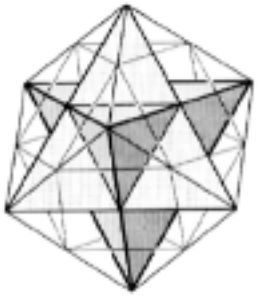

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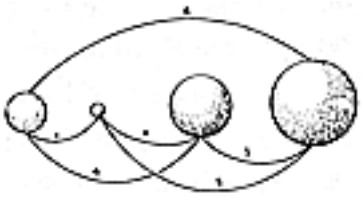

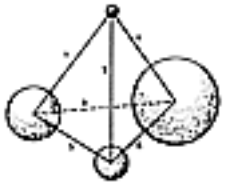

1000.00 **Omnitopology**

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.

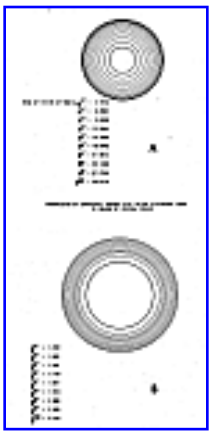

Fig. 1005.15

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

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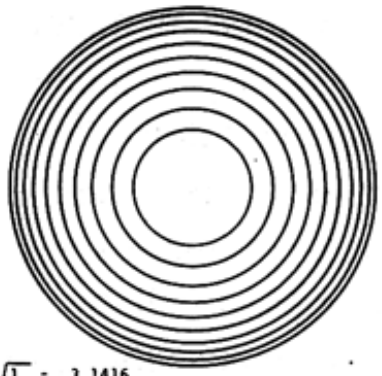


Area of Circle of Radius $\sqrt{1}$ = 3.1416

$\sqrt{2}$ = 6.2832

$\sqrt{3}$ = 9.4248

$\sqrt{4}$ = 12.5664

$\sqrt{5}$ = 15.7080

$\sqrt{6}$ = 18.8496

$\sqrt{7}$ = 21.9912

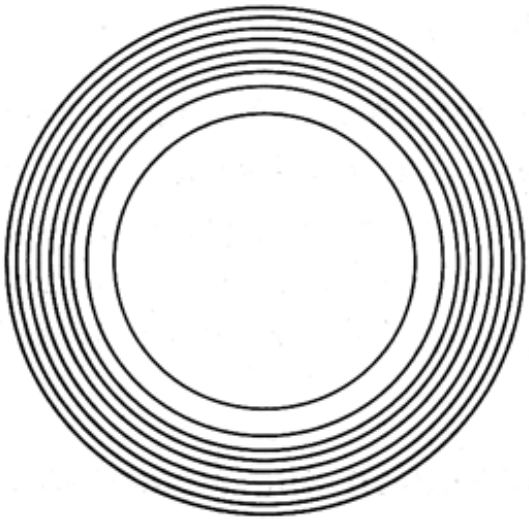
$\sqrt{8}$ = 24.1328

$\sqrt{9}$ = 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

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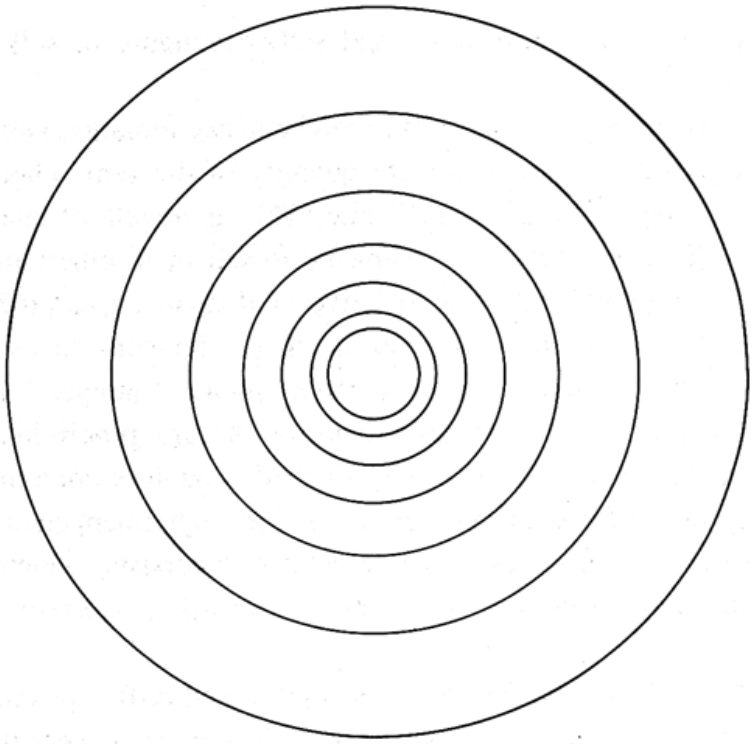
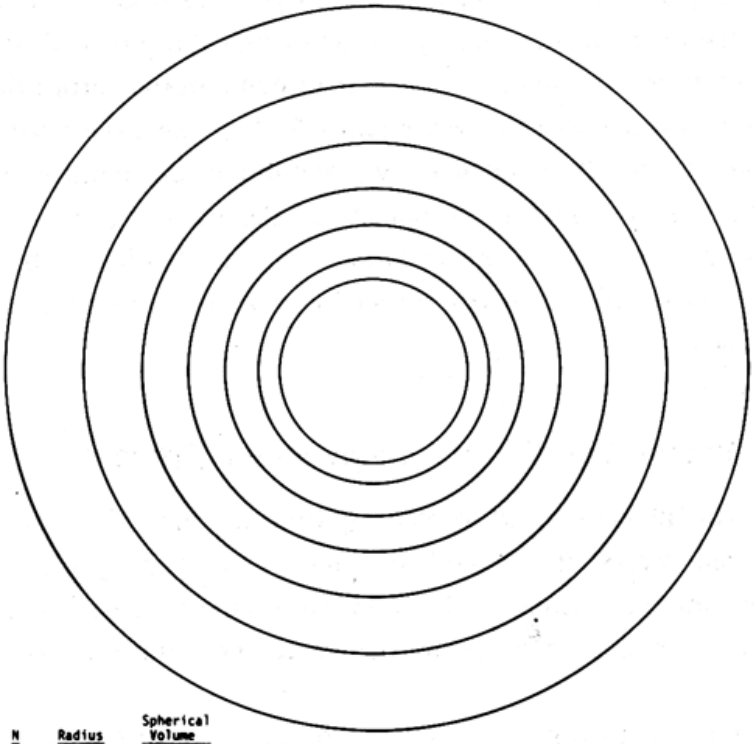
DOUBLING AREAL OF PROGRESSIVE CONCENTRIC CIRCLES



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.

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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)

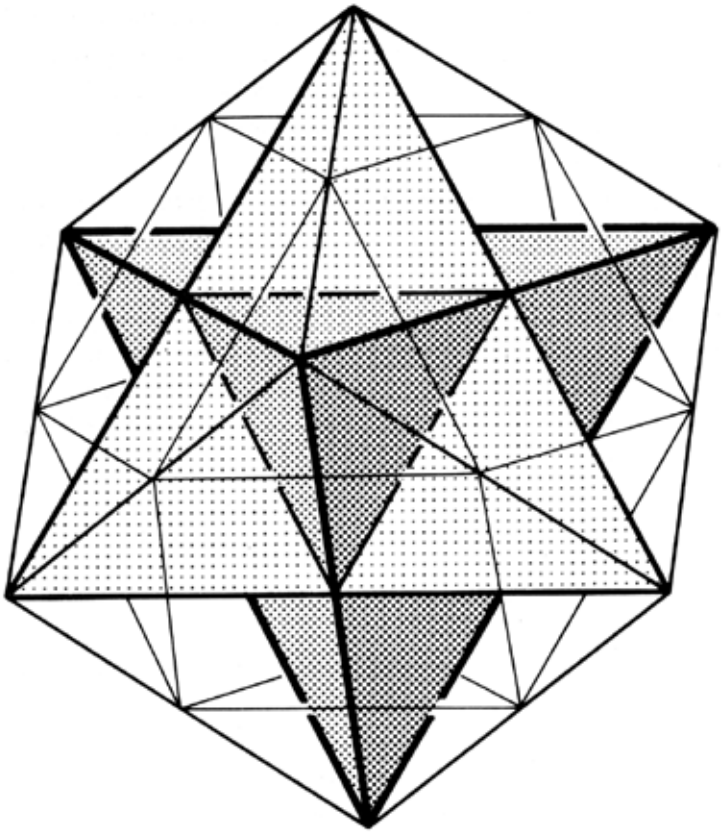

Fig. 1006.32 Duo-Tet Star Polyhedron Defines Vector Equilibrium Involvement Domain: The Duo-Tet star polyhedron that first appears in Fig. 987.242A is shown here within a vector equilibrium net. The complex also illustrates the eight Eighth-Octa that must be added to the eight triangular faces of the 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.

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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.

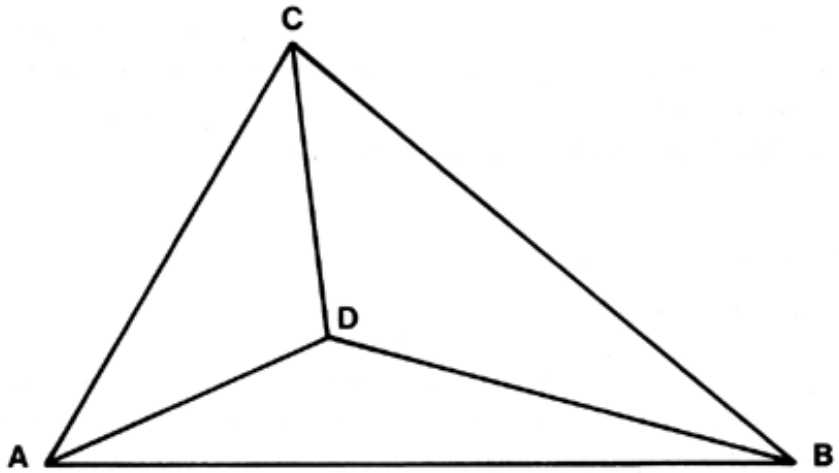

Fig. 1007.30 View of Tetrahedron from Above: There are four triangles: three surround the top vertex; the fourth is implicit in the base.

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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

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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

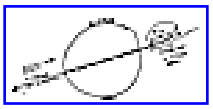

Fig. 1009.57B

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.

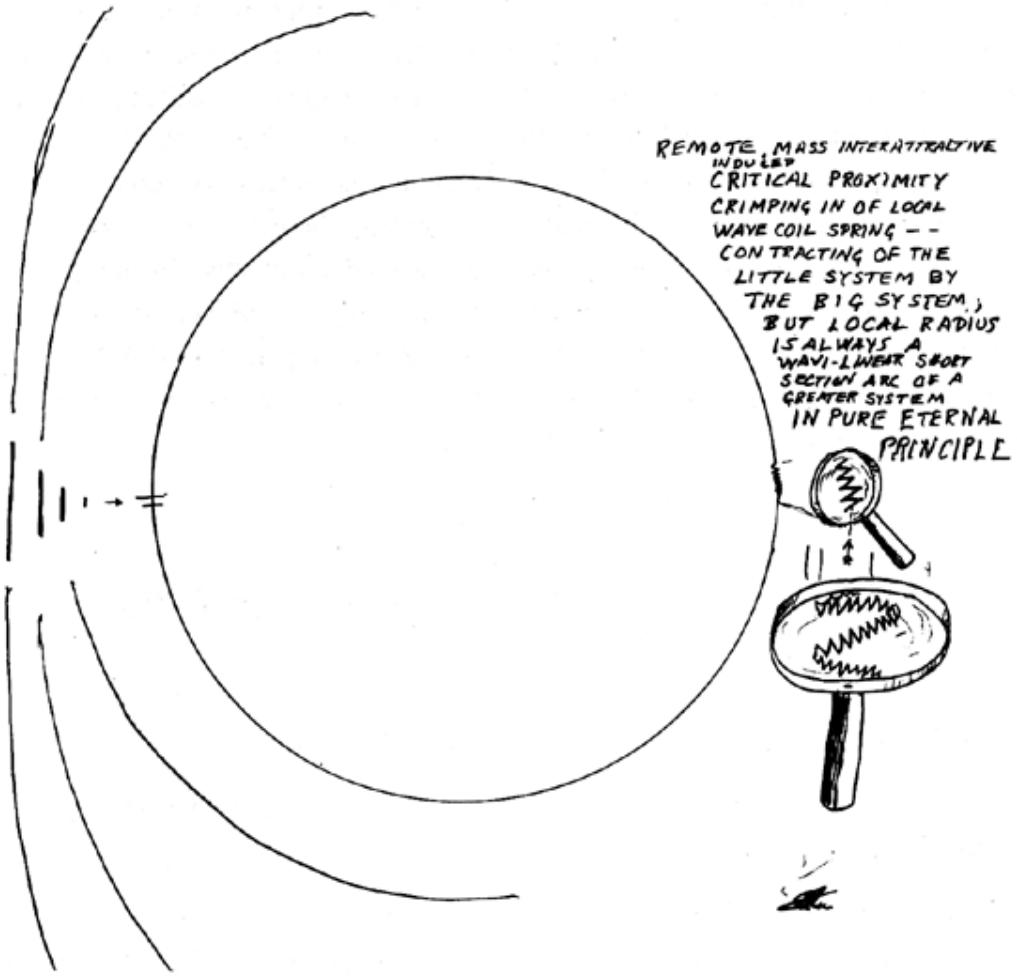

Fig 1009.57A Critical Proximity Crimping-in of Local Wave Coil-spring: Consideration of the little system by the big system. Local radius is always a wavilinear short section arc of a great system in pure principle.

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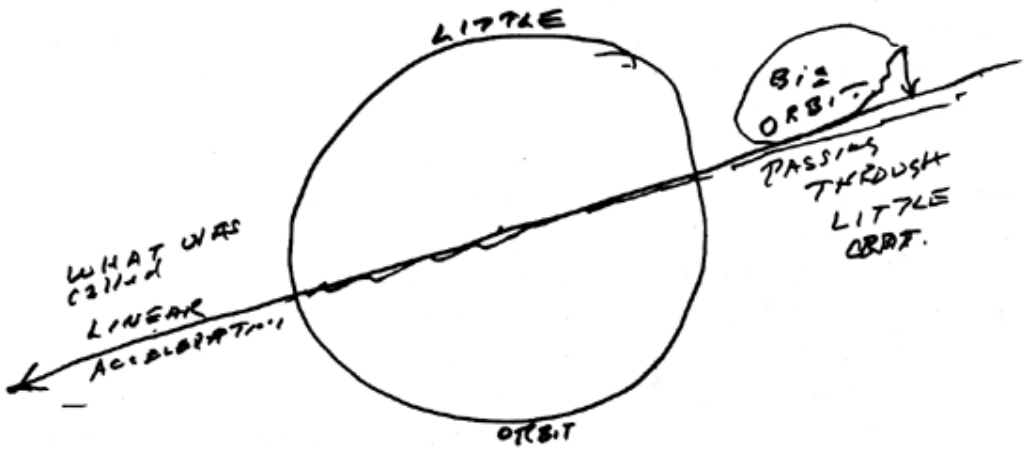

Fig. 1009.57B Big Orbit Passing through Little Orbit: What was called linear acceleration is an unrecognized arc of a bigger system.

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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

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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.

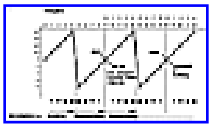

Fig. 1012.14A

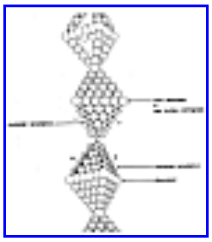

Fig. 1012.14B

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.)

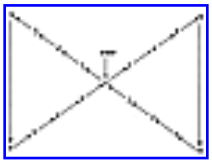

Fig. 1012.15

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.

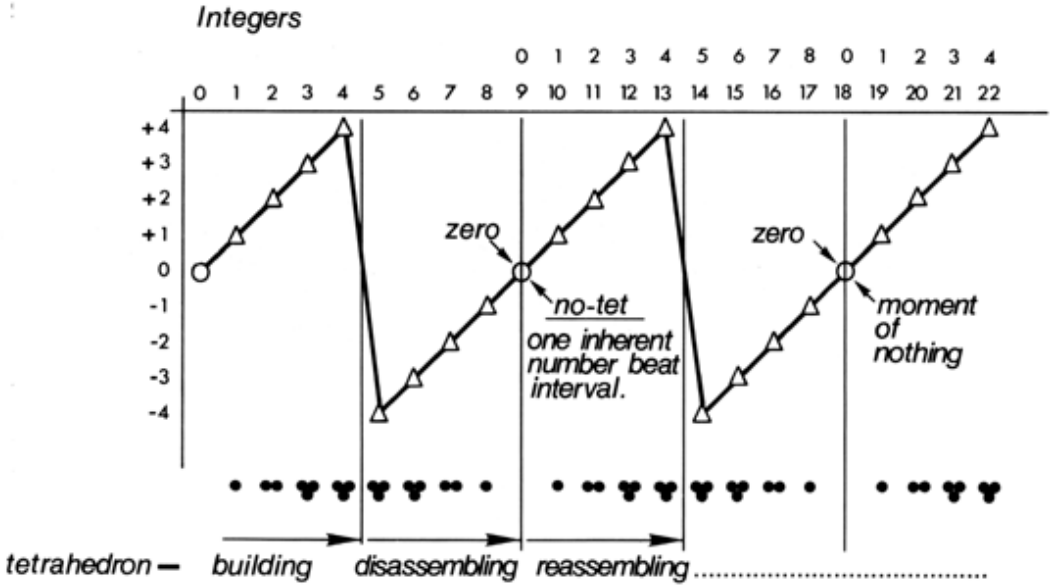

Fig 1012.14A Indig Octave System of Four Positive, Four Negative and Zero-Nine Wave Pattern of Experiential Number: This basic discontinuous wave disclosure is intimately related to inherent octavization through tension-chord halving discovered by the Pythagoreans, and the major-minor-mode "fifthing" 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.

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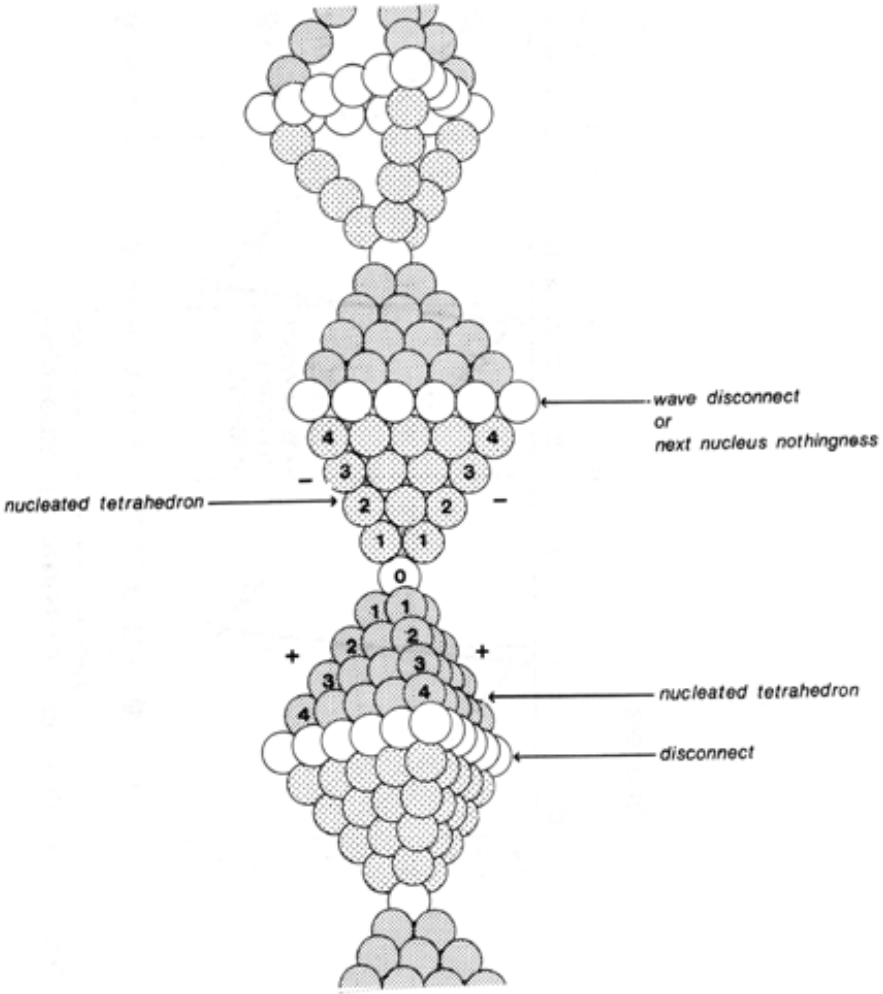

Fig 1012.14B Wave, Quanta, Indigs, Unity-Is-Plural Bow Ties: This works for any pair of the ten pairs of tetrahedra in the vector equilibrium, of which only four pairs are active at any one time. The bow-tie waves illustrate the importance of zero. They come into phase with one another and with physics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

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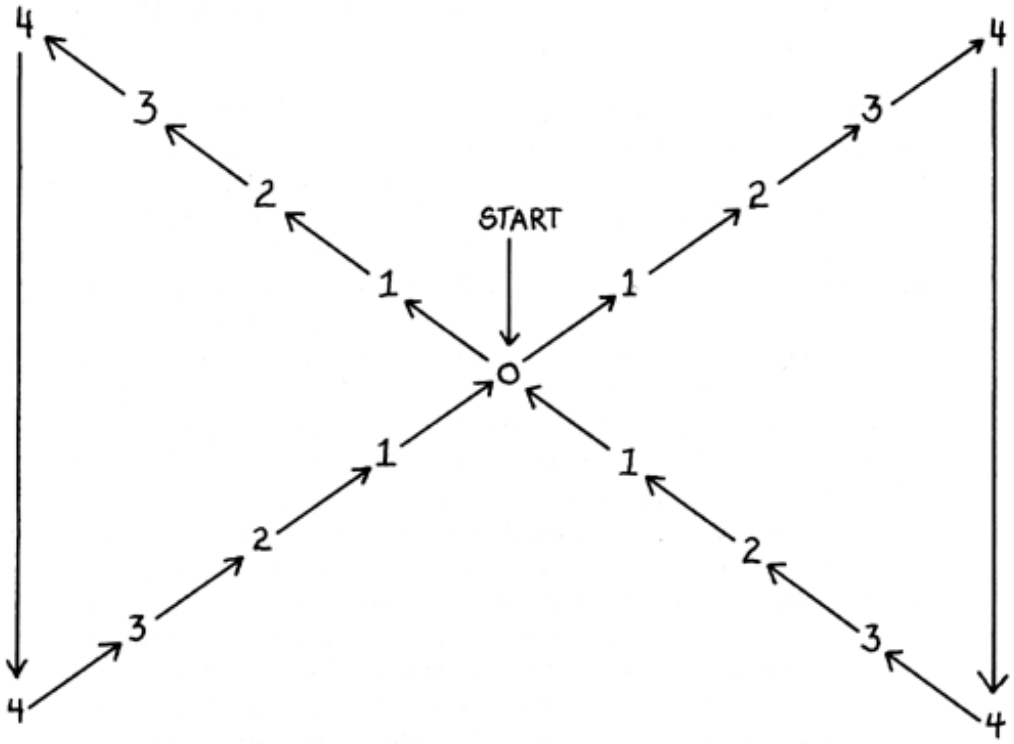

Fig 1012.15.

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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

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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

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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**