overdose of vitamin D. Where there is not much Sunlight, as in the far north, human organisms had to progressively remove their pigment filters, which left only light skin that permitted maximum synthesis of vitamin D from the Sun. But dark skin was the norm. The skin pigmentation effect on human organisms is a generalized phenomenon like that of diet, wherein undernourishment alone can account for mental dullness in otherwise healthy humans. Physiognomic and physiological differentiations in humans result solely from generations of unplanned inbreeding of those types that survive most successfully under unique environmental conditions within which tribes or nations dwelt for protracted periods. Thus there is scientific evidence that there is no organic class or species differentiations of humanity. This thesis is further elaborated in my essay *No Race No Class.* Communication is ultimately independent of culture or race or class.)

1052.65 The metaphysical drive of humanity is toward total comprehension and an eternally changeless definition of all understanding. Despite the limited conditions governing our special-case human lives we can discern the syntropic cosmic trending of the metaphysical slowdown toward eternal changelessness in inverse complementation of the entropic physical trend to ever greater acceleration toward terminal velocity, frequency, and disorderliness at the speed of all radiation in vacuo. The metaphysical eternity is inherently absolute, whereas physical acceleration is terminated only by exhaustion. The physical limit is special case and suggestively alterable. The metaphysical limit is absolute and unalterable.

1052.66 The metaphysical is comprehensively generalizable. The physical is always realized only as special case experience. The metaphysical reorders the disorderly-prone physical. The metaphysical continually seeks to comprehend, master, harness, and cohere the physical. The metaphysical comprehends and reorders. Humans oscillate between the pushes of their physical incarnation and the tensing of their metaphysical propensities. This ubiquitous push-pulling propagates cosmic regenerativity.

1052.67 The regeneration may be that of a complete new baby or the local regeneration of cells in an ongoing organism. Rebirth is continual. The overall growth and refinement of information and comprehension by continuous humanity transcends the separate generations of life and steadies toward eternal unalterability; the special case physical experiences and the identification of their significance in the overall scheme of eternal cosmic regenerativity ever accelerate as the information bits multiply exponentially; wherefore the overall rate of gain of metaphysical comprehension of the physical behavior in general accelerates exponentially in respect to such arithmetical periodicities as that of the celestial cycles of the solar system.

1052.68 The physical Universe is an aggregate of frequencies. Each chemical element is uniquely identifiable in the electromagnetic spectrum by its special set of unique frequencies. These frequency sets interact to produce more complexly unique cycle frequencies, which are unheard by human ear but which resonate just as do humanly hearable musical chords or dissonances. Thus occurs a great cosmic orchestration, ranging from the microcosmic nuclear isotropicity—directly undetectable by the human senses— through the minuscule range detectable by humans, to the very complex, macrocosmic, supra-to-human-tunability symphonies of multiaggregates of isotropically interpositioned galaxies. (Compare Secs. 515.21 and 530.13.)

1052.69 Thus develops our human awareness of the special-case physical experience events that spontaneously trigger the metaphysical faculties of humans into applying their extraordinary sorting capabilities. The more metaphysically sensitive and comprehendingly effective humans become, the more truly do they fulfill the unique cosmic function for which they were designedly included in the scheme of eternally regenerative Universe. If we seek one word that most succinctly identifies the experience we call life, it is *awareness.* Since no weight is lost as individual life terminates, and since all the chemical ingredients are as yet present and all the sense organs and their separate information- integrating brains are also intact, we have to conclude that the awareness of otherness, which we identify as the prime characteristic of human life, is indeed a weightless idea, or thought concept, of an also weightless metaphysical thinker. Life is not the corporeal chemical complex. Life is only metaphysical.

1052.70 Humans are born into their physical-sensing and information-inventorying organism not only to experience Universe but to cope with local problem-solving in support of the eternal regenerative integrity of ever complexedly intertransforming physical Universe, employing their metaphysical minds to discover the metaphysical slowdown toward the eternal generalized principles governing Universe: and thereafter to define the principles ever more adequately, incisively, and inclusively until the frequency of redefinability decreases toward zero. Thus the metaphysical processing of humanity's cognition of a generalized principle tends in time to slow toward zero. It must be noted, however, that the metaphysical mind's tools of communication with other temporal beings—including the organic self—within the temporal reality are always special case ergo, finitely limited tools—for instance, the arbitrary symbols chosen for a Greek alphabet written with special case ink on special case paper.

1052.71 The physical accelerates to terminal and finite velocity where terminality renders the physical inherently inferior and subservient to the inherently eternal metaphysical comprehensivity's omnicoherence. Only the self-destructive, special case physical, entropic, negative evolvements accelerate to their own totally disintegrative transition into totally redistributed subfunctionings of other systems.

1052.80 **Radiation-Gravitation: Electromagnetic Membrane**

1052.81 **Membrane Model:** The reason why the second-power rate of interattractiveness gains in respect to the arithmetical rate of variation of the relative proximity of remote bodies is that gravity is not a linear, radial force but is a circumferentially tensional embracement force.

1052.82 We will think of two spheres inside a closed elastic membrane so smoothly intimate to each that, when the two spheres are tangent to one another, they appear as two clearly independent spheres momentarily in kissing tangency, the membrane continuity between the two being so intimately clinging as to be observationally subvisible. But as the two spheres are pulled apart, the elastic membrane is locally stretch-pulled away evenly from the surface of each sphere, and the membrane tube running between the two contracts to a progressively invisible, fine-line, spider-thread tube stretched between the two spheres. As the two spheres are pulled further apart, the tube between the two remote spheres will appear to be an invisible line-of-sight perpendicular to each of the enclosed spheres.

1052.83 Since the nuclei of the atoms are not touching one another and only the cosmic totality integrity mantle is cohering the atoms, they can be singled out in space and time array in the same manner as the much larger molecules can be thinned to a film of a single molecular thickness, cohered only by the mass interattractiveness like the vast multiplicity of atomic interattractiveness (as we have seen in Sections 644 through 646.03).

1052.84 As the spheres are next allowed to approach one another, the everywhere self-together-gathering proclivity of the elastic membrane providing the elastic tube between them will redistribute its perpendicular linear multitude of atoms back in both directions, yielding equally to the two stretched membranes around each sphere in much the same way as atoms in a thin stream of viscous maple syrup impinging vertically on a stack of pancakes will spread out in all directions to envelop the pancakes. Thus the two- way flowing stream of stretched-far-apart atoms of the omnihugging elastic membrane tightly embracing the two reapproaching-to-one-another spheres flows outwardly at 90 degrees to their perpendicular impingement to reenvelop thickly each of the two spheres. This means that the linear length of the tautly stretched tube reopens itself at the point of tangency to enclose each of the tube's separate spheres. The atoms previously invested in the remote-from-one-another, stretched-out tube of tension between the two spheres have now returned to the two spheres and have rejoined their nearest neighboring atoms around the elastic-membrane spherical sheath of the two tangent spheres.

1052.85 What had been a linear requirement becomes a surface requirement for the elastic membrane. Surfaces of omnisymmetrical geometrical objects are always second powers of the object's linear dimensions. If we were to remove one of the spheres from the omniclingingly embracing sheath, the elastic membrane would snap-contract to enclose only the remaining sphere, but the rate of atomic population gain of the spherical, surface- clinging membrane derived from the previous intersphere linear tendon is of the second power of the arithmetical rate of linear contraction of the elastic tendon. Soon the thickness of the membrane on each sphere would multiply into a plurality of closest- packed atomic layers, and the volume of the atoms will thus increase at a third-power rate in respect to an arithmetical rate of distance-halving between any two spheres. This two- sphere-embracing, few-atoms-thick, clinging elastic membrane fed into, or spread out from, an intersphere tension may be thought of as an electromagnetic membrane acting just like electric charges fed onto the convex surface of a copper Van de Graaff sphere or a copper wire (electric charges always inhabiting only the convex surfaces).

1052.86 Please now think of all the tensional forces of Universe as one single membrane containing all the radiational, explosive forces we have enumerated. Now think of the original compression sphere exploding into many parts inside the endlessly stretchable membrane, whose rate of ductility-adjustment-to-stretch equals the speed of light or radiation, c^2. Inside our tensile membrane unitary bag would be a number of individual, exploded-apart, spherical mass components, each of which is tightly embraced by the membrane—leaving only intervening perpendicular linear tubes. (See Fig. 1052.86.)

1052.87 To understand the linear expansion rate think of making soap bubbles: Deeply layered molecules get stretched into a single layer as the single atoms guarantee the interattractiveness integrity of the area-stretching thin-out of the atoms. We now come to the balancing of the vectors of the vector equilibrium and the arrangement of the 24 external vectors end-to-end, closing back upon themselves—in four great-circle planes, constituting an "additional" vector force magnitude of 24, embracing the outwardly and separatingly exploding 24 internal vectors, which now operate in increasing independence of one another—each thus producing a force of only one. We have the surface net drawing on a force resource of 24—multiplied by radius frequency to the second power— while the originally-24-force, radially explosive events separate out from one another and thus produce only separate first-power effectiveness. Hence the gravitational force's geometrical progression rate of gain—i.e., its second-power, surface-

embracing finiteness closure is always at a high-energy effectiveness advantage over the disintegrative, linear, first-power, or only arithmetical progression rate of gain in force.

1052.88 The second-power rate of gain in interattractiveness occurring with each *halving* of the intervening distance of two heavenly bodies recalls Pythagoras's whole, rational-number, harmonic-octave integrity progression (or regression) occurring with each halving of the length of the tensed cord (thirding results in sharping or flatting key progressions); wherefore the gravitational-radiational, second-power, spherical surface rate of gain occurs in respect to the radial linear rate of identification of omnidirectionally propagated sound waves—at a gain of the second power of the linear. This gravitational omnisurface-embracement mathematics apprehending coincides with harmonic resonances:

$$E = \text{Mass} \left(\begin{array}{c} \text{Arithmetical} \\ \text{rate of} \\ \text{symmetrical} \\ \text{system's} \\ \text{radius} \end{array} \right)^2 \quad \text{Newton's gravitation}$$

$$E = \text{Mass} \left(\begin{array}{c} \text{linear radial} \\ \text{lengthening with} \\ \text{system expansion} \end{array} \right)^2 \quad \text{Einstein's radiation}$$

Next Section: 1053.00

1053.00 **Superficial and Volumetric Hierarchies**

1053.10 **Spherical Triangular Grid Tiles:** The interrelationship of the vector equilibrium and the icosahedron when their respective 25- and 31-great-circle grids are superimposed on one another, with the center of area of the vector equilibrium's eight spherical triangles congruent with the areal centers of eight of the icosahedron's 20 spherical triangles, reveals a fundamental, asymmetrical, six-axis, alternative, impulsive- pulsative potential of surface intertransformabilities in respect to which the vector equilibrium serves as the zero between the positive and negative, "relative" asymmetry, deviations.

1053.11 The vector equilibrium's 25 and the icosahedron's 31 spherical-great-circle grids manifest different least-common-denominator, identically angled, spherical triangular "tiles," which together exactly cover and subdivide the spherical surface in whole even numbers of tiles; the vector equilibrium having 48 such LCD triangles and the icosahedron having 2 1/2 times as many LCD triangles, i.e., 120.

1053.12 The fundamental fiveness of the icosahedron is split two ways, with 2 1/2 going one way (the outside-out way) and 2 1/2 going the other way (the inside-out way). The least-common-denominator triangular surface subdivision of the vector equilibrium's sphere provides 48 angularly identical (24 inside-out and 24 outside-out) subdivisions as spherical surface "tiles" that exactly cover one sphere.

1053.13 120/48 = 2 1/2; and there are always both the four *positively* skew-rotated and the four *negatively* skew-rotated sets of spherical triangles (two sets of four each), symmetrically borrowed from among the spherical total of 20 equiangled, spherical triangles of each of two spherical icosahedra (each of radius 1)_which four out of 20 (20/4 = 5) spherical icosahedron's triangles' centers of area are exactly concentrically registerable upon every other one of the spherical octahedron's eight triangles, which areal centers of the octahedron's eight triangles are also always concentrically and symmetrically in register with the eight equiangled, spherical triangles of the spherical vector equilibrium when the octahedron and the vector equilibrium spheres are all of the same unity-l radius. With this registration of four out of eight centers of the icosahedron upon the octahedron-vector equilibrium's eight triangular surfaces each, we find that one icosa set of four skews rotationally positive, while the set of four from another icosahedron phase registers the negative skew rotation, which is a +30 degrees or -30 degrees circumferentially-away-from-zero, rotational askewness for a total of 60 degrees differential between the extremes of both. The remaining 16 out of the total of 20 triangles of each of the two different (plus-or-minus-30-degree) phase

icosahedra, subdivide themselves in four sets of four each, each of which sets of four arrange themselves in polarized symmetry upon each of the octahedron's four other spherical triangles which are not concentrically occupied by either the positively- or negatively-skew, concentric sets, of four each, triangles, neither of which four sets of four each non-triangularly-concentric sets repeat the other sets' complementary, asymmetric but polarized, array in superimposition upon the octahedron's four nonconcentrically occupied triangles.

1053.14 It was in discovering this alternate, concentric askewness of icosa-upon-octa, however, that we also learned that the symmetrical, equiangular, spherical triangle areas, filled evenly—but rotationally askew—with sets of 15 of the icosahedron's 120 LCD triangles, exactly registered with the spherical surface area of one of the spherical octahedron's eight triangular faces (each of which are bound by 90-degree corners and 90- degree arc edges). This meant, however, that the 15 LCD icosa triangles' plusly-rotated askew phases are not congruent with one another but are superimposed in alternately askewed arrays, both in the cases of the four concentric triangles and in the cases of the nonconcentrically-registered triangles.

1053.15 Because each of the octahedron's eight faces is subdivided by its respective six sets of spherical "right" triangles (three positive—three negative), whose total of $6 \times 8 = 48$ triangles are the 48 LCD's vector-equilibrium, symmetric-phase triangles, and because $120/48 = 2\ 1/2$, it means that each of the vector equilibrium's 48 triangles has superimposed upon it 2 1/2 positively askew and 2 1/2 negatively askew triangles from out of the total inventory of 120 LCD asymmetric triangles of each of the two sets, respectively, of the two alternate phases of the icosahedron's limit of rotational aberrating of the vector equilibrium. This 2 1/2 positive superimposed upon the 2 1/2 negative, 120- LCD picture is somewhat like a Picasso duo-face painting with half a front view superimposed upon half a side view. It is then in transforming from a positive two-and- one-halfness to a negative two-and-one-halfness that the intertransformable vector-equilibrium-to-icosahedron, icosahedron-to-vector-equilibrium, equilibrious-to-disequilibriousness attains sumtotally and only dynamically a spherical *fiveness* (see Illus. 982.61 in color section).

1053.16 This half-in-the-physical, half-in-the-metaphysical; i.e., half-conceptual, half- nonconceptual; i.e., now you see it, now you don't—and repeat, behavior is characteristic of synergetics with its nuclear sphere being both concave and convex simultaneously, which elucidates the microcosmic, turn-around limit of Universe as does the c2 the spherical-wave-terminal-limit velocity of outwardness elucidate the turn-around-and- return limit of the macrocosm.

1053.17 This containment of somethingness by uncontained nothingness: this split personality +2 1/2, -2 l/2; + 5, - 5, + 0, -0; plural unity: this multiplicative twoness and additive twoness of unity; this circumferential-radial; this birth-death, birth-death; physical- metaphysical, physical-metaphysical; yes-no, yes-no-ness; oscillating-pulsating geometrical intertransformability field; Boltzmann importing-exporting elucidates the a priori nature of the associative-disassociative; entropic-syntropic; energetic-synergetic inherency of cosmic discontinuity with its ever locally renewable cyclic continuities, wherewith Universe guarantees the eternally regenerative scenario integrity.

1053.20 **Platonic Polyhedra:** There are 48 spherical triangular tiles of the vector equilibrium nuclear sphere, which 48 triangles' pattern can be symmetrically subdivided into five different sets of symmetrical interpatterning which coincide exactly with the projection outward onto a sphere of the five omnisymmetrical planar-defined Platonic polyhedra, whose linear edges are outlined by the respective chords of the congruent vector equilibrium's symmetrical 25-great-circle grid and the icosahedron's 31-great-circle grid. These equiedged Platonic solids are the icosahedron, the octahedron, the cube, the tetrahedron, and the regular dodecahedron. (The vector equilibrium is one of the Archimedean polyhedra; it was called *cuboctahedron* by the Greeks.)

1053.21 The chords of these five spherical geometric integrities all interact to produce those well-known equiedged polyhedra commonly associated with Plato. The intervolumetric quantation of these five polyhedra is demonstrated as rational when referenced to the tetrahedron as unity. Their surface values can also be rationally quantized in reverse order of magnitude by the 48 spherical triangle tiles in whole, low- order, even numbers. These hierarchies are a discovery of synergetic geometry.

1053.30 **LCD Superficial Quantation of Systems:** Because the icosahedron's 31- great-circle grid discloses 120 least-common-denominator, spherical triangular, whole tiling units, we require a special-case, least-common-surface-denominator identity as a name for the 48 spherical tiles of the vector equilibrium. The 120 spherical surface triangular tiles (60 insideout and 60 outside-out) do indeed constitute the least-common- spherical and planar polyhedra's whole-surface denominators, ergo LCDs, of all closed systems; for all systems are either simplex (atomic) or complex (molecular) manifests of polyhedra. All systems, symmetrical or asymmetrical, have fundamental insideness (micro) and outsideness (macro) irrelevancies that leave the residual-system relevancies accountable as topological characteristics of the polyhedra.

1053.31 As we have learned elsewhere, the sphere, as demonstrated by the spherical icosahedral subdivisions, discloses a different least-common-denominator spherical subdivision in which there are 120 such tiles (60 positive and 60 negative), which are generalizable mathematically as the least-common surface denominator of surface unity, ergo, of systems in general superficially quantated. Because the icosahedron provides the maximum asymmetries into which the vector equilibrium's universally zero-balanced surface can be transformed, and since the effect of the icosahedron—which introduces the prime number five into Universe systems—is one of transforming, or splitting, equilibrium two ways, we find time after time that the interrelationship of the vector equilibrium and the icosahedron surfaces to be one such elegant manifestation of the number 2 l/2—2 1/2 positive and 2 1/2 negative, of which the icosahedron's fiveness consists. This half- positive and half-negative dichotomization of systems is the counterpart in pure principle of the nuclear accounting that finds that the innermost ball of the closest-packed symmetrical aggregate always belongs half to a positive world and half to a negative world; that is, the inbound half (implosive) and the outbound half (explosive) altogether make a kinetically regenerative whole centrality that never belongs completely to either world.

1053.32 It is a condition analogous to the sphere with its always and only complementarity of insideness and outsideness, convexity and concavity. A sphere may be thought of as half concave and half convex as well as having two different poles.

1053.33 For the moment, considering particularly spherical-system surfaces, we find the same 2 l/2-ness relationship existing between the vector equilibrium and the icosahedron, with their respective least common denominator's surface triangle building tiles (of which the vector equilibrium's 48 LCDs have five of the equiedged Platonic solids and the icosahedron's 120 LCDs have two of the equiedged Platonic solids). The icosahedron-coexistent pentagonal dodecahedron is the special-case system of domains of the icosahedron's 12 vertexes; it is not a structure in its own right. Plato's five omniequifaceted, equiedged and -vertexed, "solids" were the cube, tetrahedron, octahedron, icosahedron, and dodecahedron. All five of these solids are rationally accounted by the LCD spherical surface triangular tilings of the vector equilibrium and the icosahedron.

1053.34 The icosahedron has 120 triangles (60+, 60-), which are the least common denominators of spherical surface unity of Universe; ergo, so important as to have generated, for instance, the ancient Babylonians' adoption of 60 both for increments of time and for circular mensuration. The Babylonians attempted to establish a comprehensive coordinate mensural system that integrated time and matter. Their artifacts show that they had discovered the 60 positive and 60 negative, 120 spherical right triangles of spheres. That their sixtyness did not uncover nature's own rational coordinate system should not be permitted to obscure the fact that the Babylonians were initiating their thinking systematically in polyhedral spherical wholeness and in 60-degree vs. 90- degree coordination, which was not characteristic of the geometrical exploration of a later date by the Egyptians and Greeks, who started very locally with lines, perpendiculars, and planes.

1053.35 The great 2 l/2 transformation relations between the vector equilibrium and the icosahedron once again manifest in surface equanimity as the LCD surface triangular tiling, which is 2 1/2 *times* 48, or 120.

1053.36 **Sphere: Volume-surface Ratios:** The largest number of similar triangles into which the whole surface of a sphere may be divided is 120. (See Secs. 905 and 986.) The surface triangles of each of these 120 triangles consist of one angle of 90 degrees, one of 60 degrees, and one of 36 degrees. Each of these 120 surface triangles is the fourth face of a similar tetrahedron whose three other faces are internal to the sphere. Each of these tetra has the same volume as have the A or B Quanta Modules. Where the tetra is 1, the volume of the rhombic triacontahedron is approximately 5. Dividing 120 by 5 = 24 = quanta modules per tetra. The division of the rhombic triacontahedron of approximately tetravolume-5 by its 120 quanta modules discloses another unit system behavior of the number 24 as well as its appearance in the 24 external vector edges of the VE. (See Sec. 1224.21)

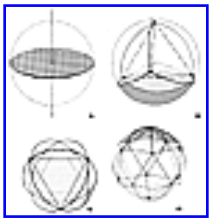


Fig. 1053.37

1053.37 Since the surface of a sphere exactly equals the internal area of the four great circles of the sphere, and since the surface areas of each of the four triangles of the spherical tetrahedron also equal exactly one-quarter of the sphere's surface, we find that the surface area of one surface triangle of the spherical tetrahedron exactly equals the internal area of one great circle of the sphere; wherefore

1 spherical tetra's triangle	= 1 great circle
2 spherical octa's triangles	= 1 great circle
5 spherical icosa's triangles	= 1 great circle
30 spherical Basic LCD triangles	= 1 great circle

1053.40 **Superficial Hierarchy:** We have here a total spherical surface subdivisioning hierarchy predicated upon (a) the relative number of LCD (48/n) tiles necessary to define each of the following's surface triangles, wherein the tetrahedron requires 12; the octahedron 6; cube 8; and rhombic dodecahedron 4; in contradistinction to (b) their respective volumetric quantations expressed in the terms of the planar-faceted tetrahedron as unity.

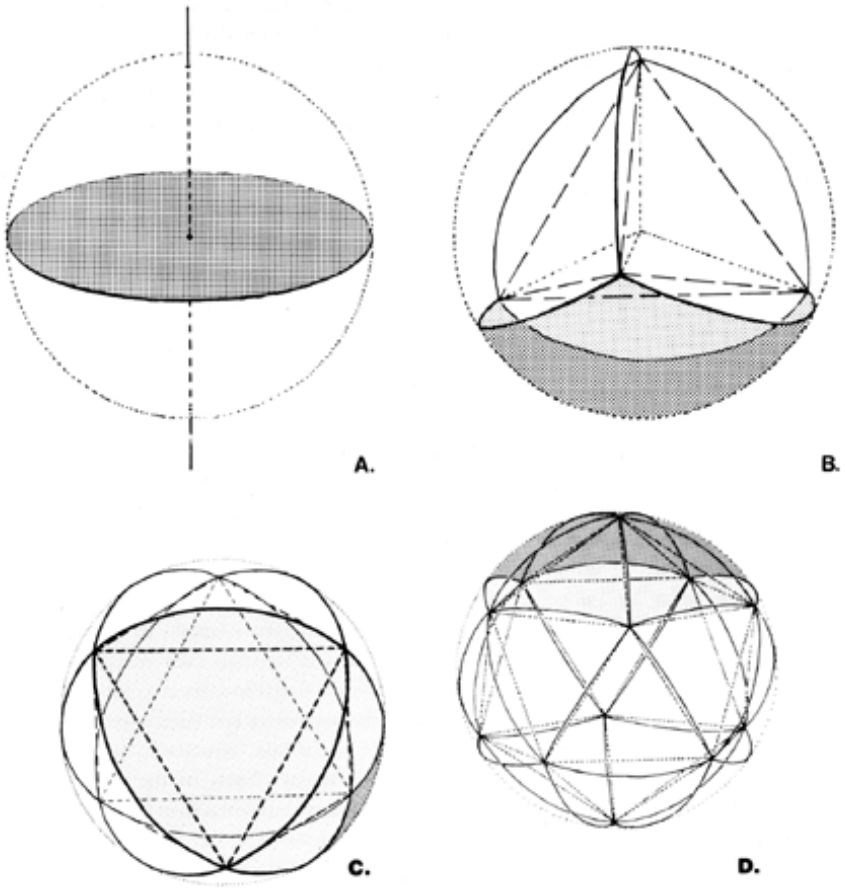


Fig. 1053.37 Spherical Great Circles Are Commensurable with Spherical Triangles of Three Prime Structural Systems: Tetra Octa and Icosa:

A. Internal area of one great circle of a sphere
B. Surface triangle of spherical tetrahedron
C. Surface triangle of spherical octahedron
D. Surface triangle of spherical icosahedron

[1 great circle = 1 tetra triangle = 2 octa triangles = 5 icosa triangles = 30 basic LCD triangles]

1053.41 **Table: Spherical Surface Hierarchy**

Number of Spherical LCD (48 VE)	*Spherical Conformation*		*Nuclear Sphere's Radius-1 Volumetric Hierarchy*
48	define one		
	Vector Equilibrium sphere	×2=96	1
12	define one		
	Tetrahedron face	×2=24	3
8	define one		
	Cube face	×2=16	4
6	define one		
	Octahedron face	×2=12	6
4	define one		
	Rhombic Dodecahedron face	×2=8	
4	define one		
	Regular Dodecahedron face	×2=8	
2 1/2	define one		
	Icosahedron face	×2=5	

1053.50 **Volumetric Hierarchy:** With a nuclear sphere of radius-1, the volumetric hierarchy relationship is in reverse magnitude of the superficial hierarchy. In the surface hierarchy, the order of size reverses the volumetric hierarchy, with the tetrahedron being the largest and the rhombic dodecahedron the smallest.

1053.51 **Table: Volumetric Hierarchy:** The space quantum equals the space domain of each closest-packed nuclear sphere:

Space quantum	= 1
Tetrahedron	= 1
Nuclear vector equilibrium	= 2 l/2
Nuclear icosahedron	= 2 1/2
Cube	= 3
Octahedron	= 4^{10}
Nuclear sphere	= 5
Rhombic dodecahedron	= 6

(Footnote 10: The octahedron is always double, ergo, its fourness of volume is its prime number manifest of two, which synergetics finds to be unique to the octahedron.)

1053.51A Table: Volumetric Hierarchy (revised): The space quantum equals the space domain of each closest-packed nuclear sphere:

Space quantum	= 1
Tetrahedron	= 1
Nuclear vector equilibrium	= 2 l/2
Nuclear icosahedron	= 2 1/2
Cube	= 3
Octahedron	= 4
Rhombic triacontahedron	= 5+
Rhombic dodecahedron	= 6

1053.60 **Reverse Magnitude of Surface vs. Volume:** Returning to our consideration of the reverse magnitude hierarchy of the surface vs. volume, we find that both embrace the same hierarchical sequence and have the same membership list, with the icosahedron and vector equilibrium on one end of the scale and the tetrahedron on the other. The tetrahedron is the smallest omnisymmetrical structural system in Universe. It is structured with three triangles around each vertex; the octahedron has four, and the icosahedron has five triangles around each vertex. We find the octahedron in between, doubling its prime number twoness into volumetric fourness, as is manifest in the great- circle foldability of the octahedron, which always requires two sets of great circles, whereas all the other icosahedron and vector equilibrium 31 and 25 great circles are foldable from single sets of great circles .

1053.601 **Octahedron:** The octahedron—both numerically and geometrically—should always be considered as quadrivalent; i.e., congruent with self; i.e., doubly present. In the volumetric hierarchy of prime-number identities we identify the octahedron's prime- number twoness and the inherent volume-fourness (in tetra terms) as volume 22, which produces the experiential volume 4.

1053.61 The reverse magnitudes of the surface vs. volume hierarchy are completely logical in the case of the total surface subdivision starting with system totality. On the other hand, we begin the volumetric quantation hierarchy with the tetrahedron as the volumetric quantum (unit), and in so doing we build from the most common to the least common omnisymmetrical systems of Universe. In this system of biggest systems built of smaller systems, the tetrahedron is the smallest, ergo, most universal. Speaking holistically, the tetrahedron is predominant; all of this is analogous to the smallest chemical element, hydrogen, being the most universally present and plentiful, constituting the preponderance of the relative abundance of chemical elements in Universe.

1053.62 The tetrahedron can be considered as a whole system or as a constituent of systems in particular. It is the particulate.

1053.70 **Container Structuring: Volume-surface Ratios**

1053.71 When attempting to establish an international metric standard of measure for an integrated volume-weight unit to be known as "one gram" and deemed to consist of one cubic centimeter of water, the scientists overlooked the necessity for establishing a constant condition of temperature for the water. Because of expansion and contraction under changing conditions of temperature a constant condition of 4 degrees centigrade was later established internationally. In much the same way scientists have overlooked and as yet have made no allowance for the inherent variables in entropic and syntropic rates of energy loss or gain unique to various structurally symmetrical shapes and sizes and environmental relationships. (See Sec. 223.80, "Energy Has Shape.") Not only do we have the hierarchy of relative volume containments respectively of equiedged tetra, cube, octa, icosa, "sphere," but we have also the relative surface-to-volume ratios of those geometries and the progressive variance in their relative structural-strength-to-surface ratios as performed by flat planes vs simple curvature; and as again augmented in strength out of the same amount of the same material when structured in compound curvature.

1053.72 In addition to all the foregoing structural-capability differentials we have the tensegrity variables (see Chap. 7), as all these relate to various structural capabilities of various energy patternings as containers to sustain their containment of the variously patterning contained energies occurring, for instance, as vacuum vs crystalline vs liquid vs gaseous vs plasmic vs electromagnetic phases; as well as the many cases of contained explosive and implosive forces. Other structural variables occur in respect to different container-contained relationships, such as those of concentrated vs distributive loadings under varying conditions of heat, vibration, or pressure; as well as in respect to the variable tensile and compressive and sheer strengths of various chemical substances used in the container structuring, and their respective heat treatments; and their sustainable strength-time limits in respect to the progressive relaxing or annealing behaviors of various alloys and their microconstituents of geometrically variant chemical, crystalline, structural, and interproximity characteristics. There are also external effects of the relative size- strength ratio variables that bring about internal interattractiveness values in the various alloys as governed by the second-power rate, i.e., frequency of recurrence and intimacy of those alloyed substances' atoms.

1053.73 As geometrical systems are symmetrically doubled in linear dimension, their surfaces increase at a rate of the second power while their volumes increase at a third- power rate. Conversely, as we symmetrically halve the linear dimensions of geometrical systems, their surfaces are reduced at a second-root rate, while their volumes decrease at a third-root rate.

1053.74 A cigar-shaped piece of steel six feet (72 inches) long, having a small hole through one end and with a midgirth diameter of six inches, has an engineering slenderness ratio (length divided by diameter) of 12 to 1: It will sink when placed on the surface of a body of water that is more than six inches deep. The same-shaped, end-pierced piece of the same steel of the same 12-to-1 slenderness ratio, when reduced symmetrically in length to three inches, becomes a sewing needle, and it will float when placed on the surface of the same body of water. Diminution of the size brought about so relatively mild a reduction in the amount of surface of the steel cigar-needle's shape in respect to the great change in volume—ergo, of weight—that its shape became so predominantly "surface" and its relative weight so negligible that only the needle's surface and the atomic-intimacy- produced surface tension of the water were importantly responsible for its interenvironmental relationship behaviors.

1053.75 For the same reasons, grasshoppers' legs in relation to a human being's legs have so favorable a volume-to-surface-tension relationship that the grasshopper can jump to a height of 100 times its own standing height (length) without hurting its delicate legs when landing, while a human can jump and fall from a height of only approximately three times his height (length) without breaking his legs.

1053.76 This same volume-to-surface differential in rate of change with size increase means that every time we double the size of a container, the contained volume increases by eight while the surface increases only fourfold. Therefore, as compared to its previous half-size state, each interior molecule of the atmosphere of the building whose size has been symmetrically doubled has only half as much building surface through which that interior molecule of atmosphere can gain or lose heat from or to the environmental conditions occurring outside the building as conductively transferable inwardly or outwardly through the building's skin. For this reason icebergs melt very slowly but accelerate progressively in the rate of melting. For the same reason a very different set of variables governs the rates of gain or loss of a system's energy as the system's size relationships are altered in respect to the environments within which they occur.

1053.77 As oil tankers are doubled in size, their payloads grow eightfold in quantity and monetary value, while their containing hulls grow only fourfold in quantity and cost. Because the surface of the tankers increases only fourfold when their lengths are doubled and their cargo volume increases eightfold, and because the power required to drive them through the sea is proportional to the ship's surface, each time the size of the tankers is doubled, the cost of delivery per cargo ton, barrel, or gallon is halved. The last decade has seen a tenfolding in the size of the transoceanic tankers in which both the cost of the ship and the transoceanic delivery costs have become so negligible that some of the first such shipowners could almost afford to give their ships away at the end of one voyage. As a consequence they have so much wealth with which to corrupt international standards of safety that they now build them approximately without safety factors—ergo, more and more oil tanker wrecks and spills.

Next Section: 1053.80

1053.80 **Growth and Decay**

[1053.80-1053.85 Growth and Decay Scenario]

1053.801 In chemical interbonding of atomic systems single-bonded (univalent) tetrahedra are only single-vertex-to-single-vertex congruent. This means that only one of each of any two tetrahedra's directionally differentiable four corners—which are as yet only infra- or ultratunable, only noisy subsystem, vertexial somethingnesses—are subcongruent critically intimate; that is, the magnitude of their mutual interattractiveness is greater than any other of their cosmic attracters. Singly interbonded tetrahedra are always attracted in critically intimate degree by one—and only one—of their corner-identifying infratunable systems attractively bonded with a neighboring tetrahedron's corner vertex subdifferentiable-system "points." For ages the vertexial somethingnesses only superficially apprehended by humans were experientially identified visually as "specks," audibly as noises, tactilely as prickly points, topologically as vertexes, and geometrically as sharp (corner) angles.

1053.802 Topology enumerates the critical-proximity-bonded pairs of "points" as constituting only one point and not as an almost tangent two. Topological accounting is confined to only superficially visible characteristics of systems. (See Sec. 262.02.)

1053.803 We learn experientially that lines are trajectories (Sec. 521.20), that two events and their trajectories cannot pass through the same point at the same time (Secs. 517.01-06), and that when we have such conflict or transit interference, they result in *smashes* (always separating each of the intersmashing bodies into a plurality of smaller systems, not dirt or dust), *plunge-ins* such as meteors plunging into Earth (to form more complex systems), *refractions*, *reflections*, or critical-proximity interrattractiveness cotravelings (Earth and Moon). When we do not have interference conflicts but we have two independent event trajectories converging to pass "near" one another only at a precessionally critical-course-refracting, mass-interattractive distance, they may converge and diverge in a twist vertex exit (see Secs. 921.15 and 942.12). The term *vertex* embraces all of the foregoing system-furnished, local-focal, event cases.

1053.804 In chemical double-bonding the edge vectors of the tetrahedra—as well as the terminal vertexes—are also so critically proximate as superficially to seem to be congruent and are topologically accredited numerically only as "one" because of their superficial aspect of unity as a single hinge-pin.

1053.810 The vector equilibrium consists of eight tetrahedra each of which is edge- bonded; i.e., vertexially double-interbonded with three others, with each of their pre-time- size internal vertexes theoretically congruent as eight-in-one. Each of the pre-time-size vector equilibrium's eight tetrahedra has six vector edges (6 × 8 = 48). (There are 24 internal and 24 external vector edges, 48 vector edges in all.) Each of the eight tetrahedra has four vertexes (4 × 8 = 32), and in each of the tetrahedra three of these vertexes are external (3 × 8 = 24): There are thus 12 externally paired sets (24/2 = 12) of visible vertexes. Three of each of the eight tetrahedra's vector edges (3 × 8 = 24) are displayed on the outside of the vector equilibrium. (Compare Sec. 1033.020.)

1053.811 There are 24 external vector edges of the vector equilibrium (8 × 3 = 24). The other three vector edges of each of the eight tetrahedra are arrayed inwardly as 24 internal edges (8 × 3 = 24), but these inwardly arrayed vector edges of the eight tetrahedra, being double-bonded or hinged together, appear as only 12 radial spokes of the vector equilibrium, which has 24 separate vectors in its four closed chordal rims of the four great-circle planes of the tetrahedra's four dimensionality; these four great circles produce the zerovolume tetrahedron. (See Sec. 441.)

1053.812 Nature never stops or even pauses at dead center. Nature contracts convergently to the center of its nuclear sphere, where each of its frequency-tuned integrities self-interfere convergently and react reflectively—ergo, omnidivergently—from their own terminally convergent self-frequency interferings. Unity is plural and at minimum two. (See Secs. 905.11 and 1070.)

1053.813 In the vector-diametered VE the convergent 2 l/2 phase coalesces with the divergent 2 l/2 phase and produces a univalent 5-ness whose consequence is also quadrivalent—producing also the vector-radiused VE's 5 × 4 = 20-ness of the vector equilibrium's subfrequency embracement of its eight edge-bonded, bivalent tetra and their six half-octahedra interstices.

1053.82 **Life and Death**

1053.821 The decaying and growing are complementary. Death is a cofunction of birth: the father is dying; the child is being born. There never has been a real negative except as a positively complementary function of the oppositely directioned positive.

1053.822 We do not have two Universes—"this world" and "the next world." Death is only the nonresonant, between-frequency silence of our oscillatory "no-stopover" passages through the Grand Central Station of the vector equilibrium's equilibrious center, as the lags in our cognition "realizations" time us into life's inherently aberrated imperfection aspects— somewhere off center.

1053.823 As we learn through experience to identify and comprehend ever more inclusively and precisely the generalized principles manifest in our experiences, and as we learn to communicate and share our recognitions of these manifests, we gradually reduce the lag rates in human cognition and come ever nearer to realization of the perfection.

1053.824 *Apprehension* is the physical brain's coordinate storing of all the special case, physically sensed information of otherness, integral (the child's thumb sucked by its mouth) or separate (the mother's udder sucked by the child's mouth.) *Comprehension* is the metaphysical mind's discovery of the meaningful interrelationship between the special- case information data that are neither implicit in, nor inferred by, any of the special-case information data when taken only separately—the meaning discovered by mind being the generalized principles manifest exclusively by the interrelationship variables and constants. *Awareness* means apprehending while also intuitively comprehending that the excitement over the novelty of the incoming information is significant because possibly pregnant with meaningful principles. (Compare Sec. 526.18.)

1053.825 Since "life" is experientially demonstrable to be weightless—ergo, metaphysical—its awareness and comprehension of meanings synchronize exclusively with the nonphysical intervals concentrically occurring between the only physically sensed frequencies of exclusively inanimate, radiantly propagated, electromagnetic-wave phenomena.

1053.826 Both death and life are complementary metaphysical functions interspersing and embracing our electromagnetic physical experience. Life's physical reality is constituted by the unique frequency identifications of the chemical elements and their atomic components as well as the humanly tune-in-able "color" frequencies of the electromagnetic spectrum's concentrically interpositioned occurrences (usually published by humans as a chart of positions along any one radius of the omnidirectional comprehensive concentric system). The metaphysical cognition of life-death reality is constituted exclusively by all the intervals between and beyond—inwardly and outwardly— all of the comprehensive electromagnetic phenomena sensed by human organisms.

1053.827 The music of John Cage is preoccupied with the silent intervals; his growing audience constitutes the dawning of the transition of all humanity into synchronization with the metaphysical rather than the physical. The decibel amplification of youth's "rock" music has switched its physical beat into the old silent intervals and is inducing metaphysical preoccupation in its listeners.

1053.83 **Positive Visible and Integral Invisible**

1053.831 To free ourselves from our preconditioned ill-chosen words of plus-minus and positive-negative, we may say operationally that there never has been a minus Universe to cofunction with Universe. There has always been cosmically integral, visible and invisible experience, which we have learned only in the past 100 years to be the consequence of whether or not we are integrally equipped organically with receiving sets having frequency tunability under the particular electromagnetic-waveband circumstances considered.

1053.832 Radiation outcasts. Radiation does not broadcast; broadcast is a planar statement; there are no planes. *Out* is inherently omnidivergent. Radiation omnicasts but does not and cannot *in*cast; it can only go-in-to-go-out. *In* is gravity.

1053.833 If radiation "goes through" a system and comes out on the other side, it does so because (I) there was no frequency interference—it just occurred between the system's occurrence frequencies—or (2) there was tangential interference and deflection thereby of the angle of travel, wherefore it did not go through; it went by.

1053.84 **Cay and Decay**

1053.841 In Webster's dictionary cay is an "emergent reef of coral or sand." We deduce that its earlier etymological meaning is a "growth," a coming together of parts (of sand or coral creatures)—ergo, we have *cay* and de-*cay*. Cay is convergently associative and syntropically cumulative. Decay is divergently disassociative and entropically dispersive.

1053.842 The nuclear vector equilibrium with a frequency of one has a double intensity (quadrivalent) tetravolume of 5 with a convergent *cay* volume of 2 1/2 and a divergent *decay* volume of 2 1/2; a congruent double 2 1/2 whose energy involvement potential is 5.

1053.843 In the generalized (subfrequency) case of the nuclear vector equilibrium (pulsatively impotent), *either* convergent *or* divergent (not both) quadrivalent tetravolume where frequency is half-zero, the tetravolume of the VE^0 = 2 l/2.

1053.844 In the generalized (subfrequency case) of the nuclear vector equilibrium (potentially pulsative), congruently one-half-convergent and one-half-divergent quadrivalent tetravolume where frequency is zero, the half-convergent tetravolume of 2 2 compounded with the half-divergent tetravolume of 2 1/2 produces a double intensity two-and-a-halfness which has—an only potential—quadrivalent tetravolume of 5; ergo, $VE^0 = 5$, one-half of which is alternatively invisible; ergo, VE^0 appears deceptively to have a tetravolume of 2 1/2.

1053.845 In the generalized (subfrequency) nucleus-embracing, convergent-divergent, bivalent tetravolume vector equilibrium of frequency one, its tetravolume is 20. $VE^1 = 20$.

1053.846 In the generalized (subfrequency) nucleus-embracing, convergent-divergent vector equilibrium of frequency two, the tetravolume is 160. $VE^2 = 160$. (See Sec. 966.05 and Fig. 966.05B.)

1053.847 What must be remembered in considering all the foregoing is that unity is plural and at minimum two, as elucidated in Secs. 905.11 and 1070; wherefore the zero- frequency vector equilibrium, the VE^0 of "apparent" tetravolume 2 1/2, has an inherent but invisible double value that will have an operational resource effectiveness of 5, 2 1/2 of which is convergently effective and 2 1/2 divergently effective. This produces the state of equilibrium whose untenability induces cosmic resonance.

1053.848 In the symmetrical doubling of linear (radial) dimension the surface area increases four times and the volume eight times their original magnitude. In the case of the nuclear (one sphere) vector equilibrium with radius = 1 and volume = 2 1/2, when surrounded with 12 closest-packed, uniradius spheres and when the center of the nuclear sphere is connected to the respective centers of the 12 surrounding spheres, the distance between the center of the nuclear sphere and the center of any one of its 12 surrounding spheres is equal to 2 radii, or one *diameter* of the uniradius spheres. With radius 2, 2 1/2 × 8 = 20. (Compare Sec. 1033.63.)

1053.849 **Table: Initial Frequencies of Vector Equilibrium:**

Closest-packed Uniradius Spheres	*Frequency*	*Tetravolumes*
Radius 1	$VE^{0/2}$	2 1/2
Radius 1	VE^{0}	5
Radius 2	VE^{1}	20
Radius 4	VE^{2}	160

1053.85 **Inventory of Alternatives to Positive**

TACTILE:	—	range-reachable, frequency dense, ergo interferable, ergo "solidly" or firmly touchable vs out-of-reach untunable
	—	cold-warm; also frequency conditions
	—	push-pull
AUDIBLE:	—	infra- or ultratunable
	—	sound and noise; we say "noise" when the frequencies are not differentiable but altogether overlap the frequency limit of our equipment
VISUAL:	—	frequency; again, electromagnetic
	—	infra- and ultratunable

	—	distance factor not a matter of resolution but of wavelength
	—	you can't differentiate the untunable
OLFACTORY:	—	sweet vs obnoxious
	—	*decay;* the divergent, the coming apart; decaying tends to be malodorous
	—	*cay* (growth); the convergent freshness tends to be olfactorily welcome
ELECTRO-MAGNETICS:	—	attractions and repulsions.

What are the relative frequency ranges involved? (Compare Sec. 100.020.)

1054.00 **Relationship of Gibbs to Euler**

1054.10 **Synergetic Analysis:** Euler's topology and Willard Gibbs' phase rule give us synergetic-analysis capability. Euler differentiated all physical Universe into lines, crossings, and areas: the fundamental visual aspects of our experiences having to do with our eyes, radiation frequencies, and conceptual images. Gibbs' phase rule differentiated the physical Universe into liquid, crystalline, and gaseous phases, which are not so much visual as thermal, which is tactile, and which are always characterized by unique whole- number interattractions, i.e., restraints. Conversely, with successive whole-number degrees of freedom, thermal, sonic, or viscosity frequencies are differentiated in respect to their condition within their respective states as well as between those states.

1054.11 Euler's synergetic differentiation and equatingly accomplished reintegration of Universe deals with energy disassociative as radiation; Gibbs deals with energy associative as matter at various thermal stages. Euler's and Gibbs' are two different system aspects or behaviors of Universe. Euler deals with the static, geometrical field aspects of Universe. Gibbs deals with energy associative as matter, and what the degrees of energetic freedom may be within a local physical complex, and what amounts of energy would have to be added locally to bring about other states.

1054.20 **Relationship of Gibbs to Euler**

EULER		GIBBS
Visual		Tactile
Energy as radiation		Energy as matter
(coming apart)		(associative)
Differentiated		Integrated
Locally superfical		Internal
	They come together in vertexial bonding which implies	
which is always potentially directional and descriptive in EULER	= Mass attraction =	which is kinetically active in GIBBS

1054.30 **Synergetic Integration of Topology and Quanta:** Synergetics' "breakthrough" integration of Euler's topology and Willard Gibbs' phase rule is explained by the number of intertetrahedral bonds:

Phases:	Bonds:		States:		
					R
				Face	I
Eccentric	3 bonds	=	Ice	bond	G
				tetra	I
					D
					F
				Edge	L

Concentric (medium phase)	2 bonds	=	Water (medium phase)	bond tetra	E X F L E X	C O M P R E S S I V E
Eccentric	1 bond	=	Vapor	Point bond tetra		
	Additional bond energies present in the eccentric phases	=	Medium +2 phase			
	3+1, 1+3	=	2+2			

1054.31 The rigid ice stage is characterized by load concentration, no degrees of freedom, and slow creep. The flexible, fluid stage is characterized by hinge-bonding, load distribution, one degree of freedom, and noncompressibility. The flexible, fluid vapor stage is characterized by universal jointing, load distribution, six degrees of freedom, and compressibility.

1054.32 Median unity is two, therefore unity plus two equals four.

Median state = Unity + 2

Frozen state = Median unity - 1 = 1

Vapor state = Median unity + 1 = 3

(3+ 1 =4; 1 +3=4; 2+2=4)

Ice = Median freedom minus one freedom

Water = Median freedoms

Vapor = Median freedoms plus one freedom

Fig. 1054.40

1054.40 **Topology and Phase** (see Table 1054.40)

1054.50 **Polyhedral Bonding:** Willard Gibbs' phase rule treats with the states of the environment you can sense with your eyes closed: crystallines, liquids, gases, and vapors. Euler's points, lines, and areas are visually described, but they too could be tactilely detected (with or without fingers).

1054.51 The mathematicians get along synergetically using Euler's topology alone. It is the chemists and physicists who cannot predict synergetically without using Gibbs' phase rule.

1054.52 Euler deals with the superficial aspects of polyhedra: of visual conceptuality. He deals only with the convex surfaces of polyhedral systems. Euler deals with unit, integral, single polyhedra, or with their subaspects. He is not concerned with the modus operandi of the associabilities or disassociabilities of a plurality of polyhedra.

1054.53 But Gibbs unknowingly deals with polyhedra that are composited of many polyhedra, i.e., compounds. He does not think or talk about them as polyhedra, but we find the connection between Euler and Gibbs through the polyhedral bonding in respect to Euler's aspects. Euler's lines are double bonds, i.e., hinges. Euler's vertexes are single bonds. Euler's areas are triple bonds. Gibbs accommodates the omnidirectional system complementations of the other senses—thermal, tactile, aural, and olfactory—not just associatively, but radiationally. Gibbs brings in time. Time is tactile. Time is frequency. Our pulses measure its passing.

1054.54 People see things move only relative to other things and feel small vibrations when they cannot see motion. The tactile *feels* angular promontories or sinuses with the fingers or body. *Sinus* means "without"— "nothing," invisible, ergo, nonidentified by Euler. The frequencies we call heat are tactilely sensed. We have radiation-frequency tunability range. Our skin structuring is tuned to frequencies beyond the eye-tunable range, i.e., to ultraviolet and infrared.

1054.55 Euler did not anticipate Gibbs. Gibbs complements Euler—as does synergetics' identification of the two excess vertexes as constituting the axis of conceptual observation in respect to all independent, individual orientations of all systems and subsystems; i.e., quantum mechanics' abstract, nonspinnable "spin."

	Inherent Qualities			Old Equation	New Equation	New Equation	New Equation		Prime Numbers	Relative Abundance ✱ + F = E
	Vertexes	Faces	Edges	V + F = E + 2	✱ + F = E	÷ 2 ●	reduced to common factor			
Tetrahedron	4	4	6	4 + 4 = 6 + 2	2 + 4 = 6	1 + 2 = 3	1 (1+2=3)		1	
Octahedron	6	8	12	6 + 8 =12 + 2	4 + 8 =12	2 + 4 = 6	2 (1+2=3)		2	
Cube	8	12	18	8 +12 =18 + 2	6 +12 =18	3 + 6 = 9	3 (1+2=3)	$\rho^{\xi} \sim \upsilon^{\xi}$	3	● [1 + 2 = 3] + ◒
Icosahedron	12	20	30	12+20 =30 + 2	10+20 =30	5 +10 =15	5 (1+2=3)		5	
Vect. Equilib.	12	20	30	12+20 =30 + 2	10+20=30	5 +10 =15	5 (1+2=3)		5	

DEFINITIONS:

✱ Number of points (vertexes) other than those on poles = (V-2=✱) = non-polar vertexes.
◒ Polarity Constant that modifies all systems under consideration, additive twoness.
● Zonality Constant (Zone of Tunability), multiplying twoness.
V Number of vertexes.
F Number of faces.
E Number of edges.
υ Frequency - Modular breakdown.
ρ Wave length.

Gibbs' Phase Rule: F = C + 2 - P

where: F = Degrees of Freedom, i.e. number of variables.
C = Number of Chemical Components.
P = Phases of the System.
2 = Constant.

The phase rule is an equation for determining the number of possible degrees of freedom (variables) that can be given arbitrary values in a system in equilibrium without upsetting the equilibrium. For example in a system consistiing of ice, water. and water vapor, there are three phases: vapor, liquid, and crystalline; and one component: water. Therefore: F = 0. The three phases of water can coexist in equilibrium at a fixed temperature and pressure only, there are no degrees of freedom.

	Single-bonded	Double-bonded	Triple-bonded
Equivalents			
Phase	gas	liquid	crystalline
Bonds(vertexial)	single	double	triple
Connection	pin	hinge	fix
Inherent Qualities	vertex	edge	face

Fig. 1054.40

1054.56 We find Euler and Gibbs coming together in the *vertexial* bonds, or polyhedral "corners," or point convergency of polyhedral lines. The bonds have nothing to do with the "faces" and "edges" they terminally define. Two bonds provide the hinge, which is an edge bonding. One bond gives a universal joint. Triple or areal bonding gives rigidity.

1054.57 Mass-interattraction is always involved in bonding. You may not have a bond without interattraction, mass or magnetic (integral or induced), all of which are precessional effects. As Sun's pull on Earth produces Earth orbiting, orbiting electrons produce directional field pulls. This was not considered by Euler because he was dealing only with aspects of a single system.

1054.58 Gibbs requires the mass-interattraction without saying so. Mass-interattraction is necessary to produce a bond. Gases may be tetrahedrally bonded singly, corner to corner, or as a universal joint. Gibbs does not say this. But I do.

Next Section: 1054.60

1054.60 **Orbit as Normal:** Ninety-nine point nine-nine plus percent of the bodies in motion in physical Universe are operating orbitally; therefore interyielding normally; i.e., at 90 degrees to the direction of the applied force.

1054.61 The rare special case of critical proximity, where bodies converge due to the extreme disparity of relative mass magnitude, happens also to be the rare special case in Universe wherein humans happen to exist, being thereby conditioned to think of the special-case exceptional as "normal," thus to misapprehend the normal general behavior. The misapprehension regards the 99.99 percent normal orbital as being strangely perverse. There is much evidence within the critical-proximity environment that demonstrates the normal 90-degree, precessional resultants—as, for instance, when a rope is tensed and reacting at 90 degrees to the direction of the tensing and thus becoming tauter.

1054.70 **Time as Frequency:** The Babylonians tried unsuccessfully to reconcile and coordinate time and space with circular-arc degrees, minutes, and seconds. The XYZ, c.g_ts. metric system accounted time as an exponent. Time was not a unique dimension. It was a uniquely qualifying increment of experience, of obvious existence.

1054.71 Synergetics is the first to introduce the time dimension integrally as the frequency of systems, which initially are metaphysically independent of time and size but, when physically realized, have both time and size, which are identified in synergetics as the frequency of the system: the modular subdividing of the primitive, metaphysical, timeless system.

1054.72 You cannot have time without growthability, which implicitly has a nucleus from which to grow. We would not have discovered the frequency or time dimensions had we not explored the expansiveness-contractiveness and radiational-gravitational behavior of nuclei in pure metaphysical sizeless and timeless principle.

1054.73 It follows that the isotropic-vector-matrix field discovery represents the frame of reference through which all the interpulsating transformations of time realizations transit, but which will never be directly witnessable in the eternally instant static state.

1054.74 Synergetics is an integration of the frequency of Gibbs with the timelessness of Euler. In Table 223.64, Columns 7, 8, and 9 represent the metaphysical timelessness of Euler; Columns 13, 14, and 15 represent the physical-in-time of Gibbs, the thermal, acoustical, sensorial characteristics that are expressible only as frequency.

1055.00 **Twentyfoldness of Amino Acid System Indestructibility**

1055.01 **Return to the Shell of Homogenized Contents of an Egg:** There are 20 amino acids, and they can all be made in the laboratory. They always reorganize themselves in geodesic tensegrity patterns. That's why you can pull all of the liquid out of an egg through a tiny needlelike hole, homogenize the contents, and then put it back in the shell, and the embryo will reorganize itself—even after the embryo chick is a week old and has started to form. The amino acids themselves do this.

1055.02 In connection with the 20-amino-acid system's indestructibility, we intuitively sense the necessity to consider the possible interrelations of all of the 20 amino acids' indestructible pattern integrities with other twentyfoldnesses. The number 20 is particularly significant in a plurality of nature's most elementary aspects.

1055.03 **Icosahedral Twentyness:** There is, for instance, the minimum twentyfoldness of the icosahedron's 20 equiangular, triangular (ergo, structural) facets, which constitute the highest common unit-angle, unit-edge, and unit-vertex structural denominator of universal structural systems. The icosahedron encloses the most volume with the least energy investment as matter or work. Universal limits of eternal abstract principles are indestructible. The discontinuous-compression, continuous-tension, multifrequency geodesic, icosahedral structures are approximately indestructible pattern integrities. They are employed as the protein shells of almost all the viruses. In principle, they are probably involved in the 20 amino acids.

1055.04 **Magic Number Twentyness:** Then there is the Magic Number twentyness in the relative cosmic abundances of all the atomic-element isotopes, which Magic Numbers we have now identified with mathematical exactitude as constituting a hierarchy of symmetrical, geometrical patterns occurring in mathematical sequence and manifest in the icosahedron-tetrahedron shell-frequency symmetry relationships (see Illus. 995.02).

1055.05 **Vector Equilibrium Twentyness:** Twentyness is significant as the inherent minimum twentyfoldness of the time-space, energy-mass, volume potential of the subfrequency vector equilibrium as quantized by using as unity the geometric volume of the minimum structural system of Universe: the tetrahedron, whose fractional integrity subdivided by the complex of A and B Module reorientations is in the high order number of magnitude of the amino acid's interrelationship permutations.

1055.06 **Twentyness in Mass Ratio of Electron and Neutron:** It is relevant in this exploratory speculating to consider that since enzymes are molecular event integrities and involve electron-binding proclivities, this introduces further identification with the fact that the icosahedron's non-closest-packability tends mathematically to be identifiable exclusively with the migrating, trading independence of the electron and its volumetric relationship to the vector equilibrium, i.e., 18.51:20, which is akin to the fractional-number relationship of the electron's mass to the proton's mass.

1055.07 **Twentyness of Maximum Limit Nonnuclear Tetrahedron:** There is another twentyness that seems highly relevant, and that is the twentyness of spherical atoms composing the largest single-shell tetrahedron that can be closest-packingly assembled without a nucleus of its own, which 20-sphered (atomed) tetrahedron has the new potential nucleus to be "crowned" when further layers are added; this tetrahedron of 20 occupies each of the eight triangular face regions of the outermost shell of the highest frequency vector equilibrium which is inherently nuclear—that is, it contains only one interior closest-packed sphere. This is its exact volumetric center (see Sec. 414).

1055.08 **Twenty-Sphere Models of DNA-RNA Compounds:** Furthermore, the 20- sphere (atom), closest-packed, non-nucleused tetrahedron consists of five basic (because minimum limit) four-ball tetrahedra that, unlike their planar-faceted polyhedral counterpart tetrahedra, can be closest-packingly assembled without octahedral complementation because the octahedra are internal to the four-ball basic tetrahedra. It is further relevant to these considerations that the DNA-RNA code consists always and only of the four chemical compounds—guanine, cytosine, adenine, and thymine—and that the helix that they generate consists entirely of tetrahedra whose four constituents in all vast variety of combinations will always be the same tetrahelixes.

1056.00 **Hierarchy of Generalizations**

1056.01 **Epistemology:** The more we know the more mysterious it becomes that we can and do know both aught and naught. The number one a priori characteristic of the entirely mysterious *life* is awareness—which develops gradually into comprehension only to become aware of how inherently little we know. But that little we know or may come to know additionally is ever subject to further vast integral exploration, discovery, differentiation, and comprehension.

1056.02 *Nature* is all that we think we do know plus all that we don't know whether or not we know that we don't know. Whatever nature permits is natural. If nature does not permit it, it cannot and does not occur.

1056.03 That there is an a priori unknown is proven by the ever unscheduled, unexpected succession of revelations of additional, theretofore unknown, unconceived-of, generalized principles all of which are discovered and experientially reverifiable as implicit in Universe. It is also retrospectively manifest that this progressively amplifying knowledge, discovered by intuition and mind as constituting eternally operative cosmic relationships, was revealed only because of intuitively pursued, frequent reconsiderations of information complexes redrawn from the ever-recallable special-case experience inventory stored in the humans' brain neuron bank. All that is known emanated exclusively from the previously unknown. (See Sec. 529.21.)

1056.10 **Cosmic Hierarchy of Comprehensively Embracing Generalizations**

1056.11 = *Integrity:*

The cosmic intellectual integrity manifest by Universe. The orderly interaccommodation of all the generalized principles constitutes a design. Design as a concept of ordered relationships is apprehendable and comprehendable exclusively by intellect. As the human mind progressively draws aside the curtain of unknownness the great design laws of eternally regenerative Universe are disclosed to human intellect. (See Sec. 1056.20, line 38.)

1056.12 = *Synergy:*

The behavior of whole systems unpredicted by behaviors or characteristics of any of the system's parts when assessed separately from the other parts of the system. (See Sec. 1056.20 line 37.)

1056.13 *N = Nature:* The totality of both all that is known, U (Universe), and all that is unknown, O. N is the integral of all the integrities always manifest in the progressively discovered generalized eternal principles. (See Sec. 1056.20, line 36.)

1056.14 *O = All the Unknown:* The a priori mystery experientially and operationally manifest as a cosmic source by the scientific record of all the *known,* which has always been unpredictedly and successively harvested exclusively from the *a priori unknown,* which nonsimultaneous succession of discoveries thereby discloses that no discovery has as yet exhausted the a priori mysterious exclusive source of all the scientific knowledge—all of which discoveries are always experimentally reverifiable to be forever a priori existent and waiting to be reverified as being eternally coexistent with all the other principles. (See Sec. 1056.20, line 35.)

1056.15 *U = Universe: All The Known:* All the thus-far observationally known to exist phenomena. Universe is the aggregate of all of humanity's alltime, consciously apprehended and communicated experiences, including both the explicable and the as-yet unexplained. Communication in this definition can be either self-to-self, or by selves-to-others. It is only by such eternal-generalized-principles- discovering mind's conscious communication to the brain's neuron bank that each generalized-principle-discovering experience becomes an integral special-case asset of humanity's awareness-processing facility. All the foregoing integrate as the *known.* Human awareness first apprehends, then sometimes goes on to comprehend. No guarantees.

1056.20 **Cosmic Hierarchy of Comprehensively Embracing and Permeating Generalizations-of-Generalization = gg^n**

gg	Symbol	*Sphere of inclusion*		
38.		COSMIC INTEGRITY		(Sec. 1056.11)
37.		SYNERGY		(Sec. 1056.12)
36.	*N*	NATURE		(Sec. 1056.13)
35.	*O*	UNKNOWN	All that is unknown	(Sec. 1056.14)
34.	*U*	UNIVERSE	All that is known	All known experience (Sec. 1056.15)

gg	Symbol	*Sphere of inclusion*	
33.	*M*	METAPHYSICAL	All that is experienceable but weightless, energyless.
32.	*P*	PHYSICAL	All the physical is energy. (Note Einstein's $E=Mc^2$ is equivalent to $P=GR^2$)
31.	*G*	SYNTROPY	Energy associative as matter precession, gravity, magnetics, interference knotting.
30.	*R*	ENTROPY	Energy as radiation, Energy disassociative.
29.	*A*	ASTROPHYSICS	The entropic-syntropic, eternally regen-erative synergetical intertransformings

			gravity, magnetics, interference knotting.
30.	*R*	ENTROPY	Energy as radiation, Energy disassociative.
29.	*A*	ASTROPHYSICS	The entropic-syntropic, eternally regenerative, synergetical intertransformings of universal evolution.
28.		SOLAR SYSTEM	Star systems
27.		EARTH	Planetary system in general.
26.		BIOLOGICALS	Planetary Biosphere Ecology
25.		HUMANITY	Individuals as miniature Universes, each a consequence of unique way of playing the game Universe.
24.		PHILOSOPHY	Ideologies, religions, associations.
23.		NATIONS	
22.		OTHERS	
21.		WE	
20.		YOU	

gg	Symbol		*Sphere of inclusion*
19.		THEY	
18.		ME (intuitive)	Synergetically coordinate sense, intellect. Exploratory sensor, glimpsor, initiator.
17.		ME (intellect)	Mathematics, logical conceptioning.

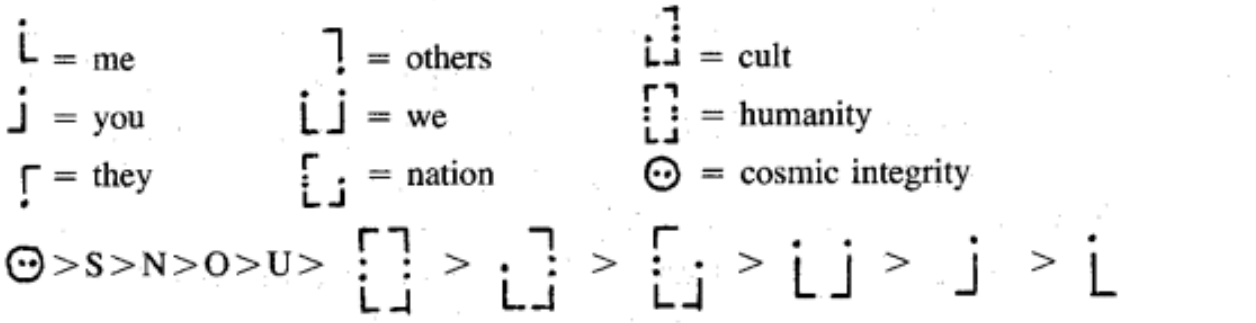
18.	⌊	ME (intuitive)	Synergetically coordinate sense, intellect. Exploratory sensor, glimpsor, initiator.		
17.	⌊	ME (intellect)	Mathematics, logical conceptioning. Mind discovering and employing eternal principles.		
16.	⌊	ME (sensorial)	Subjective Objective	Brain Neuron	Storing Retrieving Commanding
15.	⌊	ME (memory banked)	Sorted out concepts and data. Booked; librariied, microfiched, computer programmed, interrelated, memory banked around planet, retrieval through satellite relay anywhere.		
14.	⌊	ME (biophysically)	Atomic Physics	Nuclear Structures	
13.	⌊	ME (biochemically)	Exploratory chemistry behavioral proclivities	Atomic compound structures as atomic complexes.	
12.	⌊	ME (scientist)	(Exploratory)	(Science History) Cosmology Cosmogony	
11.	⌊	ME (scientist)	Applied mechanics, structures, electrical and chemical engineering.		
10.	⌊	ME (common sense)	Culture Tribal	Group communication of group sensing, hunting, dancing.	Philosophy needs.
9.	⌊	ME (art)	Individual sense of intuitive communication. Expression of individual philosophy and opinion.		

		sense)		hunting, dancing.
9.	⌊	ME	(art)	Individual sense of intuitive communication. Expression of individual philosophy and opinion.

gg	Symbol	*Sphere of inclusion*			
8.	⌊	ME (incisively disciplined)	Statistics Written Communication Social History	Ideograms Hieroglyphs Phonetics Script.	Accounting Historical Data.
7.	⌊	ME	(verbally communicating)		
6.	⌊	ME	(gestured communication) human to humans Including smiles, clothing, perfumes, etc.		
5.	⌊	ME	(gestured communication) articulated	Humans to other creatures	
4.	⌊	ME	(gestured communication understood by me)	Animals to humans Yes-no purring—Tail wagging—barking.	
3.	⌊	ME	(gestured communication sensed by me)	Nonhuman life to nonhuman life Trees-to-trees Birds-to-trees	
2.	⌊	ME	(mute) (communication)	Biologicals to biologicals Thorns—odors —coloring.	
1.	⌊	ME	(mute) Gross communication	Stone-to-stone Stone-to-water Thermodynamics, electrolysis, crystallization, erosion.	

⌊ = me ⌉ = others ⌊⌉ = cult

Stone-to-water
Thermodynamics, electrolysis,
crystallization, erosion.



1060.00 **Omnisensorial Accommodation**

1060.01 The great compressibility of gases is occasioned by the fact that all the tetrahedra are interlinked to one another only by single corners. This is a single bond: it requires the minimum mass-attraction energy of joining. You can fill a very great deal of space with single-bonded tetrahedra; and they are not only highly compressible or infoldable but, being universal-jointed, are most flexible, as are all gases.

1060.02 We will now examine two-bonded associations of tetrahedra. Double- bonding means two mass-attractions. Double-bonds are twice as powerfully cohered and take twice as much energy to disturb their interpatterning. Double-bonding makes a hinge between the tetrahedra. They are, therefore, flexibly interlinked. Forces being applied telegraph throughout the whole system. Both gases and liquids have this property of distributing forces. But whereas single-bonded gases are highly compactible or compressible, double-bonded liquids are noncompressible. If you assemble tetrahedra edge to edge, you cannot compress them any more even though they are flexibly hinged. The coherence of the liquid's viscosity is inherently twice that of the gases.

1060.03 We get even closer inter-mass positioning when there are three-corner bonds (i.e., triangular faces congruent with faces). This produces crystalline rigidity. Crystalline or triple-bonded structuring does not distribute loads as do gases and liquids. Nature designed the triple-bonding to produce the high cohesiveness in tension of crystalline structures. Due to its triple-bonding, the most difficult structure to pull apart is the crystalline.

1061.10 **Tree Structure**

1061.11 In the structuring of a tree or plant, the crystalline tensions of liquid cell sacs are hydraulically filled in order to distribute the compression and tension loads throughout the whole structure. The hydraulically filled cells of the tree are noncompressible. Thus is the tree capable of holding a five-ton branch out horizontally, due first to the noncompressibility of the liquid content of the cell sacs, and second to the tension being provided at greatest effectiveness by the triple-bond crystalline sac skins. Gases are inserted between the molecules of liquid of the tree's cell sacs. The gases' compressibility provides the compressibility or flexibility of the tree's branches to wave in the wind. If you have ever tried to hold a 25-pound suitcase out horizontally at arm's length, you can appreciate how great a structural task is being performed when a tree's five-ton branches wave yieldingly in the storm without breaking off. You can understand that in an ice storm, the hydraulic content of the tree's cells freezes and can no longer distribute the stresses, and as a consequence during such conditions, many tree branches break off and fall to the ground.

1061.12 We use these combined single-, double-, and triple-bond principles in making the transport airplane's landing gear operate. The pneumatics are in the airplane's rubber tires, and the hydraulics operate as nonfreezing liquids forced through long passageways of the airplane's undercarriage.

1061.20 **Conic Geometry of Trees**

1061.21 Nature operates only convergently and divergently, never in parallel. She uses equispaced, concentric convergence and divergence. Trees grow annually by successively and concentrically producing enveloping, live, cambium-layer cones divergent from the green nuclear apex budding and of greater diameter at the tree's wide and deeply rooted base.

1061.22 Nature's approximately equispaced, concentrically conical, spherical and polyhedral convergences and divergences are all asymmetrically aberrated in respect to their symmetrical geometries of reference—in respect to which they are progressively conformed while being forever in time closely or remotely affected by the ever-changing proximities of all other systems of ever-transforming Scenario Universe.

1061.23 As with the misassumptions of "straight" lines, "flat" planes, and "absolute" solids, the misassumption of an all-embracing, rectilinearly associative and disassociative cosmic system of parallelisms has been occasioned by too-close, too-short-term, and too- limited consideration and accounting of humanity's observational experiences. Splitting a tree discloses an apparently rough parallelism of grain running vertically between the concentric cones, but it proves to be not parallel, as the concentric spacing gradually converges toward the conic apexes and diverges toward the conic tree base.

1061.24 Nature's omnidirectional growths and contractions are accomplished only convergently and divergently, even when directionally focused by combined reflective interference and refractive shunting through lenses. Even focused radiant energy does not operate in parallels but in pulsively alternating, convergent-divergent contractions and expansions of either the wirelessly beamed or wired-beam transmissions, both of which occur in concentric cones. Cones are simply rotated tetrahedra linked together first base- to-base and then apex-to-apex, repeat and repeat, with the number of concentric circles of any cross section of either the most closely or most openly spaced concentricity constituting the cyclic frequency of the special case transmitting.

1061.25 Radiation is omnidirectional entropic divergence from a nucleus; gravity is omnidirectional syntropic convergence toward all nuclei. Cross sections of gravitational convergence and radiational divergence appear as the successive concentric cambium layerings of the cross section of a tree trunk.

Next Section: 1070.00

1070.00 **Plurality of Inherent Topological Twonesses**

[1070.00-1077.11 Geometry of Two Scenario]

1071.00 **Systematic Character of Prime Thinkability**

1071.10 **Prime:** Prime means sizeless, timeless, subfrequency. Prime is prehierarchical. Prime is prefrequency. Prime is generalized, a metaphysical conceptualization experience, not a special case.

1071.20 **Systematic Realization:** The mathematician's "purely imaginative," no-thickness, no breadth—ergo, no insideness or outsideness— points, lines, and planes are nonexperienceable. All image-ing derives from experience. Conceptually imaginable point, line, and plane experiences are only systemic—i.e., they have polyhedral insideness, outsideness, and angular constancy independent of size.

1071.21 Size is always special case realizability. The mathematician's undemonstrable assumption that three points define a plane of no thickness— no radial depth—is therefore subsystemic; ergo, unthinkable, nonoperationally evidencible, and unimaginable; ergo, unemployable as constituents of proofs.

1071.22 Contrary to conventional mathematical dogma three points do not define a nonexistent—ergo, nondemonstrable—no-thickness plane; nor do they define an altitudeless triangle because there can be naught to do the defining systematically. No- thickness is neither experimentally evidencible nor conceptually feasible. System is conceptual independent of size and special case.

1071.23 Operationally omnitriangulated polyhedra may be realized only systematically—i.e., with special case dimensionality or special case radial depth of insideness. Dimensionality = special case time-size radial depth = frequency.

1071.24 Radial depth is expressed in frequency of omnidirectional wave propagations per unit of time.

1071.25 It takes a minimum of four differentially experienceable event-loci to define a system. System is primitively fourfoldedly experienceable. When humans see three stars, they see three separate special case events: there is neither special case measurability nor generalized considerability. With inherent a priori systemic fourfoldedness there is imaginability of topological vertexes and a sixfoldedness of unique interrelatedness of the inside-from-outside differentiating thinkability. Conceptual = imaginable.

1071.26 Prime thinkability is inherently systemic. Prime epistemology is generalized thinkability. Epistemology discovers intuition.

1071.27 Intuition is the dawning awareness of the experienced, but at first unconsidered, newly occurring, unique, system-defining fourfoldedness apprehending and the epistemological system search for the sixfolded system interrelationships. Comprehension, often misidentified as "understanding," occurs when the six prehending interattractive relationships of the fourfoldedness are identified.

1071.28 Structures are systems and have radial depth; wherefore "surface" triangle structures are always tetrahedra or truncated tetrahedra.

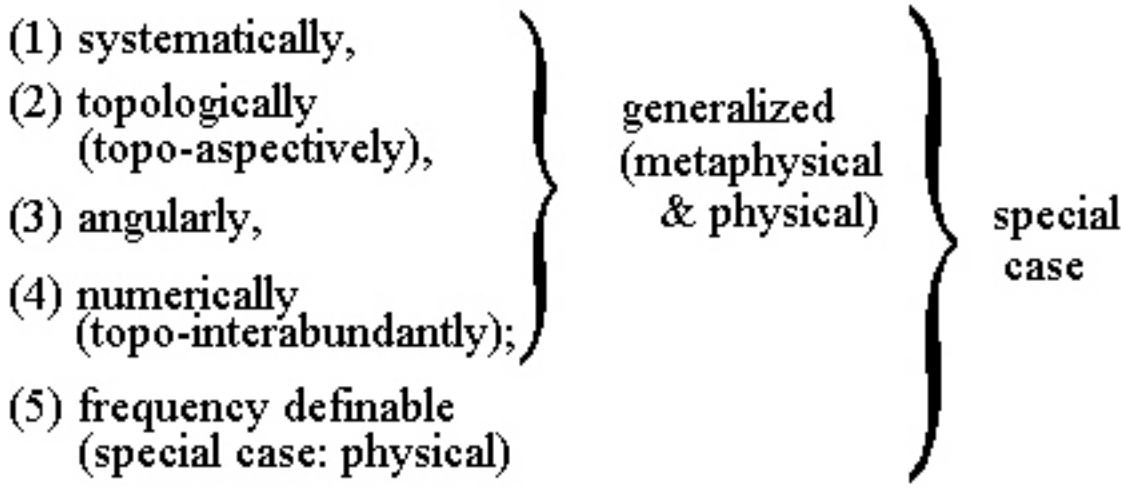
1072.00 **Definability of Structural Systems**

1072.10 **Proposition to Be Proven:** that structural systems are always special case operational realizations in which there is a constant relative abundance of all the topological and system characteristics, the only variable being a quantity multiplier consisting of one of the first four prime numbers—1, 2, 3, and 5—or an intermultiplied plurality of the same first four prime numbers.

1072.11
Given: definition of prime: Sec. 1071.10
Given: definition of system: Sec. 400.01
Given: definition of structure: Sec. 600.02
Given: definition of structural systems: Sec. 610.20
Given: definition of prime tetra, octa, and icosa: Sec. 1011.30
Given: definition of subfrequency: Sec. 1011.32
Given: definition of nucleus: Secs. 414 and 1012.01
Given: definition of thinkable generalization: Sec. 501
Given: definition of special case realizations: Sec. 504
Given: definition of cosmic inherency: Sec. 1073
Given: definition of two kinds of twoness: Sec. 223.05

1072.20 **Generalized Topological Definability**

1072.21 Generalized principles have topological system definability of angle, number, and constancy. Special cases have unique frequency dimensionability. Wherefore we propose that all recallably thinkable experiencings, physical and metaphysical, are fivefoldedly characterized:



1072.22 All conceptually thinkable, exclusively metaphysical experiencings are fourfoldedly characterized as above. All generalized principles are conceptually thinkable and fourfoldly definable. Generalization is conceptually (i.e., systematically) imaginable independent of (5) frequency.

1072.23 The fifth characteristic, *frequency*, is the unique *special case variable.* Physical experiencings are dependent not only on the four generalizable characteristics, but also on the fifth, frequency (i.e., size).

1072.30 **Wave and Particle Definability**

1072.31 Wave as a constant topological aspect is exclusively defined by angle, conceptually independent of frequency; ergo, frequency is the additional special case fifth characteristic—the generalization realized in time.

1072.32 Particle is frequency-definable special case, and wave is angularly defined generalization. The numerically unique condition of special case 5 (not equal) 4 of generalizations identifies the dilemma of physics in reconciling the minimum fourfoldedness of wave definability by angles and the minimum fivefoldedness[11] definability of particle particularization by unique frequencies. (See Secs. 541.30, 961.46, 973.30, and 986.720).

(Footnote 11: See Sec. 1053.12-15.)

1073.00 **Cosmic Inherency**

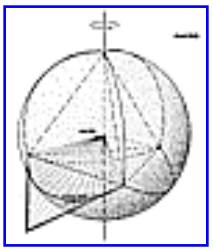


Fig. 1073.10

1073.10 **Four Kinds of Twoness**

1073.11 Since unity is plural and, at minimum, two, the *additive* twoness of systemic independence of the individual system's spinnability's two axial poles, the latter's additive twoness must be added to something, which thinkable somethingness is the inherent systemic *multiplicative* twoness of all systems' congruent concave-convex inside-outness: this additive-two-plus-multiplicative-two fourness inherently produces the interrelationship 2 + 2 + 2 sixness (threefold twoness) of all minimum structural-system comprehendibility.

1073.12 All systems are conceptually differentiated out of Universe.
System + environment = Universe Universe - system = environment

1073.13 The environment is dual, consisting of the macro and micro (outsideness and insideness). Ergo, a *fourth twoness* of all prime structural systems is synergetically accountable as

$$2 + 2 + 2 + 2 = 8.$$

(See Fig. 1073.10.)

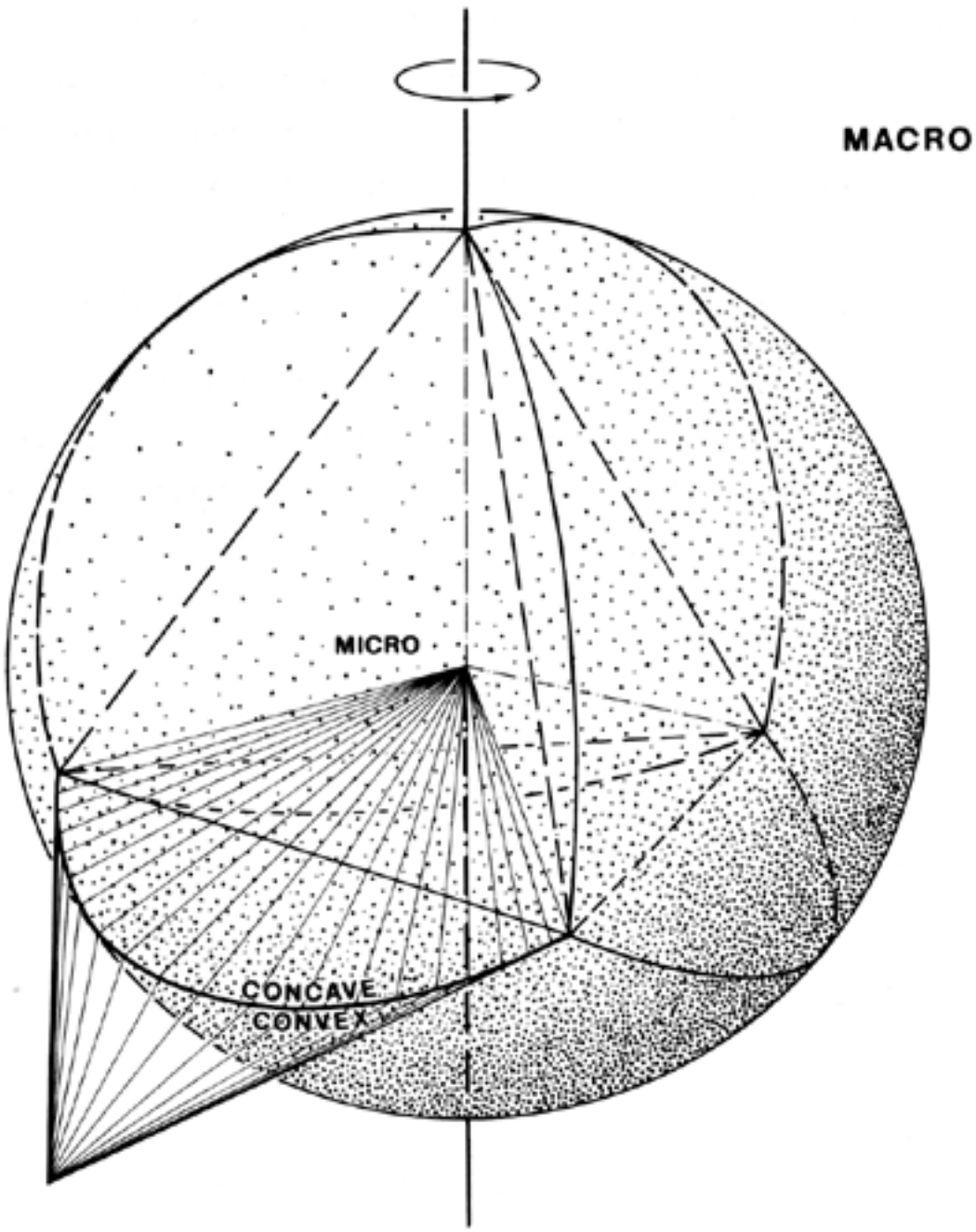


Fig. 1073.10 Cosmic Inherency: Four Kinds of Twoness: Spin twoness is additive. Duality twoness (concave-convex) is multiplicative. The spin twoness and duality twoness together comprise a third relationship twoness. The fourth twoness is comprised of the macro-micro (insideness and outsideness) twoness.

1073.14
Integral system is threefold twoness = 6.
Integral Universe is fourfold twoness = 8.

Spin twoness	⋯ 2
Duality twoness	⋯ 2
Interrelationship twoness	⋯ 2
Environmental twoness	⋯ 2

	8

1073.15 **The Indispensable Center:** At the indispensable center of the system convergent-divergent Universe turns itself inside out. The invisible, a priori, multiplicative twoness differentially disclosed in the system's omnitopological hierarchy is manifest of the integrity of the sizeless, timeless nonconceptuality always complementing the conceptual system takeout from nonconceptual Scenario Universe's eternal regenerating. (See Sec. 1006.10.)

1073.16 Partial vacuum results as the physical atmospheric gases are removed; beyond those zero evacuations the electromagnetic tensing induces reverse flows of physically demonstrable positive energy (as manifest in cryogenics, in which liquids flow antigravitationally). Vacuum = novent.

1073.20 **Interrelationship Twoness: Third Kind of Twoness**

1073.21 All systems have a neutral axis of spinnability, with two external polar vertexes and two interior center axis vertexes which are congruent— ergo, visible only as one vertex located at the convergence-divergence, integrative-disintegrative, inbound- outbound, turnaround, neutral center of gravity-center of radiation of the system.

1073.22 The exterior and separate set of two polar vertexes is the additive twoness of systems, and the congruent exterior-interior set is the multiplicative twoness of all systems. The interior-exterior differentiating fourness has an interrelated sixness that differentiates as a unique third kind of twoness of unique interrelatedness of all systems.

1074.00 **Prime Nuclear Structural Systems**

1074.10 All prime nuclear structural systems have one—and only one— (unity two) interior vertex.

1074.11 Internally nuclear structural systems internally consist entirely of tetrahedra that have only one common interior vertex: omniconvertex.

1074.12 In nuclear structural systems each of the surface system's external triangles constitutes the single exterior facet of an omnisystem-occupying set of inter-triple-bonded tetrahedra, each of whose single interior-to-system vertexes are congruent with one another at the convergent nuclear center of the system.

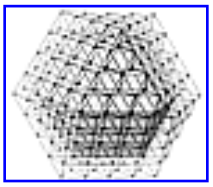


Fig. 1074.13

1074.13 In all nonredundant, prime, nuclear structural systems the congruently interior-vertexed, omnisystem-occupying tetrahedra of all prime structural systems may all be interiorly truncated by introducing special-case frequency, which provides chordal as well as radial modular subdivisioning of the isotropic-vector-matrix intertriangulation of each radial, frequency-embracing wave layer, always accomplished while sustaining the structural rigidity of the system. (See Fig. 1074.13.)

1074.20 **Omnitopological Domains**

1074.21 Omnitopological domains are defined in terms of the system's unique central-angle-defined insideness and its unique surface-angle-defined outsideness. (See Sec. 1006.20.)

1074.30 **Spin Twoness and Duality Twoness**

1074.31 Having identified (a) the constant additive twoness of the vertexial poles of the axial spinnability operative in all independent systems, and (b) the multiplicative twoness characterizing the concavity and convexity congruently operative in all independent systems, we find that the first four prime numbers—1, 2, 3, and 5—are the only variables present in the Eulerean topological inventorying of all the omnitriangularly, nonredundantly stabilized, symmetrical polyhedra.

1074.32

Spin twoness is additive.

Duality twoness is multiplicative.

1075.00 **Special Case: Energy and Information**

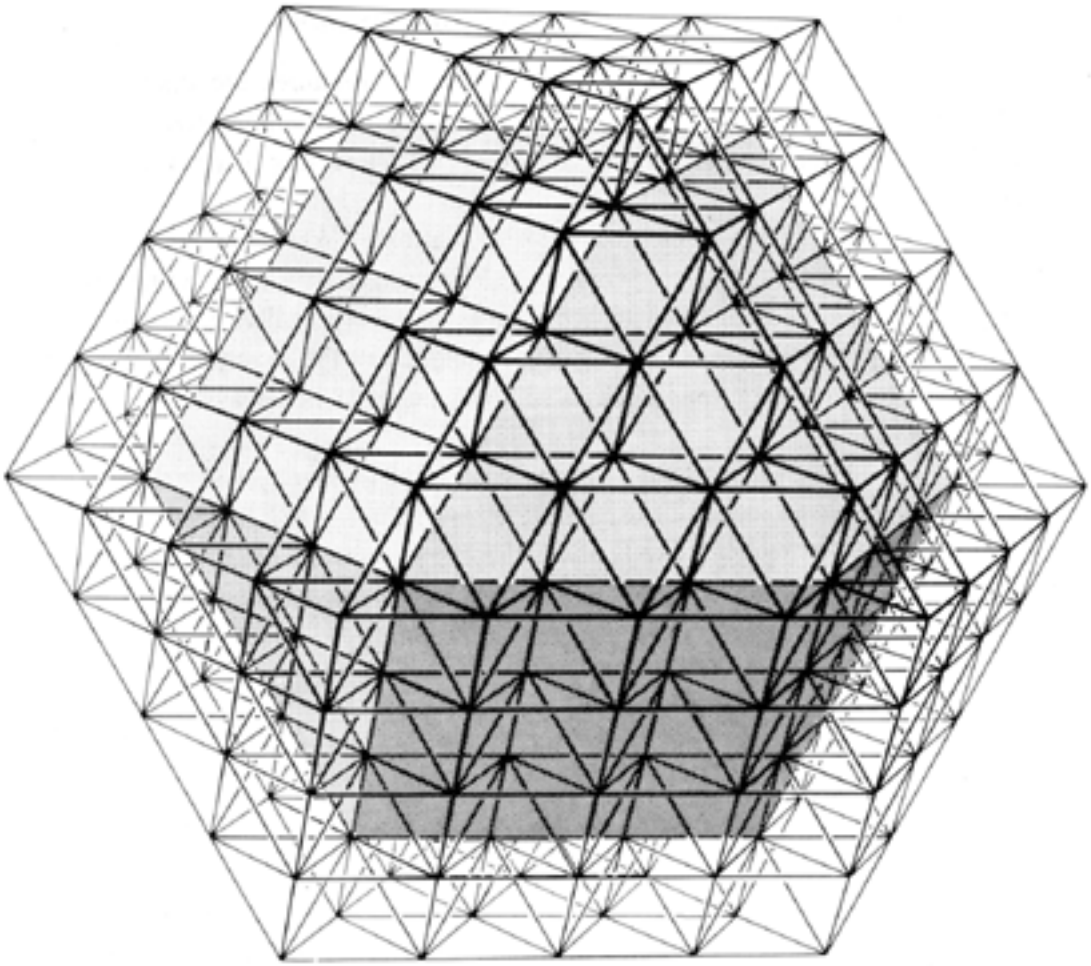


Fig. 1074.13 Nuclear Structural Systems: Nuclear structural systems consist entirely of tetrahedra having a common interior vertex. They may be interiorly truncated by introducing special case frequency. which provides chordal as well as radial modular subdivisioning of the isotropic-vector-matrix intertriangulation. while sustaining the structural rigidity of the system.

1075.10 Structures are always special case. Structures are operational. Operational = physically realized. Structures always have unique size. By definition a structure is a complex of energy events interacting to produce a stable pattern.

1075.11 An energy event is always special case. Whenever we have experienced energy, we have special case. The physicist's first definition of physical is that it is an experience that is extracorporeally, remotely, instrumentally apprehensible. Metaphysical includes all the experiences that are excluded by the definition of physical. Metaphysical is always generalized principle .

1075.12 Physical is always special case. Energy is physical and always special case. Information is always special case. Energy is information: information is energy. Special case is always realized by its energetic information Dimension is unique frequency information. Time incrementation is special case information. Concept is general: information is quantitative (special case) .

1075.20 **Equation of Intellect**

1075.21 By thermodynamic law energy may neither be created nor lost in Universe. By synergetic postulate intellect is irrevocable and irreversibly comprehensive—both subjectively and objectively—in respect to energy.

1075.22 Intellect mensurates and modulates relative energy events and event interrelationships. The total quantity of energy operative in Universe is a constant, but a dependent, function of intellect. Universe is the integral of all metaphysical and physical phenomena.

1075.23 In respect to individual humans total energy occurs as a complex of local variables of systematically cooperative, convergent-divergent, complementary-reciprocal, intertransformation patternings of uniquely differentiable local system aspects, accountable by intellect in locally varying magnitudes of concentration. The modulations are selectable, predictable, and governable by intellect to the extent that superficial acceleration permits.

1075.24 Modulations through local transformations are arranged or valved by intellect through inherent associative-disassociative patterning of local energy-complex environments. Thus the aggregate effective energy behavior sum-totally accountable as a universal constant is engaged in its local behaviors by individual experience (and apprehended and appraised by consciously operative intellect) in widely differentiated sets of patterns in variable magnitudes of regenerative pattern concentrations.

1075.25 Wealth is the measurable degree of established operative advantage locally organized by generalized-principle-employing intellect over the locally occurring, differentiable behaviors of universal energy. Wealth is an irreversible advantage: it cannot be expended in a preferred reorganization of past events; it can only be expended in organizing forward events in preferential patterns.

1075.26 The *wealth* advantage increases as intellect comprehends local behaviors and acts in complementary regeneration to produce patterns advantageous to human processes. With every inventorying of local-energy behaviors by intellect, and with the informed rearrangement of them to provide wider, more frequently and precisely modulatable patterns with ever less weight of materials ergo of energy—and fewer seconds of time per accomplished life protection, support, and accommodation function, the established wealth advantage is manifest and the documented knowledge in local Universe increases.

1076.00 **Primitive Regeneration**

1076.10 Prime = primitive. Primitive is generalized principle and not special case. Virgin = primitive. "Virgin soil" = special case. Virgin female human = special case, only because of the "human" case realization. Virginity is a generalized aspect of primitive. There can be no special-case generalized virgins. Virginity is not only prefrequency, it is pretime, pre-special-case, and pre-experienceable-dimension.

1076.11 Virgin identifies the topological insideness aspect of the coincidental insideness-outsideness of all generalized systems independently differentiated from all the macrocosmos Universe outside the virginal system, from all the microcosm Universe inside the virginal system and from the little of the cosmos Universe with which the virgin imaginably differentiates the outsideness from the insideness. And virgin is half a system because unity is plural and at minimum two, the virgin being the prime insideness of concavity to be dimensionally or experientially and operationally realized only by special- case-recognized congruence of the convex outsideness with the inside concavity.

1076.12

Male is convex; 1/2 system; 1/2 spin; 1/2 quantum.

Female is concave; 1/2 system; I/2 spin; I/2 quantum.

Engendering is a special-case phenomenon that requires fertilization. Fertilization is the systemic differentiating out of Universe that produces conceptually local Universe marrying the macrocosm to the microcosm, which realizes a new special-case system event with its own set of insideness-outsideness topological characteristics.

1076.13 Physics of the 1970s identifies:

2 quantum = 1/2 spin; and 1 quantum = 2 (spin/2)

Conception-birth comes with the realization that the aspects of the externally viewed, plus-curvature convexity that are seemingly separate from those of the internally viewed, minus-curvature concavity have no interveningly differentiating, zero-curvature sheath structurally differentiating the only timelessly (or generalized) conceptual coincidence of both the plus and minus curvature. In the alternately plus-or-minus pulsativeness frequencies of special case time the multiplicative twoness "conception" releases or gives birth to new, coexistent, additive twonesses as independently axially spinnable: special case spin twoness inherently coupled with the duality twoness, producing the individual unity fourness, with its primitive sixfoldedness of integral system interrelatedness and its eightfolded integral Universe environment.

1077.00 **Prime Number Inherency and Constant Relative Abundance**

1077.10 Since the relative interabundance of one nonspin vertex for every two faces and every three edges is a constant topological system condition, we may identify them as a constant interabundance set in terms of the number of vertexes and edges as a constant topological relationship of all symmetrical and triangularly stabilized, modularly unsubdivided, polyhedral systems.

1077.11 We may substitute T, meaning the number of topological system sets, for the bracketed groups:

$$.: 2 + 2 = T.$$

And when the symmetrical, omninonredundantly triangulated, modularly unsubdivided systems are subjected to symmetrical modular subdivision, and the number of edge- module subdivisions is represented by F, then:

$$2 + 2NF^2 = T.$$

where the first 2 is the additive spin two; the second 2 is the multiplicative duality two; N is the prime number uniquely characterizing the system; F is the frequency of modular subdividing; and T is the number of topological sets of one vertex plus two faces equal three edges (1 + 2 = 3) that exists in the symmetrical structural (because nonredundant) triangulated polyhedral system. Q.E.D.: See Sec. 223.

Next Chapter: 1100.00
