WORLD DESIGN SCIENCE DECADE 1965 - 1975

FIVE TWO YEAR PHASES OF A WORLD RETOOLING DESIGN
PROPOSED TO THE INTERNATIONAL UNION OF ARCHITECTS
FOR ADOPTION BY WORLD ARCHITECTURAL SCHOOLS

Phase I (1965) Document 3
COMPREHENSIVE THINKING

World Resources Inventory
Southern Illinois University
Carbondale, Illinois U.S.A.

Phase I, (1965) Document 3

COMPREHENSIVE THINKING

by: R. Buckminster Fuller

(Selected and edited by John McHale.)

World Resources Inventory
Southern Illinois University
Carbondale, Illinois
U. S. A.

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(Other volumes in this series are:

Phase I, (1963) Document 1: Inventory of World Rescurces,
Human Trends and Needs
by R. Buckminster Fuller and John McHale

Phase I, (1964) Document 2: The Design Initiative
by R. Buckminster Fuller)

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Introduction to Halo:
Omni-directional Halo:

No More Second Hand God
Southern Illinois University Press
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Wave Transformations of the City:

New York as a Focus of Energy
'The New York Guidebook'
Dell Publishing Co., Inc., 1964.

The Prospect for Humanity:

Saturday Review
Anniversary Issue
August/September/October, 1964.

FOREWORD

This document, the third publication in the 'World Design Science Decade, 1965 - 1975 series has been prepared for the VIII World Congress of the International Union of Architects to be held in Paris, July 1965. It should be read, therefore, in conjunction with the first two documents in this series – particularly, Document Three, "World Design Initiative" by R. Buckminster Fuller, which deals specifically with the ways in which students may assume the design initiative and which also outlines the overall conduct of generalized design science exploration.

Although this selection of the writings of Buckminster Fuller has been compiled primarily for the use of students participating in this world program, it may also be useful to the general reader as an introduction to certain aspects of his design philosophy which have tended to be overshadowed by his practical inventions and structural achievements.

The writings have been ordered in a manner which is intended to reflect the basic orientation suggested in the title, Comprehensive Thinking. As will be seen, this order proceeds from the whole to the particular – from considerations of how one may think about the larger comprehensible whole system to how one may apply such 'whole systems' thinking to local and particular aspects of the system in the planning of environment for man.

Though the language of some of the texts may seem difficult at first approach, it should be borne in mind that one of our major problems in thinking today is the use of language systems which still represent a fixed structurally compartmentalized world view. The terms available to us for the expression of dynamic, rather than static, concepts are far from satisfactory. Fuller's language is particularly representative of the 'transitional state (of the Western world) between the older, traditional, noun-centered culture and its present day, changing, verb-centered culture'. In his search for an adequately descriptive terminology he tends to employ concepts and usages from many different fields juxtaposed in ways which may be unfamiliar to those more customarily restrained within the vocabularies of particular disciplines.

Some brief notes on the specific texts may be useful at this point –

The Halo papers deal primarily with the exploration of the thinking process itself and provide a conceptual 'general systems' model of thought, in terms of tuning, frequency modulation, and feedback operation as analogies of this comprehensive process.

The Halo concept represents the further development of Fuller's 'Energetic and Synergetic Geometry' towards a rational 'all energy behavior accounting system. An important aspect of the geometry is that it allows of conceptual modelability of many dynamic energy relationships whose behaviors are traditionally considered as not communicable in this way. Citations of the congruence of many of Fuller's constructs and geometrical accounting procedures have particularly increased in recent years, i.e. in tissue and virus structures, in bio-molecular research generally, and in the study of fundamental particles

These recent insights extend and amplify the postulates of the geometry into the area of a more generalized epistemological frame work.

Many similarities in conceptual approach already exists in various widely separated areas of enquiry where such modelability is being sought, e. g. the 'radex' and 'circumplex' figures employed in mathematical analyses in social sciencel, the 'biofilm' approach in overall earth ecology' structural relations in the electro-magnetic spectrums. Though similar in 'form' to such approaches the Halo concept is a more fundamental attempt to provide a 'structural tool' for the elucidation of the widest range of complex phenomena relationships.

The Profile of the Industrial Revolution applies the conceptual organizing principles discussed in Halo to the historical development of man's accumulated intellectual discoveries, their practical implementation into environ controlling technologies, and their cumulative effects on man's overall ecology on earth.

Venus Proximity Day analyzes the 'local' aspects of various social, economic, and political forces and the ways in which they may retard or accelerate comprehensive planning. Within this context the role or architecture and environment planning is discussed in relation to industrialization.

An analogy is drawn which poses medicine as the prime discipline which deals comprehensively with all the internal metabolic processing of man, and discusses the new role of architecture and environment planning as the emergent comprehensive discipline which would deal in similar overall fashion with all the external metabolic processing of man.

Wave Transformations of the City examines New York as an urban center in terms of its cyclic growth patterns and discusses the ways in which we may analyze such organic growth as dynamic frequency-modulated wave phenomena.

The Prospects for Humanity is an example of comprehensive long-range thinking applied to the future extrapolation of various discernible trends in man's present ecological patterning.

Geosocial Revolution represents a summation of all the above aspects of comprehensive, historical, 'local', and long-range thinking, directed towards the specific problems of man's present global dilemmas and their solution, through comprehensive redesign. and redirection of the world's industrial tool complexes toward the 'livingry' revolution. Our present political and ideological impasse in relation to the various facets of the world geosocial revolution is discussed. It is emphasized that science and technology as key formative processes favor no one political ideology as against another and, indeed, that such formative forces alone maintain and forward man's physical well being,without direct benefit of supporting ideological constructs.

In this ordered sequence the reader may choose alternative routes. If he wants to examine first the results of thinking comprehensively let him go first to Geosocial Revolution. If more concerned with the process of comprehensive thinking he should begin with Halo and work through the series of following chapters.

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1. "Mathematical Thinking in the Social Sciences:' Edited, F. L. Lazarsfield, Illinois, Free Press, 1954.

2 F. L. Kunz, The Film of Living Beauty, Main Currents in Modern Thought, Vol. 18,Oct. '61.

3 Time: Its Breadth Depth in Biological Rhythm, J. J. Grebe, N.Y. Acad. 1962.

The schematic diagram using the Halo conceptual structure to process man-shelter environment as a functional system is included here as a rough example of the operational use of the concept. The first major categories of the 'Universal Requirements of a Dwelling Advantage' by Fuller[1] are laid out in terms of magnitude, frequency of occurrence, etc. within the Halo system. Students may from this example, be able to devise ways of using Halo as a conceptual tool in organizing the interrelationships of many other problem areas. It might also be usefully applied in this manner to material in other chapters of the present work.

In general, within our present program, each of the texts will be found to have particular relevance to the comprehensive manner in which we must now approach world planning. The major problems confronting our global society are no longer amenable to local piecemeal solutions, but require such comprehensive confrontation. The statement of the problems alone requires that we deal with our world as a whole process, as an overall ecological system, within which man, his present requirements, and future trending must be viewed as part of the ongoing evolutionary development.

How can the student learn to think comprehensively about such large-scale processing? Little training in such thinking is given in our present educational systems. The assumption of any degree of comprehensivity tends to be suspect, when extreme specialization within the given range of academic divisions is still the prevailing education-al goal. Yet, patently, no single human problem may be wholly solved within the province of any one academic discipline; even 'local' problems require for their consideration and solution the cooperative efforts of many such disciplines.

This selection, then, is offered as a guide towards such integrative thinking from the writings of a man who has attempted throughout his life and work to think consistently in such a comprehensive manner and to apply such thinking towards the practical solution of man's environment problems.

An essential quality of Fuller's philosophical orientation is that he views man's entire relationship to universe as inseparable from man himself. Universe and man are not individually operating 'entities' but complementary and interactive aspects of a whole process. He defines 'universe' as 'the aggregate of all men's consciously apprehended and communicated experience'. As total universe is perhaps the largest possible concept which man may attempt to comprehend, this premise enables one to come to terms with such a concept through the statement of how we may describe and measure it; Operationally such a premise enables us to deal with universe in definable and conceptual ways.

This may still seem far from the kind of comprehensive thinking required in the practical replanning of world facilities! However, the premise of 'universe' as a describable structural pattern visible to, and experienced by us, at our local pattern level, is further refined by Fuller through his postulation of the two corollary aspects of universe – the synergetic and energetic. He defines synergy as 'the unique behavior of whole systems unpredicted by the behavior of their respective subsystems events'. The 'energetic' aspect of universe represents the more directly observable separated out local behavior pattern – the subsystems events. In thinking about man's relationship to his environment this avoids undue reliance and emphasis on the local and specialized pattern considered in isolation.

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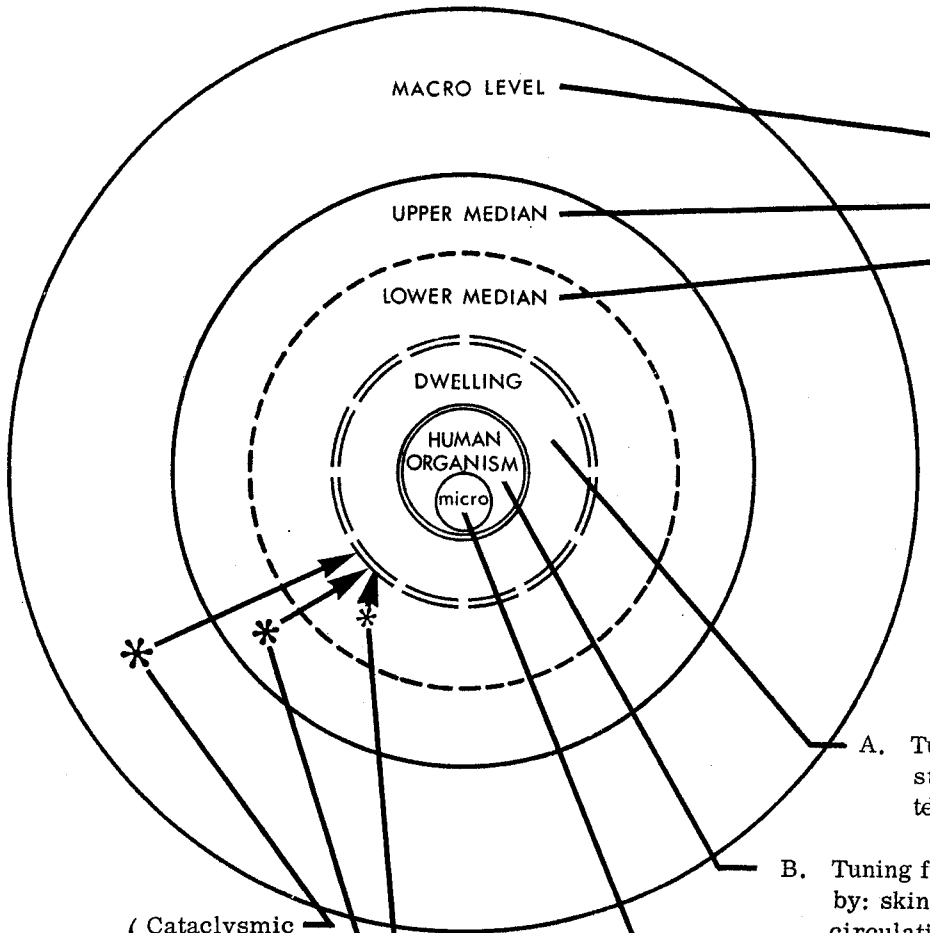
1 Document Two, The Design Initiative, R. B. Fuller, S.I.U,1963, Carbondale, Illinois,



FREQUENCY	STRESS
low	high
medium	medium
high	low

A. } Relationship = Performance criteria of 'DWELLING'
B. }

A. Tuning function of dwelling accomplished by structural shell and mechanics, i.e. temperature, lighting control, etc.

B. Tuning function of human organism accomplished by: skin, nervous system, internal organs, circulation system, etc.

'Micro' functions of human organism: psycho-physical factors as yet not determined, or irrelevant as too small or infrequent.

impinging energies { Cataclysmic, Dangerous, Inclement

nb. may be expanded to include all sections of requirements.

from-(Universal Requirements Schedule)
Doc. 2. The Design Initiative 1964, pp. 142-145

nb. Based on the 'Omni Directional Halo' concept of R. B. Fuller.

Further, in assuming an a priori structural order throughout, all physical events occur as interrelated energy patterns-whether they are macro events at the level of galaxies, median events as social patterns, building systems or rainstorms, or micro events at the level of the atomic nucleus.

Within this scale, all man's environmental transactions – whether building, sleeping, designing structures, or plowing a field – form part of the total energy system. As defined out of his experience, it is a finite system in which energy may be neither lost nor gained, therefore the process within the system is one of interrelated and regenerative cycles of energy transformation. We cannot, in the strictest sense, deal with any local aspect of the system without taking into account the regenerative and synergetic aspects of the whole. If then, in planning for man's requirements we take cognizance of such observable 'universal' laws as have been found to operate in common throughout the scale, it is more probable that such planning will be on the right track.

For example, in the designing of 'shelter' for man we may note that in these comprehensive terms we are locally rearranging certain locally occurring energy events to our immediate and future advantage. The requirement 'shelter' viewed comprehensively is seen not as traditional 'house' but as an 'instrument' which man may employ to adjust and control the local energy patterns impinging upon him, as a 'valving' device which allows him to control, shunt, or redirect environment energies in preferred forms of frequency. It is viewed as an instrument, whose primary function is to allow man to 'tune in' on any preferred range of facilities he may require. The end ’design', by such definition, tends not to be the obtrusive and important feature but rather to be oriented towards functioning invisibly until called into direct play by the occupant. This leads not only to a strictly scientific 'energy' accounting in the design of such environment systems but returns the responsibility for the end-use control of the system back to the individual user. Man is not to be provided with 'machines to live in', but with such anticipatorily designed instruments as may allow him to adjust and control his environment to any individually preferred manner of living.

There may be noted even in such a briefly outlined example, that the comprehensive formulation of any particular aspect of man's environ relation does lead to a considerable difference in the angle of attack on a given practical problem. The more comprehensive the statement of the problem, the more adequate and universally applicable its indicated solutions.

Within such comprehensive assumptions of the integral nature of environment processes, 'chemistry, biology, or art science technology, etc. ' and other separate field categories are merely local labels for various ways of organizing our experience of universe. They are all more or less convenient ways of packaging different aspects of an experience which is in itself comprehensive – in which 'there are no discernible separate compartments in which nature functions differently the one from the other'. Undue emphasis on locally unique aspects of the system, or ways of organizing the individual local experience, may however obscure the operation of the larger universal patterns. Designing or planning for man’s maximal advantage requires that we remain comprehensively oriented towards the employment of such preferred patterns as man has been able to elicit from universal behavior, i.e., scientific laws.

Fuller often refers to the completion of the table of atomic elements as the prime ’universal’ structural discovery of our time; one which gives man a full basic inventory of energy configurations and possible combinations whose true functioning is invisibly located at the submolecular level. From this time on 'design is more clearly seen as the visible ordering of subvisible energy patterns with no value division between

natural and synthetic materials--synthesis is but a local rearrangement of the basic element inventory. Similarly, with the new alloy and chemical strengths now available, function, in the material 'form' sense may no longer be visibly determined. There can no longer be any preconceived formal preference for particular materials and forming means. There can be no preconceived end solutions but only the continued flexible response to man's requirements which may be viewed in themselves as dynamic energy relationships in varying degrees of transformative change.

The needs of man within such a comprehensive orientation requires also to be considered in the widest sense, as extending beyond his physically measurable well-being. Though man may, in a sense, define Universe, no adequate statement of the phenomenon Man himself has yet been made. Therefore, we have to design so as to accommodate those needs beyond the physically demonstrable which may yet be crucial to his forward evolution.

In applying such comprehensive review to man's historical progress, Fuller points out that he has only survived by anticipatory strategy – by consciously organizing and transmitting his past experience to control and direct his future progress. His stored 'scientific' experience evolves into technology which externalizes the principles discovered by mental processing into tools which give him material survival advantage. All man's technological progress up to and including full industrialization forms part of his evolutionary pattern. Industrialization is the reintegration of discovered scientific principles into a common regenerative and universally applicable advantage for man. It is, in this sense, organically inherent in the evolutionary direction of the human enterprise. The enormous survival advantage and 'wealth' generated through industrialization is potentially inexhaustible as it depends ultimately on the accumulated universal experience of all men ordered through science and manifested in the regenerative technological cycling of materials and tools. Within this regenerative process there can be no real depletion of wealth if the overall system is comprehensively maintained and allowed to develop to its full global extent. Based on the universal experience of all men it is inherently global in nature, requiring for its full operation, access to the entire world's raw materials, and for its successful and economic operation, the global redistribution of its products for the advantage of all men.

From this time forward, with the full development of industrialization as a prime feature of his accumulated experience, man's evolution is no longer dependent only on locally fortuitous environmental factors, natural selection or biological mutation. The capacity to consciously modify his own forward evolutionary pattern comes increasingly within his own power.

Our present world crises hinge directly upon this issue – the realization of man's historical role and the cooperative ecological relationship and interdependence of the entire human family.

Viewed comprehensively the central problem of this present critical period in man's affairs is how to make the total world's resources, which now serve only 4e per cent of humanity, serve 100 per cent through competent design – despite the continuing decrease of metal resources per capita. The requisite designed application of our world industrial potential to this problem is not implicit within the present trend of our major

social and political directions. It patently requires the assumption of a new social initiative and leadership. This is the purpose of the World Design Science Decade 1965-75, through which the world students, initially in architecture and environmental planning, will forcefully demonstrate their capacity to deal comprehensively with the redesign of the world's major tool facilities and networks.

John McHale
Carbondale, Illinois
May, 1965

INTRODUCTION TO OMNIDIRECTIONAL HALO

The useful but infrequently used word epistomology means science of the thought processes. A total epistomological reorientation and, to the best of my knowledge, a unique philosophical reconceptioning, regarding the regenerative constellar logic of the structuring of the universe (both as a new cosmology and as a new cosmogony), seem to have followed gradually upon my hypothetically-initiated querying regarding the possibility of formulating more comprehensive and symmetrical statements regarding dawningly apparent natural laws. I intuited in irrepressible degree that such a potential formulation might be accruing and harvestable in all of our acceleratingly-reconsidered and progressively-integrated world-around, all-history experience as now only diffusely inventoried at the middle decades of the twentieth century.

Out of multi-overlaid experience patternings there sometimes emerges an awareness of what we may call a coincidence pattern – a localized thickening of points. These emergent patterns of frequency congruences and concentrations display a unique configuration-integrity which has up to now been so dilute in any one experience as to be only invisibly common to many differentiated or special experiences, e. g., a pack of one hundred 4-inch by 5-inch file cards each riddled with hundreds of different sized small holes. Each card appears to be chaotically patterned with holes. However, when the cards are stacked with edges aligned three holes in each card are vertically aligned; all others are obscured by blank spaces on one card or another. A triangular pattern relationship of the light coming through three tubes in the stack of cards is now lucidly conceptual. To such persistently emergent, uniquely mutual, coincidence-patterning relationships as the same triangle array of holes in each and every card we may apply the term "pattern generalization" as used in a mathematical sense, in contradistinction to the word "generalization" as used in the literary sense. The latter often means a too-ambitious subject range which consequently permits only superficial considerations of any specific case data.

When the uniquely emergent generalized patternings become describable by us in mentally regenerative conceptual terms, as completely divorced from any one of the specific sensorial conditions of any of the special experiences out of which they emerged, yet apparently, as seen in retrospect to have been persistent in every special case, then we may tentatively assume such unique mutual pattern content to be a generalized conceptual principle, as for instance the conception of tension as opposed to compression independent of textures, smells, colors, sound, or size of any one tension-dominated experience.

It is in just such an epistomological process that we discover that size is not a, generalized conceptual principle. Whether referring to the size of an object in respect to other objects or the sizes of any one object's subdivision, size emerges exclusively as a frequency concept uniquely differentiating-out each "specialized case." Generalized shape conceptioning is independent of size. A triangle is a triangle independent of size.

When a second order of pattern distillation as a generalized conceptual principle emerges, but this time exclusively from the emergently-induced co-ordinate consideration of a plurality of generalized conceptual principles themselves, each

independent of any special case sensoriality, and in such a regeneratively-recognizable manner of patterning as to provide a means of mathematical accounting and therefrom a tentative forecasting capability, not only of generalized developments but also of special forward experiences in the terms of specific sensorial conditions, and those calculated forecast conditions materialize, and the forecasting capability is subsequently verified by recurrent experimental demonstrations under controlled generalized conditions, then we may tentatively assume that we have discovered at least a clause of "natural law. " For example, we tentatively assume that radiation is generalized compression and that gravity is generalized tension and that tension and compression are inseparable, precessionally-complimentary functions of universal structure.

Newly recognized generalizable principles seem emergent in unprecedentedly accelerating accumulation as reported from the instrumentally extended range, velocity, and exactitude of special case experiences in the most recent moments of history's scientific venturing. The manywhere local probings have been meticulously organized and reported regarding measurable relationships and rates of changing relationships throughout the vast macrocosmic and exquisite microcosmic angle and frequency universe events both infra and ultra to man's direct tuneability yet instrumentally tuneable and transformably readable within regeneratively informative tolerance despite inherently limited observational exactitude.

Out of cumulative patterning overlays there emerges what seem to be generalized principles apparently governing all associative and disassociative transformings and their resultant regeneratively persistent hierarchy of constellar configurations. These hierarchies of constellar configurations disclose in turn a hierarchy of dynamically symmetrical constellation phases and their respective maxima-minima, asymmetric and complimentary, accommodative transformabilities which are apparently permitted within an omnirational, omnidirectional, omniequi-economic, energy-accounting, co-ordinate system of universe. This omnirational, arithmetical-geometrical accountability is of such sublime simplicity in contrast to the awkward "mathematics" of all known yesterdays as to have occasioned an almost universal incredibility and nonconsideration of its potential significance though it has been in disclosure for one quarter of a century.

This co-ordinate system may be described as an isotropic vector system; that is, a generalized Avagadron system in which the energy conditions and relative quanta ratios are everywhere the same yet multi-differentiable in local patterning aspects, which aspects are interchangeably emergent without altering the comprehensive energy equilibrium or its unitary totality as implicit in the Law of Conservation of Energy by which it is assumed that energy may be neither created nor lost.

The discovered co-ordinate system is apparently governed by generalized laws, some of whose mathematical equatability I have been allowed not only to discern (as far as I know for the first time by anyone) but also to codify and translate into unique structural realizations. This codification governs the total co-ordinate abundance ratios of the unique pattern aspect relationships of uniquely irreducible co-operative function aspects of locally nonsimultaneous events and their equilibrious pattern totality.

Discovery of the primary and corollary laws of constantly co-ordinate relative abundance of pattern function-aspects of totality as an omnirational regularity governing all local patternings of universe as a minimum-maximum family of complexedly complementary yet uniquely identifiable conceptual function-patterning relationships followed upon intuitive formulations of the seemingly most comprehensive self-querying question I was capable of propounding to myself regarding possible detectable pattern

significances accruing to progressive life experience integrations and overlays.

That most comprehensive question was, "What do you mean by the word 'universe'?" "If you cannot answer, you had best abandon use of the word 'universe' for it will have no meaning." My intuitively-adopted rules for self-questioning and answering were that the answer must be made exclusively from man's experience patterns. I learned many years later that the Nobel physicist Percival Bridgeman had identified this same rule adopted by Einstein as "operational procedure," subsequently a much-abused phrase. My answer (or discard of the word "universe" as a communication tool) was operationally inherent: "Universe is the aggregate of all consciously apprehended and communicated (to self or relayed to others) experience of man." If my finite answer holds against all specific experience challenges as being comprehensively anticipatory and adequate, the universe is finite, and all its components definable. Each life as we know it is definitive, i. e., consists of a plurality of terminable, ergo definite, experiences, beginning with each awakening and terminating with each surrender to sleep (no man can prove upon awakening that he is the man who he thinks went earlier to sleep, or that aught else which he thinks he recollects is other than a convincing dream). The intermittent beginnings and endings of conscious experience constitute an aggregate of definitive experiences--and the aggregate is therefore finite.

In the recent moments of historical experience, men as scientists adopted the law of conservation of energy: as predicated upon the sum total experience of physicists which recalled no contradiction to this hypothesis. They thus accomplished a finite packaging of all physical behaviors of physical universe as predicated also upon the hypothesis that all physical phenomena are entirely energetic.

By embracing all the energetic phenomena of total experience, the scientists secured a synergetic advantage for all energy accounting and prospecting. "Synergy" means "behavior of whole systems unpredicted by the behavior of any of its components or by any sub-array of its components." Corollary to synergy is the law of the whole system. Systems are definite as they return upon themselves in a plurality of directions, ergo have concave inwardness and convex outwardness, ergo inherently subdivide universe into mutually exclusive definitive macro and micro entities. The law of whole system states that, given the sum of whole system pattern conception its component behaviors may be differentially discovered and predictably described as required by the already evidenced behavior functions implicit in the a priori-definitive experience and conceptioning of any given experience-verified system. Thus by the law of whole system as corollary of synergy, the component behaviors of systems may be predictably differentiated as primary and secondary componential sub-divisions of whole system and then progressively isolated and locally reconsidered for further dichotomy.

Adopting synergetic advantage, science hypothesized that the physical portion of universe is energetic and finite. Under this hypothesis Einstein wrote his equation of physical universe as $E=MC^2$. This said that the total of local system energy is the product of all concentric local systems of energy's self-interfered, shunt-holding patterns (M for mass) as multiplied by the entirely noninterfered local omnidirectional velocity of surface growth of an omnidirectional, outward-bound spherical wave of radiant energy (in terms of second power of radial wave module frequency growth rate).

In Einstein's formula mass constitutes all the patterns of precessionally self-interfered and concentrically shunted, ergo locally articulated and locally and periodically regenerative holding patterns of energy. This is also to say that M equals all the locally complex, concentric, self-associative, unique holding patterns of all

energy, and C^2 equals all the eccentrically disassociative individual patternings of all energy (C being the radial or linear speed of radiant energy, which is approximately 186, 000 mps).

But physical science lacked the experience which might have persuaded it to hypothesize what all universe is. Physical science therefore restricted its comprehensive accounting strategy to the special case of definitive isolations within the physical portion of universe. This left the remainder of all experiences, no matter how earnestly and meticulously reconsidered, outside the definitive portion of comprehended experiences of universe, i. e., the physicists said all that is not physically encompassed as $E=MC^2$ is metaphysical.

However, by my definition of universe, all that was relegated to metaphysical nebulosity is now embraced by finite universe along with the physically energetic wherefore all the hitherto "inexact sciences" may become rigorously defined, enjoying equatable treatability at optimum degree of determinability.

I have found a general law of total synergetical structuring, which we may call "The Law of Structure." This law discloses that ”universe" of total man experience may not be simultaneously recollected and reconsidered, but may be subdivided into a plurality of locally tuneable event foci or "points" of which a minimum of four positive and four negative points are required as a "considerable set"; that is, as a first finite subdivision of finite universe. (This fourness coincides with basic quanta strategy.) All experience is reduced to nonsimultaneously "considerable sets” and holds irrelevant to consideration all those experiences which are either too large and therefore too infrequent, or too miniscule and therefore too frequent, to be tuneably considerable as pertaining to the residual constellation of approximately congruent recollections of experiences. A ”considerable set" inherently subdivides all the rest of irrelevant experiences of universe into macro-cosmic and micro-cosmic sets immediately outside or immediately within the considered set of experience foci.

There are two inherent twilight zones of "tantalizingly almost-relevant recollections" spontaneously fed back in contiguous frequency bands--the macro-twilight and the micro-twilight.

It is a corollary of this first subdivision of universe that a considerable set is a locally definitive system of universe returning upon its considerability in all circumferential directions and therefore has an inherent withinness and withoutness, which two latter differentiable functions inherently subdivide all universe into the two unique extremes of macro and micro frequencies.

The "Law of Structure” says that "local structure is a set of frequency associable (spontaneously tuneable) recollectable experience relationships, having a regenerative constellar patterning as the precessional resultants of concentrically shunted periodic self-interferences, or coincidences of its systematic plurality of definitive vectorial frequency, wave length and angle inter-relationships."

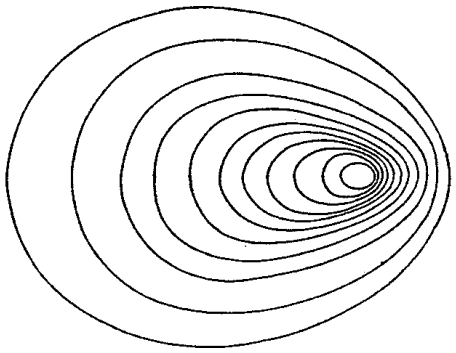
The precessionally regenerative concentricity of structure is antientropic, and evolutes toward optimally economic local compressibility and symmetry. (See Dymaxion World of Buckminster Fuller, by Robert Marks, for Fuller's Law of omni-optimally-economic, omnitriangulated-point-system, symmetry relationships and relative abundance of frequency modulated multiplicative subdivision of unitary local systems; i. e., M (mass) means: All the universe's self-interfering complexes having

concentrically self-precessing, local-focal-holding patterns resulting in locally regenerative constellar associabilities as positive-outside-in structures. CD (radiation) means: All the universe's nonself-interfering complexes having eccentrically inter-precessing, omnidirectionally diffusing patterns resulting in comprehensively degenerative negative limits of dissociabilities as negative (inside-out) de-structures.)

In the chapters on Energetic-Synergetic Geometry I identify second powering with the point population of any one radiant (eccentric) or gravitational (concentric) wave systems circumferential arrays of any given radius stated in terms of frequency of modular subdivisions of the circumferential arrays radially-read systems' concentricity layering; third powering with the total point population of all the successive wave layers of the system; fourth powering with the interpointal domain volumes; fifth and sixth powering as products of multiplication by frequency doublings and treblings, etc. The Dopler effect or wave reception frequency-modulation caused by motions of the observer and the observed are concentric wave system fourth and fifth powering accelerations.

The Dopler effect is usually conceived of as an approximately "linear" experience. "You," the observer, stand beside a railway track (which is a "linear" model); a swift train approaches with whistle valve held open (at constant frequency pitch as heard "on board" by the engineer "blowing" the whistle). The whistle sound comes to you at approximately 700 mph, but the train is speeding toward you at 100 mph. The train's motion reduces the interval between the successive wave emissions, which in

Fig. 5. Omnidopler Effect



effect decreases the wave length which gives it "higher" pitch as heard at your remote and "approached" hearing position. After the train goes by, the train runs away from each successive wave emission, thus increasing the interval between wave "crests" and therefore lengthening the waves, which apparently "lowers" the pitch as you hear it but not as others elsewhere may hear it. This is pure observational "relativity." But the real picture of the Dopler effect is not linear; it is omnidirectional.

The Dopier effect may also be explained in omnidirectional, experience-patterning conceptionality which is more informative than the familiar linear conceptioning of the railroad train and "you, at the crossing." "You" were flying in an air transport which exploded, and because of the sudden change in pressure differential between your in'ards and your out'ards at high altitude you personally have just been "exploded" into many separate parts receding from one another at high velocity. A series of secondary explosions follows from somewhere in the center of the galaxy of exploding debris, as one item after another of the late airplane's explosive cargo is reached by progressive local conflagration-heat concentrations. The sound waves of the successive

explosions speed after your receding parts amongst which are your two ear diaphragms as yet "stringily" interconnected with your exploding brain cells, which "hear" the explosion's sound waves first at low pitch. But as your parts explode from one another at a decelerating rate because of air friction, etc., the waves of remote explosion sounds "shorten" and pitches go "up." Now consider many separate, nonsimultaneous, secondary explosions of your various exploding parts all of varying intensities of energetic content and in varying degrees of remoteness and realize that the decelerations and ac-celerations of Dopier effects will render some of the explosive reverberations infra and some ultra to your tuning range limits of hearing, so that the sum total of heard events provides very different total conceptioning as heard from various points in the whole galaxy of exploding events whose separate components would tend to new grouping concentrations.

The Halo discovered in the next chapter is that of an omnidirectional, complex, high-frequency, Dopier-effected hypothetical-zone experience in an omnidirectional universal maelstrom of nonsimultaneous near and far explosions and their interaccelerating and refractive wave frequency patternings. Several of these fundamental concepts are also repeated several times in Halo, being reintroduced in various complex associations each of which provides unique discoveries.

In order to generate a spontaneous comprehension of the significance of the thoughts expressed in "Halo," which now follows, the latter essay will open with a swiftly martialed digest of the epistomological concepts of this introduction.

OMNIDIRECTIONAL HALO

Synergy means behavior of integral aggregate systems unpredicted by behaviors of any of their components or subassemblies of their components. Chrome-nickel-steel has a higher tensile, or integrally self-cohering, strength than the sum of the separate tensile strengths of its alloyed elements. Synergetic behaviors are commonplace throughout chemistry and biochemistry but so unfamiliar to man's visible spectrum range events that the word syn-ergy, though the equal in age of its companion word energy, is popularly unfamiliar.

The lack of popular and academic familiarity with the word synergy, which in the English language alone connotes the behavior of whole systems unpredicted by behavior of their components, means that man in his everyday social world has not been in need of this word, which in turn tells us that he lacks this fundamental conception in his conscious thinking processes. He ascribes all behaviors unpredicted by his statistical probabilities to ”luck" or miracle. This particular gap in man's everyday fundamental thinking and common sense accounts for many fallacies in his spontaneous reflexing and contemporary behavior. Ignorant of the regenerative significance of synergy, man is vulnerable to de-generative feed-back consequences in his comprehensive determinations.

Universe is the comprehensive integral-aggregate system embracing all the separate integral-aggregate systems of all men's consciously apprehended and communicated experiences. The total of experiences is integrally synergetic. Universe is the comprehensive a priori synergetic integral. Universe continually operates in comprehensive, co-ordinate patternings which are transcendental to the sensorially miniscule apprehension and mental comprehension and prediction capabilities of mankind, consciously and inherently preoccupied as he is only with special) local and nonsimultaneous pattern considerations.

Encyclopedias and dictionaries inventory man’s progressively invented words for communicable identification of all his evolving experience cognitions. Dictionary is a collective concept. Universe is the ultimate collective concept--i. e., the collection of all intelligible, inherently separate evolutionary event aspects which latter apparently occur exclusively and only through differentiating considerations which progressively isolate the components of whole and inclusive sets, super-sets, and sub-sets of generalized conceptioning in retrospectively abstracted principles of relationships. The generalized comprehensive principles of interrelationships progressively discovered as governing our subsidiary generalized principles are embraced by our finition of universe.

The word con-sider-ation comes from sidus, the Latin for star, the focal point of an as yet nondifferentiated concentration of events--ergo, con-sider-able, or con-stellar patterning, means an exploratory grouping of "stars" or complex idea entities that seem to man's limited tuneability to stand out together.

Neither the set of all-experiences nor the set of all-the-words which describe them nor the set of all the generalized conceptual principles harvested from the total of experiences are either instantly or simultaneously reviewable. "What was that man’s name?" Our answering service may take five seconds, five minutes, five hours, five

days, or five generations to reply. Our conscious orderly reconsideration of our variable lag experiences discloses subconsciously coordinated regularities of feed-back rates governing the recall phenomena.

All experiences are finitely furnished with differentiated cognitions, recognitions and comprehensions. The finite furniture consists of widely-ranging degrees of comprehensive constellar complexities. A wide range of time investment magnitudes must be assigned to the respective considerations of the multitude of different constellar, experience-pattern comprehensions. We cannot read simultaneously all the words in the dictionary; yet the dictionary is a finite collection of finite word entities each in turn consisting of collections of finite letter symbol entities.

Universe is finite because it is the sum total of finitely furnished experiences. The comprehensive set of all-experiences synergetically constituting universe discloses an astronomically numbered variety of sub-set event-frequency rates and their respective rates of conceptual tuneability comprehension. It takes entirely different lengths of time to remember or "look up" different names or past event facts. Universe, like the dictionary, though integral is ipso facto nonsimultaneously recollectable and, there-fore, as with the set of all the words of the dictionary, is nonsimultaneously considerable and therefore is also nonsimultaneously reviewable, ergo is synergetically incomprehen-sible, yet progressively revealing.

The age-long fallacial propensity which has frustrated adult man's adequate conceptioning of universe is that of spontaneously assuming that universe must consist of a simultaneously unit conceptuality – ergo, of simultaneous geometry or shape, i. e., a simultaneous structure. What is the shape of the universe? What are its boundaries? These are unitary, simultaneous static questions. They have no logical answer for universe though finite is a nonsimultaneous structure. Children know this better than their parents through innate conceptioning as yet unspoiled by erroneous logic. They remember the juggler putting a simultaneous array in the sky with nonsimultaneous tosses. The childhood representational pictures depict their dynamically arrayed concept of the "whole world" inventory, of mentally juggled arrays of nonsimultaneously occurring experiences agglomerated without any intended geometrical interrelationships. In all lands the children's spontaneous pictures contain "the" house, trees, birds, dogs, flowers, grass, clouds, stars, the sun and the moon. The parents say, "Darling, a nice picture, but we don't have both the moon and the sun at the same time." The parents are wrong--both the sun and moon coexist at all times whether temporarily co-visible or not. The parents' rationale has been damaged so that it can only consider and associate those items which are simultaneously grouped in unitarily static array. Yet in equal illogic the parents keep on attempting to see the universe of nonsimultaneity in unitary, static and simultaneous geometrical array as a "thing"--a very big "thing" --the biggest "thing."

It is in evidence that universe, as the co-ordinate integral of all-experience is finite yet nonsimultaneously recollectable--ergo, unitarily unpatternable--ergo, conceptually unthinkable – ergo, undefinable. This is to say undefinable does not mean infinite or un-finite. It means that--definability – de-finite is a sub-set of finite--ergo, pattern definition is a subdivision of finite-yet-unitarily-undefinable universe. The definable conception is therefore the first thinkable sub-set functioning of universe.

There are metaphysical yet cogent early words emergent from the limbo of prehistory's quasi-logical accounting continuities which show that intellect has long been aware of the DEfunction. For instance, DI-Vine, DI-, DE- (of Di-chotomy – cell division

--regenerate through bi-multiplication). The concept of a DE-VINING DE-ITY, i.e. the defining deity, the great intellectual capability of differentiating discernment, probably originated in the same conceptual logic as did DI-VIDE out of DI-VISION--to see the whole as functionally differentiable yet only locally and progressively conceptual. In the differential calculus this becomes the delta--$\Delta\ \delta$ D--of fundamental differentiation.

Differentiable function x in respect to y. Functions do not occur exclusively of one another. Functions occur only as inherently co-operative and accommodatively varying sub-aspects of synergetically transforming wholes. MULTIPLICATION accomplished only by DIVISION. Universe expanding through progressively differentiating considerations.

Definable thought patterning deals only progressively (by re-scanning) with the local event foci of experienced patternings of universe. Definable thought though constituting systematic consideration and orderly reconsideration, which returns omni-directionally upon itself in local conceptual relationships in only a subdivision of finite, which is universe, which is inherently inconceivable unitarily.

Inconceivability does not mean infinite anymore than does invisible. Finite is unique to universe because it means complete, but not terminal. The locally definable entity is not complete, for it does not exist by itself. All experiments show that local entities are inherently both entropic and antientropic, i.e., all local systems are always intimately linked with the rest of universe by measurable import and export pattern transactions. Definable entities are uniquely functioning components of universe. Universe is the minimum as well as the maximum closed system of omni-interacting, precessionally transforming, complementary transactions of synergetic regeneration. Local perpetual motion systems are impossible, since universe is the minimum regenerative set of perpetually intercomplimentary transformative functioning.

Systematic conceptioning and recollected conceptioning, both universal and local, which progressively traces, relates, and compares nonsimultaneously observable locally functioning entities is self-disciplined. The self-discovered capability to communicate to others by the recollectable and pictured word-tool developed a co-ordinate memory of all men.

Generalized systematic conceptuality's omni-directional relationships are only angularly configured and are independent of size or dimension. No man has ever "seen" outside himself. His brain is a multi-frequency (four sensory ranges) scanning (TV) integrator, continually operating in co-ordination with a multitude of memory (kinescope taped) TV scanners. The whole array of new and memory TVs is frequency monitored by an angular and frequency modulated pattern commonality scoring and score-predicting conceptual co-ordination capability. The TV co-ordinating conceptual capability includes a score-guessing and score-guess testing faculty, as well as a strategic-tests-contriving-pattern considerator, all of which conceptual patterning proclivities are self-started and regenerated by synergetical intellection.

The conceptual process is never static. Thinking does not consist of the insertion of invented images into an otherwise empty vacuum-tube chamber called brain. Thinking is the self-disciplined process of preoccupied consideration of special-case sets of feed-back answers selected out of the multitude of high frequency alternating transceiver brain traffic. This traffic consists of omniexperience processed answers to present or past questions, formulated either by the conscious or subconscious co-ordinating initiative of the individual or possibly by the individual overlapping generation of group

memory.

Because of the varying depths of storage of past experiences, some answers come back swiftly, some slowly. The reeollectability rates are unpredictable. The returning-answers traffic is heterogeneous. Many answers come to questions we have forgotten that we have asked, Conceptually systematic tuning of questions and feed-back answers, comparatively considered in the brain, results in temporary, tuneably valved exclusion of all other incoming signals traffic. Discreet tuning admits consideration only of those recollections which are clearly relevant to the omnidirectional rounding out of systematic comprehension of the special case set of events intuitively selected for momentary focal consideration. Thinking consists then of a self-disciplined, deferment of conscious consideration of any incoming information traffic other than that which is lucidly relevant to the experience intuited quest for comprehension of the significance of the emergent pattern under immediate priority of consideration.

The thinking process results in varying degrees of lucidity of the arrayed residue of focal event patterns uniquely consequent to the disciplined deferment of irrelevancies. Thinking is a putting-aside, rather than a putting-in discipline, e. g., putting aside the tall grasses in order » isolate the trail into informative viewability. Thinking is FM--frequency modulation--for it results in tuning-out of irrelevancies as a result of definitive resolution of the exclusively tuned-in or accepted feed-back messages' pattern differentiability. As the exploring navigator picks his channel between the look-out detected rocks, the intellect picks its way between irrelevancies of feed-back messages. And as the navigator realizes secondarily that the channel winds between two sets of rocks, the rocks to starboard and the rocks to port, intellect also discovers secondarily that all the irrelevancies of feed-back information have inadvertently fallen into two main classes, as follows:

1. The class of all the finitely-furnished experience events which are too large and too infrequent to have considerable frequency significance in-tuneability in respect to the modular magnitude ranges under consideration.

2. The class of all the finitely-furnished experience events too miniscule of wave module and of too high frequency to in any way he significantly tuneable into the considered spectrum range.

Each class has its twilight zone of almost (or tantalizingly almost) relevant which, if we were to accelerate our consideration rate, might attain considerability with-in the tactical limits of assignable capital-life-time intuitively budgetable to such consideration. Between the twilight zones of almost-too-large and almost-too-small to be relevantly considerable lies a zone of lucidly tuneable relevancy of the experienced event recollections.

Because of the incessant wheeling about of humans first in the womb, then in the baby carriage, then on foot, in the auto and ship and plane roundabout a spinning earth in a spinning solar system within an involuting-evoluting, spirally spinning galaxy, totally inventoried experiences are inherently omni-directional when considered as the sum of observational orientations. Universe (as all-experience) is inherently omni-directional in its observational orientations--ergo, the temporary putting-aside of the two classes of irrelevancies requires an omnidirectional putting aside which differentiates as an outwardly dismissed macrocosmic disposition of the too-large and too-infrequent con-ceptual informations and an inwardly dismissed residue set of all the too-miniscule and too-frequent events--ergo, the lucidly tuned in, residually considerable set of event-foci

lies with a spherical zone between the thus separated twilight zones of almost-consider-able miniscules and bigs, respectively. As a consequence, the residual set of tuned-in experience event-foci are caught in a spherical zone trap of feed-back recollected considerability appropriate to systematic reviewing and possible definition.

Out of nonsimultaneously conceptual, yet finite, universe has emerged a definitively conceptual geometry, not a geometry invented by the conceiver but an a priori geometry discovered by the re-considerer as a residual relevancy constellation.

We thus discover that systematic recollection and thought-out definition lies within a geometrically conformed zone which inherently subdivides the universe into distinctly separate microcosm and macrocosm, which two are, however, only meagerly isolated from one another by a local constellation of considerable relationships. No matter how meager the network of zonal relationships of the residually considered star set of holding-pattern relevancy, the latter shuntingly impedes in some degree the velocity of omnidirectional universal information traffic, forced by geometrical surroundment to pass through the zonal constellation. If a squadron of boats enters a river's mouth and passes upstream and anchors, their presence and the friction of their hulls will mildly

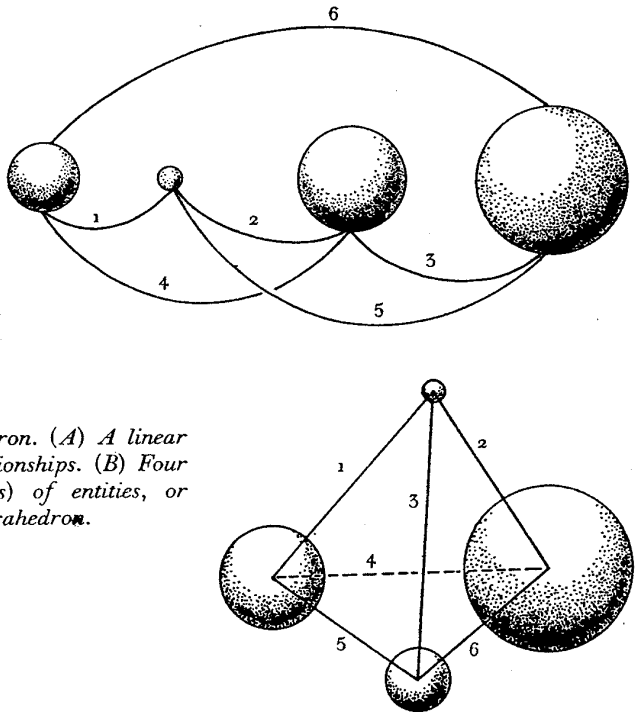


Fig. 2. Linear Tetrahedron. (A) A linear tetrahedron has six relationships. (B) Four unique frequencies (sizes) of entities, or particles, comprise the tetrahedron.

retard or choke the river's flow. Thus do the constellation of considered events mildly choke the otherwise unimpeded universal and geodesically-inter-routed communication traffic which they have separated into the two (micro-macro) realms. As Heisenberg shows in his principle of ultimate indeterminism the physical act of measurement always

alters the behavior of the measured phenomenon. In the same way we show here that the thinking process inherently alters the fundamental patterning of universal thought-about interrelationships.

We thus discover that thought and its tuneably differentiating local definitions constitute the f.irst subdivision of finite universe. Ergo finite universe is something greater than any definable local system's zone of constellar, geometrical lucidity which zone is itself secondarily definable by its disparity of concavity of withinness and convexity of withoutness.

In a consideration four is the minimum number of stars having an inherent arrangement of within-ness and without-ness. Therefore we discover next that the minimum conceptually-considerable generalized-experiences-set, affording macro-micro separation of universe, is a set of four local event-foci. These four stars have an inherent sixness of interrelationships. This four-foci, six-relationship set is definable as the tetrahedron. This minimum fourness of relevant-frequency, ergo thinkable "stars" coincides with quantum mathematics requirement of four unique quanta numbers per each uniquely considerable "particle, " quanta are inherently tetrahedronal.

In the prime dichotomy of universe into a thinkable tetrahedronaI zone between unconsiderable irrelevancies, which in turn requires a secondary zonal separation into macro-micro momentarily unthinkable cosmoses, it becomes evident that the tetrahedronal zone itself introduces a tertiary dichotomy – into the two inherent twilight zones of almost considerable bigness and almost considerable littleness, respectively.

We find a fourth-stage dichotomy of universe when we consider that the big and little twilights each respectively are again also comprised of two tetrahedra as minimal requirement, one as the concave inward tetrahedron and the other as the convex outward tetrahedron.

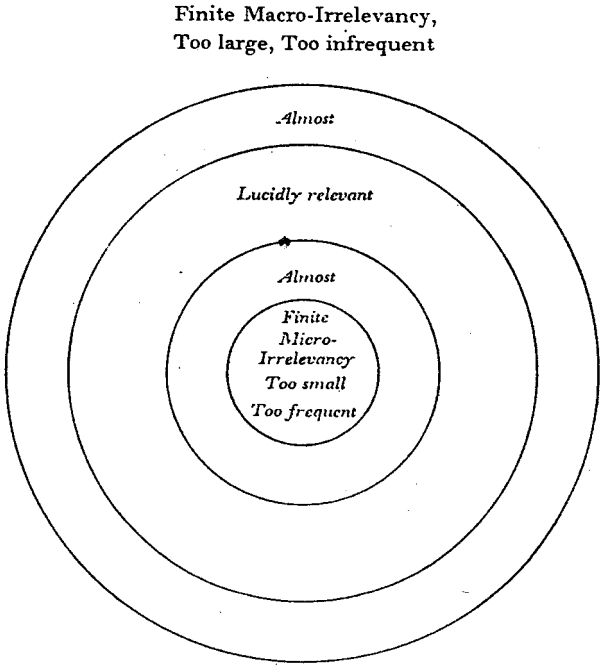


Fig. 3. Pattern of Thought. Thinking is frequency modulation—tuning out finite irrelevancies into two main classes: micro-macro, which leaves residual defined system as lucidly relevant.

We next, fifthly, discover that the positive-negative (convex-concave) tetrahedra constitute only the minimum functional dichotomy of finite universe, resulting in a minimum portion of the universe disposed in the microcosm and a maximum portion of universe assigned to the macrocosm. Among geometrical systems a tetrahedron encloses the minimum volume with the most surface and a sphere the most volume with the least surface. An approximately spherical polyhedronal zonal dichotomy of finite universe by a spherical array of considered relevancies provides the minimum portion of sum totally finite universe assigned to the macrocosm and the maximum relative portion of finite universe assignable to the microcosm.

The finite Withoutness,
Macrocosm Irrelevancy

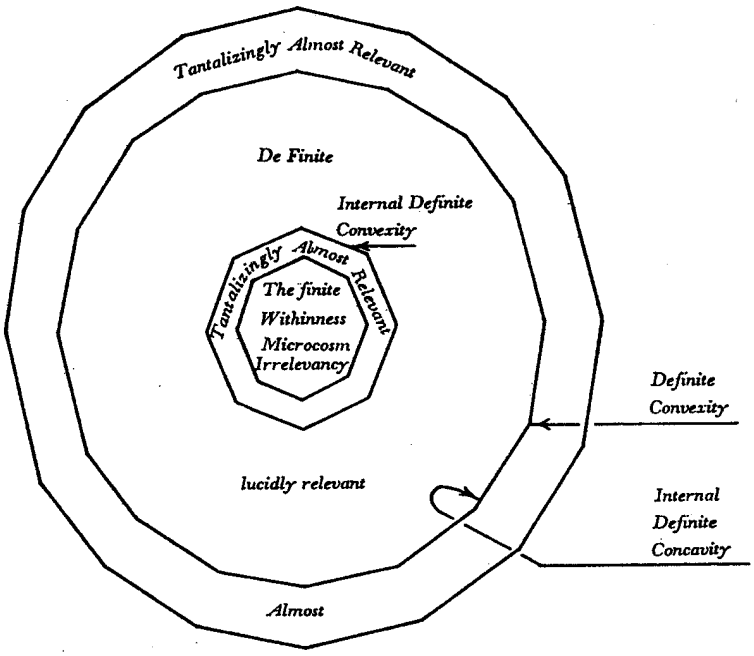


Fig. 4. Pattern of Thought—Phase 2. De-finite equals finite minus outwardness and inwardness.

We may say that the minimum zonally defined withinness conformation is tetrahedronal and the minimum zonally defined withoutness is spherical. Therefore, the most extensive lucidly conceptual and definable recollected-experience zone range lies between a tetrahedronal "withinness" twilight and a spherical "withoutness" twilight, beyond which are the nontuneable (1) outwardness and (2) inwardness--the subtracted Euler's twoness from nonconceptual finiteness which permits conceptual de-finiteness or definition of cognition.

Because the permitted conceptua1ity involves a unit expenditure from universe of a de-finite twoness, unit conceptuality must have a finite twoness pendi ture value, ergo prime conceptual unity acquires an inherent value of two. Unity is inherently plural. -Unity is always divisible as twoness, or fourness, or sixness, of inherent minimum relationships. The alternate relative proportions of finite universe's micro-macro magnitude limits of definitive dichotomy as tetrahedronal minimum or spherical maximum introduce an inherently alternative propensity of universal finite accountability whose alternative eccentric-concentric reciprocity of omnidifferential-lag-rate compensations inherently propagate and regenerate preferably considered universal evolution accomplished by omnidirectionally expansive-contractive wave propagating oscillations.

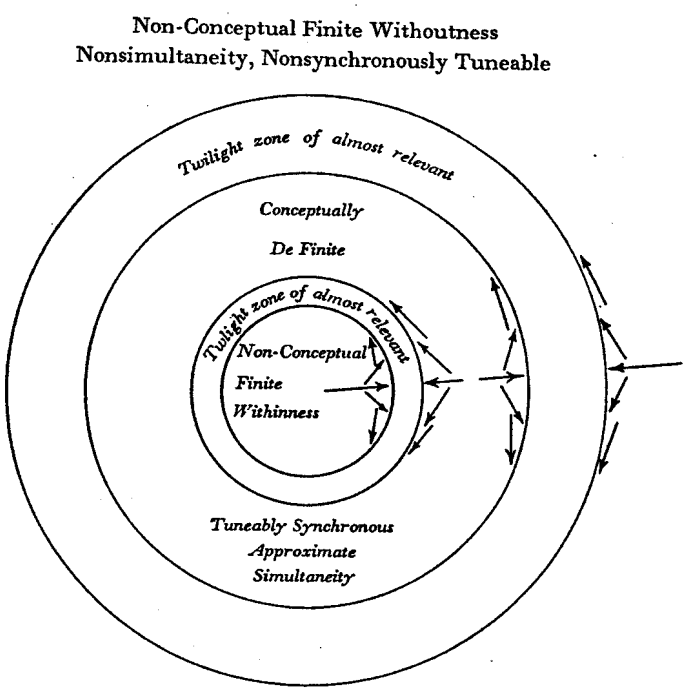


Fig. 5. Pattern of Thought—Phase 3. Concave means concentrate; convex means diffuse.

Frequency of. modular subdivision of vectorial lines are ratioed to cyclic increments of time realizing the accomplished velocity. Unity is the full circle sweep around an axis. Angles are fractions of cyclic unity. Frequency means a discreet plurality of cycles within a given greater cyclic increment. Angle means a fraction of one cycle. Angle is therefore subcyclic-unity, while frequency is plural unity. Angle is less than finite cyclic unity. Frequency is greater than finite cyclic unity. All physical realizations have relative-size, i. e., dimensionality. The phenomenon size consists of frequency modulated linear (i. e. vectorial) dimension. Angular phenomena being sub-finite cyclic unity, or zero frequency, may be independent of size. Generalized angular or triangular or tetrahedronal conceptioning may be independent of size.

The three angles of one face of a triangle always add up to 180° as a phenomenon independent of the relative dimensional size of the triangles. 180° is one-half definitive cyclic unity. Every triangle has two faces--its obverse and reverse. Unity is two. So we note that the angles of both faces of a triangle add up to 360°. The sum of the external angles of two triangles' obverse and reverse faces is 720°. The sum of the external angles of a tetrahedron is 720°. The sum of two triangles' external angles is equivalent to one tetrahedron.

The relative size of a triangle is a secondary, observer induced consideration and depends upon the frequency modulated edge increments of the triangle as ratioed to some other physical experience entity.

Angles of tetrahedra always add up to 720° independent of size. The angles of a cube always add up to 2160° independent of the cube's size. A tetrahedron is definite yet independent of size. All angularly modulated definite geometrical systems or figures are independent of size.

Relationships which have definite integrity and independence of size are

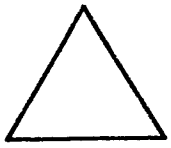
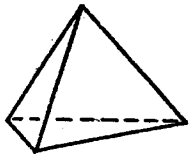
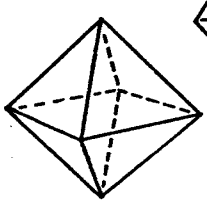
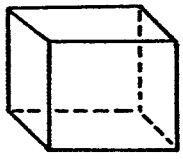
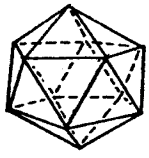
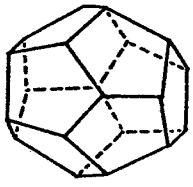
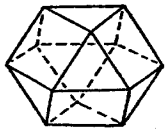
	No. of Vertices	Sum of Angels around each Vertex	Sum of angles multiplied by No. of Vertices. De-Finite	No. of Vertices multiplied by 360°. Finite	Finite minus De-Finite
Line	2	0° × 1 = 0°	0° ×2 0°	360° ×2 720°	720° −0 720°
 Triangle	3	60° × 2 = 120°	120° 3 360°	360° 3 1080°	1080° 360 720°
 Tetrahedron	4	60° × 3 = 180°	180° 4 720°	360° 4 1440°	1440° 720 720°
 Octa	6	60° × 4 = 240°	240° 6 1440°	360° 6 2160°	2160° 1440 720°
 Cube	8	90° × 3 = 270°	270° 8 2160°	360° 8 2880°	2880° 2160 720°
 Icosahedron	12	60° × 5 = 300°	300° 12 3600°	360° 12 4320°	4320° 3600 720°
 Dodeca-hedron	20	108° × 3 = 324°	324° 20 6480°	360° 20 7200°	7200° 6480 720°
 Vector Equilibrium	12	90° × 2 = 180° 60° × 2 = 120° 300°	300° 12 3600°	360° 12 4320°	4320° 3600 720°

Table 1. Angular Topology Independent of Size.

conceptual principles of abstract thought independent of physical realization.

The difference between the sum of all the angles around all the vertices of any system and the total number of the vertices times 360º (as angular unity) is 720º which equals two unities. The sum of the angles of a tetrahedron always equal 720º. The tetrahedron may be identified as the 720º differential between any definite local geometrical system (Greek solid) and finite universe.

A line has two vertices with angles around each of its vertexial ends equal to 0º. The sum of these angles is 0º. The sum of the vertices (2) times unity (360º) is 720º. The remainder of 0º from 720º is 720º or two unities, or one tetrahedron., Q.E.D..

A triangle has three vertices. The sum of the externally viewed angles around each is 120º of which 60º is on the obverse side of each vertex of the triangle; for a triangle, like a line, if it exists, is an isolatable system always having its positive and negative aspects. The angles of ob- and re-verse triangles add up to 360º. The triangle is three vertices times 360º=1080º which minus 360º (sum of triangles' angles)=720º Q. E. D.

Two triangles' external angles make one convex tetrahedron or 720º. The coincident concave tetrahedron's angles add up to 720º. The positive and negative tetrahedra always coexist +720º-720º=0º.

Four vertices equal one positive tetrahedron; therefore, one positive conceptual convex tetrahedron is +720º and the difference between it and finite universe is one-negative nonconceptual concave tetrahedron. Neither the positive nor the negative tetrahedron may occur without the other.

A zero tetrahedron is vector equilibrium, is universe.

Experience is inherently discontinuous and islanded and each special experience represents a complex of generalized principles operative in special or limited size (i.e., dimension, i.e., frequency) modulated realization.

Brower's mathematical theorem states that if any number of points on a plane are stirred around an x amount on cessation of the stirring, one of the points may be shown to have been the center point of the stirring--and never to have moved in relation to the others. In order to be "stirred," these points must have multi-dimensionality and the cluster of stirred points must have obverse and reverse sides. Therefore, the obverse-reverse sides must each have visible points that were the centers of the stirring and, short though the distance between the obverse-reverse surface neutral center points, the short line between the obverse-reverse visible central points' obverse-reverse poles constitutes a neutral axis of the system of points and isolates two points for axial function-ing in every layer of both polar zones of every point system swarm. Pauli's exclusion principle verifies that each of the stirred points in Brower's theorem and the point which did not move have their inherently separate counter part points which discloses both the neutral axis formed by the two points that do not move and the obverse and reverse sets of moving points. Thus, we discover that even a "points" angular topological difference between its definiteness and finiteness is 720º.

There is no phenomenon "solid matter"; therefore there may not be a "solid" sphere, nor a "solid" surface sphere. All spheres consist of a high frequency constellation of event-points, all of which are approximately equidistant from one central event

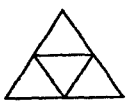
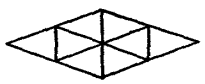
Tetrahedron	$720°$	$\frac{720°}{720°} = 1$ tetrahedron
Octahedron	$240° \times 6 = 1440°$	$\frac{1440°}{720°} = 2$ tetrahedra
Prism	$240° \times 6 = 1440°$	$\frac{1440°}{720°} = 2$ tetrahedra
Cube	$270° \times 8 = 2160°$	$\frac{2160°}{720°} = 3$ tetrahedra
Icosahedron	$300° \times 12 = 3600°$	$\frac{3600°}{720°} = 5$ tetrahedra
Rhombic Dodecahedron	$109°28' \times 24 = 2628°$ $70°32' \times 24 = 1692°$ $2628° \times 1692° = 4320°$	$\frac{4320°}{720°} = 6$ tetrahedra
Dodecahedron	$324° \times 20 = 6480°$	$\frac{6480°}{720°} = 9$ tetrahedra
Triacontahedron	$180° \times 60 = 10{,}800°$	$\frac{10{,}800°}{720°} = 15$ tetrahedra
 **Two Frequency Regular Geodesic**	$180° \times 80 = 14{,}400°$	$\frac{14{,}400°}{720°} = 20$ tetrahedra $= 5 \times 2^2$
Three Frequency Alternate Geodesic	$20° \times 9 = 180°$ $180° \times 180 = 32{,}400°$	$\frac{32{,}400°}{720°} = 45$ tetrahedra $= 5 \times 3^2$
 **Four Frequency Triacon Geodesic**	$180° \times 240 = 43{,}200°$	$\frac{43{,}200°}{720°} = 60$ tetrahedra $= 15 \times 2^2$

Table 2. Tetrahedronal Mensuration applied to Well-Known Polyhedra. We discover that the sum of the angles around all vertices of all solids is evenly divisible by the sum of the angles of a tetrahedron. The volumes of all solids may be expressed in tetrahedra.

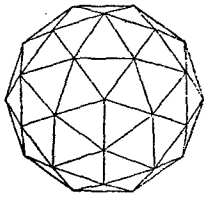
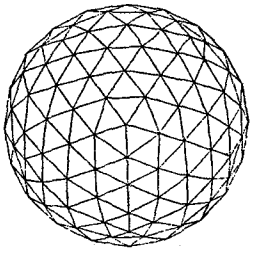
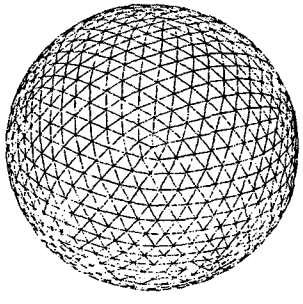
	Number of Vertices Multiplied by 360°	*Number of Triangles Multiplied by 180° Equals Sum of Angles around All Vertices*	*Difference*
 **Regular Geodesic Two-Frequency Icosahedron**	$42 \times 360° = 15{,}120°$	$80 \times 180° = 14{,}400°$	$15{,}120° - 14{,}400° = 720° =$ 1 tetrahedron
 **Regular Geodesic Four-Frequency Icosahedron**	$162 \times 360° = 58{,}320°$	$320 \times 180° = 57{,}600°$	$58{,}320° - 57{,}600° = 720° =$ 1 tetrahedron
 **Regular Geodesic Nine-Frequency Icosahedron**	$812 \times 360° = 292{,}320°$	$1620 \times 180° = 291{,}600°$	$292{,}320° - 291{,}600° = 720° =$ 1 tetrahedron

Table 3. Tetrahedronal Mensuration applied to Spheres.

"point." All the points in the surface of a sphere may be interconnected. If most economically interconnected, they will subdivide the surface of the sphere into an omnitriangulated spherical web matrix. As the frequency of triangular subdivision of a spherical constellation of omnitriangulated points approaches subvisibility the difference between the sums of the angles around all the vertex points and the numbers of vertices when multiplied by 360° remains constantly 720° which is the sum of the angles of two times unity (of 360°). The sum of the angles of a tetrahedron, regular or irregular, is always 720°, just as the sum of the angles of a planar triangle is always 180°. We may state two laws which say: (1) the sum of the surface angles of any polyhedron equals V^n multiplied by 360 minus one tetrahedron; (2) the sum of the angles of any polyhedron (including a sphere) is always evenly divisible by one tetrahedron. We may also say that: Where unity (1) equals 360°, 180° equals one-half unity (1/2) and that 720° equals two times unity (2); therefore, we may identify a triangle as one-half unity and a tetrahedron as two unities (1/2), (2).

The calculus assumes that a plane is infinitesimally congruent with the surface of a sphere at the point of the plane's tangency of the sphere. The calculus and the spherical trigonometry therefore also assumes that the sums of the angles around any point of any sphere are always 360°. The demonstration thus far made discloses that the sums of the angles around all the vertices of a sphere will always be 720° or one tetrahedron less than the sum of the vertices times 360°, ergo, one basic assumption of the calculus is invalid.

In review, this chapter shows that the phenomenon "infinity" of the calculus is inherently finite. Universe equals the aggregate of men's consciously apprehended and communicated experiences. By my definition, universe is nonsimultaneous but finite because all experiences begin and end and being terminal are finite; ergo, universe as the sum of finites is finite. The first subdivision of nonsimultaneous universe is effected by a local system which divides the universe into three finite parts: the portion of universe outside, the portion of the universe inside, and the system. We find local spherical systems of universe are definite rather than infinite as presupposed by the calculus' erroneous assumption of 360 degreeness of surface plane azimuth around every point on a sphere. Nonsimultaneous universe is finite but conceptually undefinable; local systems are definable. We discover that universe is finite and a local system is definite and the definite local system plus one tetrahedron (or two unities) equal finite universe. The difference between universe and any local system is always one tetrahedron. Every local system may be subdivided into whole tetrahedra.

If we combine, first, the fact of Van't Hoff's discovery that all the organic chemical compounds are structurally cohered in the terms of the tetrahedra's four vertexes and, secondly, the fact of Linus Pauling's X-ray defraction implemented discovery that all the metallic elements thus far experimentally analyzed combine in non-vertexially interlinked tetrahedronal structures and, thirdly, the facts which I have disclosed in this and the preceding pages we may well conclude that it is reasonable to adopt the working assumption that: all of the definable structuring of universe is tetrahedronally co-ordinate in rational number increments of the tetrahedron.

Finite minus de-finite means two tetrahedra minus one tetrahedron. Finite universe equals four cyclic unities. Each tetrahedron equals two; therefore, finite (4) minus conceptual definite (2) equals two, which constitutes one negative invisible tetrahedron.

Reviewing again, this halo conceptioning discloses the minute yet finitely

discreet inaccuracy of the fundamental assumption upon which the calculus was built; to wit, that for an infinitesimal moment a line is congruent with the circle to which it is tangent and that a plane is Congruent to the sphere to which it is tangent. Calculus had assumed 360º around every point on a sphere. The sum of a sphere's angles was said to be infinite. The Halo concept and its angularly generated topology proves that there are always 720º or two times unity of 360º less than the calculus assumption of 360º times every point in every "spherical" system. This 720º equals the sum of the angles of a tetrahedron. We can state that the number of vertices of any system (including a "sphere" which must, geodesically, in universal energy conservation, be a polyhedron of N vertices) minus two times 360º equals the sum of the angles around all the vertices of the system. Two times 360º which was the amount subtracted, equals 720º, which is the angular description of the tetrahedron. The spherical error of calculus is one discreet tetrahedron. We have to take angular "tucks" in the nonconceptual finity (the calculus infinity) to make a local definite system (the calculus finity). The "tucks" add up to 720º, i. e., one tetrahedron. The difference between conceptual definity and non-conceptual finity is one nonconceptual finite tetrahedron.

In the general theory of variables it has been recognized that the set of all the variables may be divided into two classes – (1) the class of all the inclusive variables within a given system and (2) the class of all those operative exclusive of the system. It has been further recognized that the variables outside the system may affect the system from outside. In varying degrees specific levels of sub-classes of these "background" or outside variables are identified as parameters. This background "inside and outside" concept is a two dimensional or flat-projection concept.

Our omnioriented Halo concept converts the parameter consideration to conceptual four dimensionality and discloses a set of parameters inside as well as outside the zone of lucidly considered system stars. And the parameters are at minimum four-fold: [1] the convex twilight zone of inward relevancy, f2] the concave twilight zone of outward relevancy, [3] the stark nonconceptual irrelevancy inward, and [4] the stark nonconceptual irrelevancy outward. Parameter [1] is a tetrahedron. Parameter [2] is a tetrahedron. Parameter [3] plus parameter [4] comprise an invisible tetrahedron.

The considered relevancy within the zone of lucidity consists of one more tetrahedron. For each "considered tetrahedron" there are three parameteric tetrahedra. We discover that our omni-halo epistomological accounting consists of rational tetrahedronal quantation.

When we missed the moon in our first attempt to shoot a rocket to it, the tetrahedronal tuck in universe may have represented that discreet error. It was directly relatable to our lack of awareness of the disparity of the calculus. This disparity is corollary to the same mathematical disparity that was physically discovered in atomic behavior, which brought its discoverer's the 1957 Nobel prize and which discovery in-validated "physics" long held "law of conservation of parity" which held the obverse and reverse to be identical, ergo, redundant. A further corollary to the tetrahedronal disparity of systems invalidates the functioning significance of the transcendental irrational constant Pi. The comprehension of this mild error and implementation of the mathematical strategy of nature's co-ordinate system which I have disclosed and named Energetic/Synergetic Geometry may greatly improve the extra-terrestrial undertakings whose effectiveness has not been frustrated so much by inadequate energy supply as by inadequacy of fundamental mathematical conceptioning and its resultant technical incapability. Our computer instrumentation is phenomenally good, but our problem stating and question asking have been inadequate.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Dymaxion Hierarchy of Vector Generated Field-, Volume-, Mass-, Charge-, Potential of Geometric Forms, i.e. Potentials of Basic Energetic Transformations (Where 3-fold axii and 4-fold axii rotate on 6 axii)	*With energy potential in equilibrium dymaxion vector* $= 2^6\sqrt{9/8}$ $= 2 \times 1.019825$ $= 2.039651 = V$ Volume =	*480 × Col. 1. Where 'A' particle = 480 makes rational whole subparticle fractionation by interaction of planes of 25 great circles*	*Where edges of cube and all other planar bound forms = 2 as per common Greek 3 Dimension. 'Coord'. System 'regular solids'. Euclidian platonic*	*Where edges of cube and all other planar bound forms = 2 as per common Greek 3 Dimension. 'Coord'. System 'regular solids'*	*Edges of tet, octa, icosa, dymax, rombid, dodeca, tetraxidec, all = 2. but diagonal of cube and rombidec '2' = 2, radius of spheres = 2, or arc of spheres = 2 as marked*	*Special formula*	*Ratios*	
'A' PARTICLE 1/6 of 1/4 of regular Tet. 1/6 of Tet. formed on 4 faces of regular Tet. with apex at C. at G. of Tet.	$1/2V$ = edge (outer) .0416666.. = 1/24 of unity	Rational						
ICOSACENTET Each of 20 tets. Formed on 20 faces of Icosa with apex at C. of G. of Icosa.	V = outer edge .9255		.10908	.8726	.8726			
TETRAHEDRON (Regular Tet.) 4 equal triangular faces.	V = edge 1.0000	< Rational 11.52000	.1179	.9432	.9428	$\frac{\left(\sqrt{\frac{V^2}{2}}\right)^3}{3}$		
CUBE (1) Edge of Cube $3\sqrt{3} = 1.4422$. Cube = Tet. + 4 (1/8 Octa) on its faces fills all space. If edge of Cube = V, Vol. = 8.4904	V = diagonal face 3.0000	< Rational	1.0000	8.0000	2.828428	$Vol = \left(\sqrt{\frac{V^2}{2}}\right)^3$		
OCTAHEDRON (Regular Octa) 8 equal triangular faces.	V = edge 4.0000	< Rational	.4714	3.7712	3.7712			
RHOMBICDODECAHEDRON (Rombidec. 1) Fills all space. 12 equilateral rhomboid faces = Octa and 8 (1/4 Tet.). Radius Tet. = V.	V = long diag. face 6.0000	< Rational			5.6576			
CUBE (2) Where edge of Cube is Vector = 2.039651.	V = edge 8.4900..	Complementary Rational						
ICOSAHEDRON (Icosa) 20 triangular faces. Radius = 1.93909. Perpendicular from C.G. Icosa to C.G. triangular face = 1.574.	V = edge 18.5100..		2.1817	17.4536	17.4526	$\frac{20}{3}\sqrt{\frac{V^2}{2}^3}$	Vol. icosa.: icosasphere 'R' = 1: 1.61725	
DYMAXION (Dymax) 6 square and 8 triangular faces. All edges and radii identical and are identical vectors in omnidirectional equilibrium.	V = edge and radius 20.0000	< Rational	2.3574	18.8592	18.85618		Vol. dymax: dymaxisphere 'A' = 1: 1.54753, factor = 1/20 vol. dymaxisphere	dymaxion: dymaxisphere 'R' = 1.77715 Note $\sqrt{\pi} = 1.772454$
RHOMBICDODECAHEDRON (Rombidec. 2) Fills space. 12 rhomboid faces where edge = V.	V = edge 25.8960	< Rational	3.0622	24.4974	24.4974			
TETRAXIDECAHEDRON (Tetraxidec. 1) Lord Kelvin's all-space solid. 6 square, 8 hexagonal faces. Dymaxion + 1 2/3 Octa = total 1 1/3 Dymaxion.	V = edge 96.0000	< Rational						
ICOSASPHERE (A) Where arc 63° 26′ = arc edge of spherical triangle of 20 Spherical triangles of Sphere = arc = 2.039651.	V = arc 63° 26′ 27.788	Spheres			arc 63°26′ = 2 26.1989		icosasphere 'A': dymaxisphere 'A' = 1: 1.1813	
ICOSASPHERE (R) Where radius = V = 2.039651.	V = radius 30.570..				radius = 2 28.8216		icosasphere 'R': dymaxisphere 'R' = 1: 1.16268	icosasphere 'R': dymaxisphere 'A' = 1.012452
DYMAXISPHERE (A) Where arc 60° = V = 2.039651	V = arc 60° 30.950				arc 60° = 2 29.18051; radius = 1.9098	$\frac{288}{\pi} = Vol.\,SP.$ $\pi R = 6$	dymaxisphere 'A': dymaxisphere 'R' = 1.148379	

faces = Octa and 8 (1/4 Tet.). Radius Tet. = V.	6·0000							
CUBE (2) Where edge of Cube is Vector = 2·039651.	V = edge 8·4900..	Complementary Rational	2·1817	17·4536	17·4526	$\frac{20}{3}\sqrt{\frac{V^2}{2}}^3$	Vol. icosa.: icosasphere 'R' = 1: 1.61725	
ICOSAHEDRON (Icosa) 20 triangular faces. Radius = 1·93909. Perpendicular from C.G. Icosa to C.G. triangular face = 1·574.	V = edge 18·5100..							
DYMAXION (Dymax) 6 square and 8 triangular faces. All edges and radii identical and are identical vectors in omnidirectional equilibrium.	V = edge and radius 20·0000	< Rational	2·3574	18·8592	18·85618		Vol. dymax: dymaxisphere 'A' = 1: 1.54753, factor = 1/20 vol. dymaxisphere	dymaxion: dymaxisphere 'R' = 1.77715 Note $\sqrt{\pi} = 1.772454$
RHOMBICDODECAHEDRON (Rombidec. 2) Fills space. 12 rhomboid faces where edge = V.	V = edge 25·8960	< Rational	3·0622	24·4974	24·4974			
TETRAXIDECAHEDRON (Tetraxidec. 1) Lord Kelvin's all-space solid. 6 square, 8 hexagonal faces. Dymaxion + 1 2/3 Octa = total 1 1/3 Dymaxion.	V = edge 96·0000	< Rational						
ICOSASPHERE (A) Where arc 63° 26′ = arc edge of spherical triangle of 20 Spherical triangles of Sphere = arc = 2·039651.	V = arc 63° 26′ 27·788				arc 63°26′ = 2 26·1989		icosasphere 'A': dymaxisphere 'A' = 1: 1.1813	
ICOSASPHERE (R) Where radius = V = 2·039651.	V = radius 30·570..	Spheres			radius = 2 28·8216	$\frac{288}{\pi} = Vol.\ SP.$ $\pi R = 6$	icosasphere 'R': dymaxisphere 'R' = 1: 1.16268	icosasphere 'R': dymaxisphere 'A' = 1.012452
DYMAXISPHERE (A) Where arc 60° = V = 2·039651.	V = arc 60° 30·950..				arc 60° = 2 29·18051; radius = 1·9098		dymaxisphere 'A': dymaxisphere 'R' = 1.148379	
DYMAXISPHERE (R) Where arc 60° = V = 2·039651.	V = radius 35·540..				radius = 2 33·51029 arc = 2·0944			
DODECAHEDRON 12 hexagonal faces.	V = edge 65·018..	< Rational	7·6631	61·3048				
TETRAXIDECAHEDRON (Tetraxidec. 2)	V = edge 136·0000	< Rational	16·0242	128·1936				
	∧ Note that 10 out of the 13 planar bound solids are rational and 2 others are com-complimentary rational		∧ Of above only cube is rational	∧ Of above only cube is rational	∧ Of above none is rational To convert above solids to values in column 1 multiply by 1.06066 = $\sqrt{9/8}$			

NOTE: It may readily be seen from above why the preoccupation of mathematicians and laymen alike with the 3-dimensional coordinate system and its 'cube' has obscured the existence of the rational dymaxion hierarchy and why it would most naturally be discovered only by the pursuit of the concept of vectorial—omnidirectional equilibrium.

$\sqrt[26]{9/8}$ = dymaxion vector constant

$1/2V = 1.0198255$
$(1/2V)^3 = 1.0400440504$
$(1/2V)^3 = 1.0606605$
$(1/2V)^6 = 1.12500000$
$= 1\ 1/8$
$= 9/8$

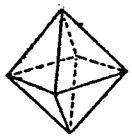
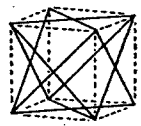
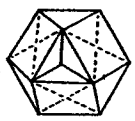
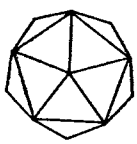
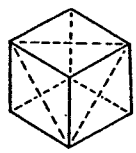
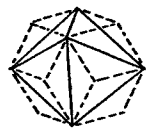
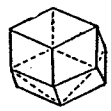
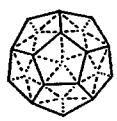
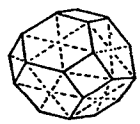
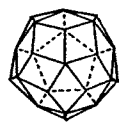
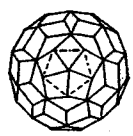
This ratio has significant implications as in natural numbe behavior as indicated by basic sphere and dymaxion an octa-tets. It is seen that number integers take octave—nin modular congruence.

1 2 3 4 5 6 7 8
o – o – o – o – o – o – o – o – o
1 2 3 4 5 6 7 8 9

Unique maxima of dymax nucleus employs above: 9 balls 8 spaces.

Table 5. Dymaxion Energetic Geometry. Copyright 1950 by R. Buckminster Fuller. Reprinted by permission of Mr. Fuller.

Synergetically Symmetric

True Rational Volumes where Tetrahedron is Unity	*Locally Symmetrical, Omni-triangulated*	*Locally Mixed Sym-asym. Omni-triangulated*	*Locally Asymmetrical, Omni-triangulated*	*Space Fillers*	*Complementary Space Fillers*	*System*
1					•	Vector Edge Tetra
4					•	Vector Edge Octa
5				•		Alternating+to−tetra Vector Diago
20						Vector Equilibrium
18.510						Vector Edge Icosahedron
27.000						
8.490				•		Vector Edge Cube
6				•		Vector Diagonal Rhombic Dodecahe
25.986				•		Vector Edge Rhombic Dodecahedro
91.004						
65.018						Vector Edge Dodecahedron
96				•		Vector Edge Tetraxidecahedron
						Vector Edge Triacontahedron
						Vector Edge Enenicontahedron

Area: Volume Ratio 1 : 1 | 1 : 2 | 1 : 4.63

Table 4. Topological Hierarchies. Copyright 1959 by R.
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System	*Euler Formula* $V+F=E+2$	*Fuller Synergetic Treatment Extracts Two Polar Vertices For Neutral Axis* $V+F=E$	*Remainder Divided by Two* $V^{NP}+F=E$	*Fuller Synergctic Treatment Divides by Fundamental withinness and withoutness, Convex—Concave Disparate Twoness* $\div 2$
			$2+4=6$	
			$\div 2$	
			$1+2=3$	
tor Edge Tetra	$4+4=6+2$		$\times 1$	
			$4+8=12$	
			$\div 2$	
tor Edge Octa	$6+8=12+2$		$2+4=6$	$\times 2$
			$6+12=18$	
			$\div 2$	
rnating+to−tetra Vector Diagonal	$8+12=18+2$		$3+6=9$	$\times 3$
			$10+20=30$	
			$\div 2$	
tor Equilibrium	$12+20=30+2$		$5+10=15$	$\times 5$
			$10+20=30$	
			$\div 2$	
tor Edge Icosahedron	$12+20=30+2$		$5+10=15$	$\times 5$
		$2V^P$	$12+24=36$	
			$\div 2$	
tor Edge Cube	$14+24=36+2$		$6+12=18$	$\times 3\times 2$
			$12+24=36$	
			$\div 2$	
tor Diagonal Rhombic Dodecahedron	$14+24=36+2$		$6+12=18$	$\times 3\times 2$
			$12+24=36$	
			$\div 2$	
tor Edge Rhombic Dodecahedron	$14+24=36+2$		$6+12=18$	$\times 3\times 2$
			$30+60=90$	
			$\div 2$	
tor Edge Dodecahedron	$32+60=90+2$		$15+30=45$	$\times 3\times 5$
			$30+60=90$	
			$\div 2$	
tor Edge Tetraxidecahedron	$32+60=90+2$		$15+30=45$	$\times 3\times 5$
			$30+60=90$	
			$\div 2$	
tor Edge Triacontahedron	$32+60=90+2$		$15+30=45$	$\times 3\times 5$
			$90+180=270$	
			$\div 2$	
tor Edge Enenicontahedron	$92+180=270+2$		$45+90=135$	$\times 3^2\times 5$

Fuller's Topological Formula for all Dynamically symetrical Omni-triangulated Polyhedra (where P=A Prime No.) (where v=Frequency)

$$v^2P\left(\frac{V^{NP}+F=E}{1+2=3}\right)+2^{P!}$$

v=Frequency of Modular Subdivision of Exterior Edges of System, Tetra, Octa, Icosa.

Multiplication of one of first four prime numbers 1, 2, 3, 5 or their powers or multiples by Topological Abundance Constant $1+2=3$

1 *Non Polar Vertex*
+
2 *Faces*
=
3 *Edges*

ierarchies. Copyright 1959 by R. Buckminster Fuller. Reprinted by Permission of Mr. Fuller.

In the inherently subjective language of physical transformation of an omniinteraltering and accelerating universe there are only two fundamental kinds of observable transformational changes, i. e., angular or sub-unity alterations and linear, or plural unity (frequency modulated) accelerations. These subjectively viewed transformations of universe are also objectively and locally controllable by man through designed angle and frequency modulations.

In the Energetic/Synergetic Geometry's isotropic, vectorially triangulated, omnidirectional matrix initiations the angular and linear accelerations are rational and uniformally modulated, whereas in the xyz co-ordinate analysis of the calculus only the linear is analyzable and the angular resultants are usually irrationally expressed.

Substituting the word tetrahedron for the number 2 completes my long attempt to convert all the residual heretofore unidentifiable integers of topology into geometrical conceptability.

By the omnidirectional star-studded Halo reasoning the development of a conceptual tetrahedron automatically charges a negative yet invisible tetrahedron into the nonsimultaneous, nonconceptual finite universe, comprehensive to the local de-finite conceptual system.

This discovery that all the differences between de-finite conceptual systems and finite, yet nonconceptual total universe seems to provide a fundamental means of identifying the physical phenomena entropy. Entropy no longer means inherent escape of energy from any local system or decrease of local order or increase to disorder. Entropy now means the invisible extraction from any local definitive system of the negative conceptual entity, i. e., one negative tetrahedron deposited into universe balance of energy conservation permitting the local extraction of any visible orderly conceptual system. Entropy is not random; it is always one negative tetrahedron. It may have a wide variety of relative size (frequency) dimensions. A tetrahedron is 720º and is an angular constancy independent of size. It is finite. It can account finitely for any discreet rate of energy loss.

In resume: By our systematic accounting of angularly definable concave-convex local systems we discover that the sum of the angles around each of every local system's geodesically interrelated vertices is always two vertexial unities less than universal nondefined finite totality. We call this discovery the law of finite universe conservation. ' Therefore, mathematically speaking, all defined conceptioning always equals finite universe minus two. The indefinable quality of finite universe-inscrutability is exactly accountable as two.

Ergo, finite-definite = 2 De (Di) = 2 de-
finite-finite = -2 (di) de = -2

This is a subtractive 2--not a devisive 2, which latter occurs as the second derivative stage of systematic zonal differentiation into the fundamentally positive and negative yet disparate and inseparable aspect characteristics of concavity and convexity.

The finiteness of universe is thus finitely proven by comprehensive geometrical system topological accounting. We have, therefore, a comprehensive universal synergetic accounting advantage in respect to all systematic experience considerations both physical and metaphysical.

The first synergetic accounting advantage of known man-history derived from the two-millenium-old discovery of the invariant sum (180°) of the angles of the obverse face of any plane linear bound triangle. The second major synergetical advantage accrued to Newton's inverse ratio law of gravity as a comprehensive astronomical accounting system. The third major synergetical accounting advantage was derived one hundred years ago from Euler's topological discovery that the numbers of vertices of polyhedra plus the number of their faces always equalled the sum of the number of the polyhedra's edges plus the number two.

The fourth major synergetical accounting advantage accrued a half century ago to the physicists' hypotheses of the law of conservation of energy which held that energy had shown experimentally that it could be neither created nor destroyed. From this assumption, which threw all scientific and nonscientific considerations, other than the energetically physical, into the then seemingly indeterminate realm of metaphysical, came the successive wave-quanta accounting theory and subsequent fission and successful nuclear components discovery and inventorying. Fifthly, Willard Gibbs' phase rule in a formula similar to Euler's in which the degrees of freedom are in effect the vectorial edges brought synergetic advantages to chemical strategy. Sixthly, the same synergetic accounting advantage is now extended by our law of nonsimultaneous finite universe pattern conservation to embrace definitive consideration of any and all experiences, physical or metaphysical. The latter strategically equatable accounting advantage derives from a corollary of synergy which shows that systematic accounting of the behavior of whole aggregates may disclose discreetly predictable angle and frequency magnitudes required of some unknown components in respect to certain known component behaviors of the total and known synergetic aggregate. Therefore, the definitive identification permitted by the law of finite universe conservation may implement conscious synergetic definition strategies with incisive prediction effectiveness, possibly of epoch initiating magnitude.

We inaugurate exploration with our theorem of omniuniverse tetrahedronal structuring. Whereas Van't Hoff showed that all inorganic chemical structuring is tetrahedronally configured in vertexial linkage and Pauling's X-ray diffraction analyses show omnitetrahedronal configuration interlinkages of gravitatiorial centers of compounded atoms in all metals analyzed our omnitetrahedronal structuring as a triple bonded linear tetrahedronal array may coincide with the DNA helix, and the tetra's four unique quanta corners may explain DNA's dichotomy transferred T, A; G, C patterning control of all biological species reproductions.

A trial balance reconsideration and interconsideration of the significance accruing to the inherent order of consciously permitted cognitions thus far inventoried as derived from our epistomological premise that universe is the aggregate of consciously observed and communicated experiences discloses an orderly succession of derivative dichotomies and synergetic surprises accruing to the grand operational review of derivative patterns.

First, we recognize that intellect took the measure of definitive energy universe because Einstein as intellect wrote $E = MC^2$. And we recognize the inherent irreversibility of that definitive capability because the concept of energy defining intellect is unthinkable. The defining of finite universe is a function of intellect synergetically manifest in universe. Subsequent to Einstein's intellect's definition of energy universe in two conceptual functions M and C^2 his definitive physical realm hypothesis of universe was proven valid by fission. With fission came empirical validation of Einstein's theretofore hypothetical equation as now energetically definitive. Because the

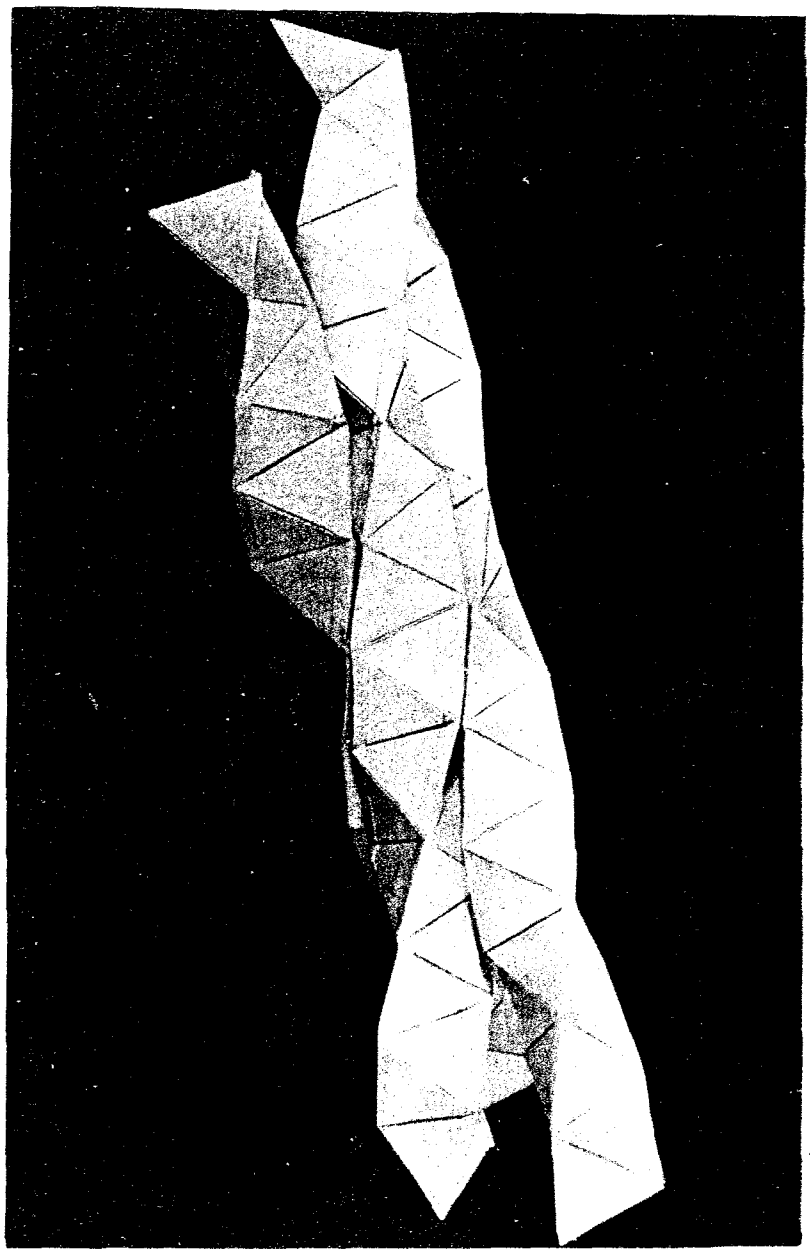


Fig. 6. Theoretical DNA. Triple tetra-helix mating.

difference between definite and finite universe is definitively two, it follows that the difference between the physical portion of universe and total universe is definitive two. Whereas all metaphysical phenomena were shuntingly disposed by the Einsteinian physicists into a then supposedly infinite universe's ephemeralization; it now comes as a surprise result of our finite-universe hypotheses that the metaphysical is as strictly definitive as the physical. Ergo the definite physical portion of universe plus the metaphysical or nondefinitive portion of universe together equal total finite universe and the metaphysical must therefore equal a nondefinitive but finite twoness.

The metaphysical which is now also contained within the comprehensive finiteness of universe is greater by two in its comprehensive magnitude than the physical portion of universe which lies inherently within the micro-macro metaphysical. And as the metaphysical embraces intellection, we may say that the nonsimultaneous all-knowledge (omniscience, or wisdom) gained by all men out of all-experience (universe) is comprehensive by a discreet margin of two to all-energy (omnipotence) whose measure omniscience took. Omniscience is greater than omnipotence and the difference is two. Omnipotence plus two equals omniscience. META = 2.

Intellections are cumulative pattern apprehensions and are synergetically integrative as wisdom and wisdom initiates new mathematical hypotheses. Mathematics implements man’s calculation within minutes regarding energy actions requiring cons of time. Man’s intellect masters energy's fastest behaviors. Energy light years are calculated in intellect seconds. Omniscience is evidently of comprehensively transcendental alacrity to the speed of light whose relatively slow articulations in universe are readily anticipated by intellectually initiated and disciplined computation of mind.

There is a question-asking-possibility that omniscience may be transcendental in velocity to the definitive physical speed of energy omnipotence. The synergetic anticipatory capabilities of intellect (in respect to conceptual formulations of evolutionary transforming potentials of universe and the anticipatory stratagems evolved by intellect to test such hypotheses) imply the possibility of a velocity transcendence of omniscient functioning over omnipotence functioning which could mean an intellectually regenerated evolutionary extension of universe in generalized synergetical integrity. Intellect's comprehensive anticipatory objectivities indicate a speed of functioning transcendental to physical events. Intellect may be "creating" finitely extending and refining universe as it asks each next good question.

PROFILE OF THE INDUSTRIAL REVOLUTION

As exposed by the Chronological Rate
of Acquisition of the Basic Inventory of
Cosmic Absolutes--The 92 Elements.

This chart is described in my Saturday Review article. It is a curve of acceleration reliably portraying the fundamental rate of impingement of science and technology upon man, as referenced to regular calendar clock time. Lists of historical inventions and discoveries are formless because they are inherently open-ended, i. e., infinite. There is one closed or finite family of pure scientific events. It is the history of the isolation by man of the ninety-two regenerative chemical elements. Membership in this family of prime universe patternings requires a "credit card" identification of specific and uniquely consecutive matching electron-proton numbers. The family must consist of a11 ninety-two unique sets from one to ninety-two electron-proton counts inclusive, and none other. That is the curve herewith presented. To it has been added the curve of the rate of isolation of the, thus far, subsequently isolated, non-self-regenerative chemical elements beyond ninety-two. These elements of negative universe are shown for comparison only.

The chart covers 800 years. It runs from 1200 A. D. to 2000 A. D. Nine chemical elements (see list at lower left corner of chart) were already known to and isolated by man when recorded history dawns. The first known isolation of a chemical element was that of arsenic in 1200 A. D. in Italy. There is a 200-year lag to the next isolation--antimony--then another 200-year interval to phosphorus, then only a half-century gap to cobalt, whereafter, the list takes "off" averaging a climbing rate of one isolation every two years.

The swiftly rising curve is not smooth. There are three distinct slow-down "shoulders." These are occasioned by periods of universal warring. Pure science activity, which these isolations represent most truly is frustrated altogether by the atmosphere of war. Because the earlier discoveries of science are often converted to technological advantage in wartime, science has been thought, erroneously--to prosper in wartime. What prospers is applied science and production technology but not pure science, not basic thinking.

It is seen on this chart that 1932, popularly identified as the "depth of the depression," is, in fact, a moment of epochal success. In 1932 the last of the finite family of ninety-two regenerative chemical elements, occurring spontaneously in nature, was isolated. For the first time in known history man had in neat "know-how cans" on the "shelf" all the basic ingredients for reassembling the physical universe's basic pattern behaviors in preferred arrangements. This permits greatly increased performances per units of controlled and invested energies. It makes "possible" theretofore undreamed-of physical advantage gains to be realized for all of humanity. It is the beginning of man's consciously successful participation in the evolutionary events of nature. This conscious and scientific participation, in turn, leads swiftly to realization of physical, metabolic

success of man in universe.

After 1932 and the ninety-second isolation, there is an important, but temporary, slow-down in further isolation. Scientific man became momentarily preoccupied in taking apart the nuclei of those fundamental chemical elements. Fission and the theoretical release of the elemental energy five years later, and realistic release twelve years later, was inevitable to that ninety-second and final isolation of the full family of prime elements in ’32.

It is interesting to note that the post-uranium element isolations, starting with ninety-three, occur with extraordinary regularity. Witness the approximately straight line ascent of the post-ninety-two isolations as well as the direct correspondence of the elemental numbers with the numbers representing the successive order of isolations. This correspondence is unlike the discovery pattern theretofore occurring. For instance, isolation number ninety-seven is berkelium--element number ninety-seven, – with ninety-seven electrons and ninety-seven protons.

In the first ninety-two isolations, however, the order of isolation does not correspond to the atomic number order. The twenty-eighth isolation was zirconium--element number forty; the thirty-first isolation, beryllium was element number fourteen; the eighteenth isolation was hydrogen, which was element number one, meaning one electron and one proton and so forth. None of the atomic numbers correspond to the number in order of successive isolation within the "first family” of ninety-two elements.

The extraordinary pattern disclosed by this curve of man's acquisition of fundamental controls over the basic energy patternings of nature portrays only the evolutionary rate of development of pure science. It is subjective in that it establishes only a potential use-advantage for man. Without discovered use or technical capability to use having been as yet invented by man, this pure knowledge remains only potential.

In view of this curve of development of the high fundamental potential, it is appropriate to ask ourselves:--What is the most comprehensive change in the relation-ship of man to his earth and his universe that may be realized physically by the application of this ”pure (physical) knowledge?"

Probably the most significant consequence of the application of this knowledge is man's alteration thereby of his ecological patterning in universe.

Amongst all the species of life on earth, none of them, other than man, has consciously participated in the fundamental alteration of their overall, lifetime ecological sweep-out patterning. Eels, plovers, and many other biological species unconsciously were forced to alter their total lifetimes' cumulative ecological patterning--by the comprehensive earth surface changes induced by the successive ice ages. As ice receded, cold-area-breeding types of life were forced to ever-larger annual migrations between the most favorable tropical feeding grounds and arctic breeding grounds, respectively. This was unconscious participation in the fundamental alteration of ecological patterns. The designing and building of an hydro-electric dam or development and production of an antibiotic constitutes conscious participation by man in the evolutionary pattern transforming of universe.

Up to and including, my own father's generation, men were limited essentially to motion accomplished almost exclusively by their own leg motion--mildly in-creased by horse and vehicular travel. In 1914, American man was averaging 1640 miles

per year total travel. Thirteen hundred miles were accomplished by his (integral) legs, and 340 additional miles were accomplished by his (non-integral) "vehicles." This vehicular augmentation was a motion increase of only 25 per cent. As a consequence of mass production of the equipment of mobilization during World War One, in 1919 U. S. A. man covered 1600 miles by vehicle alone--in addition to his continued 1300 miles per year walking--a total of 2900 miles per man. By 1942 U. S. A. man was averaging 4500 miles per year by vehicles plus 1300 miles per year by legs or an annual total ecological sweep-out of 5500 miles per year.

In view of the ”life expectancy tables" we find that the total miles of an average human's lifetime's mileage to-and-froing, ecological "sweep-out," up to and including my father’s lifetime, was only 30,000 miles. However, at 69 years of age, I have already covered three million miles which is one-hundred-fold the lifetime distance accomplished by humans of any previous generations. I am one of a class of several million human beings, who, in their lifetimes, have each covered three million miles or more. The class of senior airline pilots has covered several-fold my three-million-mile "sweep-out.” Astronauts equal my three-million-mile "sweep-out" every one hundred circuits of the earth, i. e., in approximately every four days of Earth orbiting. All these dramatic alterations of the ecological pattern of man have accrued directly to the inventory of Cosmic Absolutes--"canned" and put on the "potential shelf” by the pure scientists, working like bees to store the "honey" utterly unaware of the value to man of that honey or of what man will do with it.

To realize ecological pattern transformation requires that man penetrate environments theretofore intolerably hostile to his naked existence. His invention of hats and clothing first permitted man to penetrate hot and cold regions theretofore intolerable to him. Clothing represented man's first environment controlling and ecology transforming tool. When man built himself a house making possible his existence during external development of hostile conditions, it did not alter, however, his ecological patterning geographically--anymore than did his retreat into a cave. To make fundamental alteration of his ecological sweep-out, man must propel his harm immunizing, controlled environment into geographical realms of previously intolerable environmental conditions. He must propel the environment controlling device either by his own power or by his control of power systems external to and greater than his bodily power system.

In order to maintain a <u>uniform</u> measure of the magnitude of effectiveness of such (previously intolerable) hostile environment penetrations by man, I have documented man's circumnavigations of the earth--inside his succession of improved environment controlling machines, propelled by energy patterns, which, though indirectly controlled by man, are nonetheless external to and greater than his integral, metabolic energy conversion, propulsion capabilities.

As shown by little symbolic pictures along the top area of the chart, the first such circumnavigation of Earth by man was accomplished with the wooden sailing ship, which took approximately three years. About 350 years later man circumnavigated Earth in a steel steamship, taking approximately three weeks. Seventy-five years later he circumnavigated the Earth in an aluminum airplane, taking approximately three days total flying time. Thirty-five years later he circumnavigated Earth in an exotic-metal structured, rocket capsule, taking a little over an hour for each orbit cycle.

We have in the intervals between the progressive modes of circumnavigation as well as in the contractions of the successive elapsed times for the circumnavigations both a second and third power acceleration of the original velocity rate of pure science

growth as demonstrated by the prime family of ninety-two chemical element isolations. To be realistic we must now multiply this third power acceleration by a fourth coefficient. The fourth coefficient is the conceptual regeneration induced in the human mind by the concomitant visual information, circumnavigation of Earth now being accomplished by the team of Telstar satellites whose world-around relayings of the electromagnetic wave-borne T. V. communications will result in a four dimensional acceleration of man's teleologic and conscious participation in universal evolution.

The extraordinary fourth power acceleration thus to be realized by man in the distribution of technology generating information, through computers, electronics in general, and the world around information relay, will integrate the total acceleration of the rate of human ecology transformation to a fifth power progression. Within ten years anything reasonably "thinkupable" by science fiction will probably have been realized.

I know of no device as effective as this chart to generate comprehension of the unprecendented rate of experience acceleration into which man has now entered.

Along the bottom of the chart the numbers 150, 450, 1450, and 10, 000 occur in approximation of the cumulative number of key science and technology inventions realized by all men, everywhere, up to the historical dates at which those numbers are posted. I have not yet made accurate check of 1964 figures, but it is in the magnitude of millions. It can only be measured effectively at a later date.

1290 1310 1330 1350 1370 1390 1410 1430 1450 1470 1490 1510 1530 1550 1570 1590 1610 1630 1650 1670 1690

SAILING SHIP

EARTH ORBIT IN MAN MADE ENVIRONMENT CONTROL: PRODUCT OF SUCCESSFUL APPLICATION OF HIGH PERFORMANCE PER UNIT OF INVESTED RESOURCES

PROFILE OF THE INDUSTRIAL REVOLUTION
AS EXPOSED BY THE CHRONOLOGICAL RATE OF ACQUISITION OF THE BASIC INVENTORY OF COSMIC ABSOLUTES–THE 92 ELEMENTS

LEONARDO DA VINCI

COLUMBUS COPERNICUS

GALILEO

BOYLE

9 ELEMENTS WERE ACQUIRED BY CIVILIZATION PRIOR TO HISTORIC RECORD OF THE EVENTS, PROBABLY IN ASIA MILLENIUMS AGO

CARBON	#6	C
LEAD	#82	Pb
TIN	#50	Sn
MERCURY	#80	Hg
SILVER	#47	Ag
COPPER	#29	Cu
SULPHUR	#16	S
GOLD	#79	Au
IRON	#26	Fe

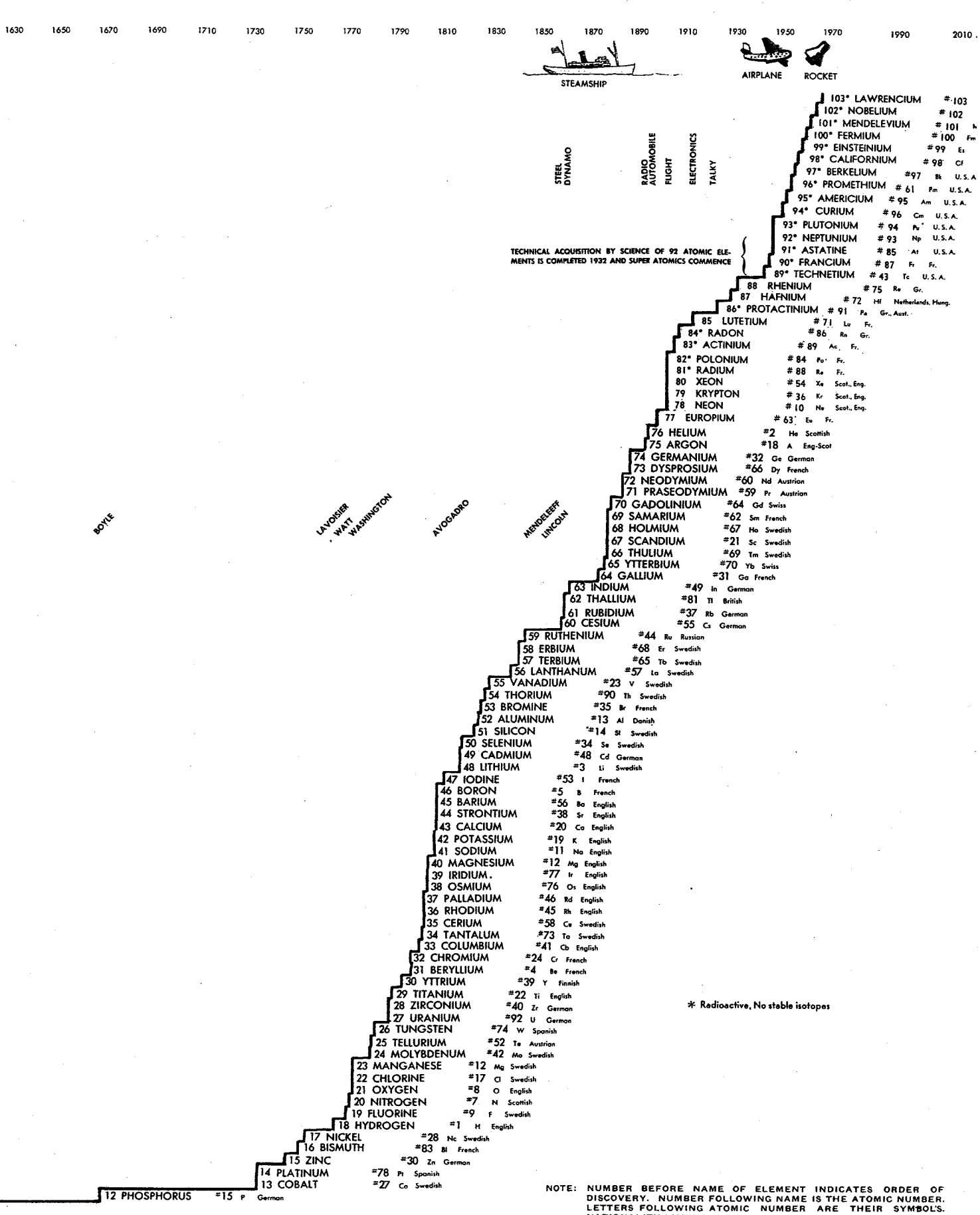
C #33 As (First recorded discovery) Bavarian

11 ANTIMONY #51 Sb German

12 PHOSPHO

APPROXIMATE CUMULATIVE TOTAL OF KEY INVEN

1290 1310 1330 1350 1370 1390 1410 1430 1450 1470 1490 1510 1530 1550 1570 1590 1610 1630 1650 1670 1690


1630 1650 1670 1690 1710 1730 1750 1770 1790 1810 1830 1850 1870 1890 1910 1930 1950 1970 1990 2010
STEAMSHIP
AIRPLANE
ROCKET
STEEL DYNAMO
RADIO AUTOMOBILE FLIGHT
ELECTRONICS TALKY
BOYLE
LAVOISIER WATT WASHINGTON
AVOGADRO
MENDELEEFF LINCOLN
TECHNICAL ACQUISITION BY SCIENCE OF 92 ATOMIC ELEMENTS IS COMPLETED 1932 AND SUPER ATOMICS COMMENCE
103* LAWRENCIUM #103
102* NOBELIUM #102
101* MENDELEVIUM #101
100* FERMIUM #100 Fm
99* EINSTEINIUM #99 Es
98* CALIFORNIUM #98 Cf
97* BERKELIUM #97 Bk U.S.A
96* PROMETHIUM #61 Pm U.S.A.
95* AMERICIUM #95 Am U.S.A.
94* CURIUM #96 Cm U.S.A.
93* PLUTONIUM #94 Pu U.S.A.
92* NEPTUNIUM #93 Np U.S.A.
91* ASTATINE #85 At U.S.A.
90* FRANCIUM #87 Fr Fr.
89* TECHNETIUM #43 Tc U.S.A.
88 RHENIUM #75 Re Gr.
87 HAFNIUM #72 Hf Netherlands, Hung.
86* PROTACTINIUM #91 Pa Gr., Aust.
85 LUTETIUM #71 Lu Fr.
84* RADON #86 Rn Gr.
83* ACTINIUM #89 Ac Fr.
82* POLONIUM #84 Po Fr.
81* RADIUM #88 Ra Fr.
80 XEON #54 Xe Scot., Eng.
79 KRYPTON #36 Kr Scot., Eng.
78 NEON #10 Ne Scot., Eng.
77 EUROPIUM #63 Eu Fr.
76 HELIUM #2 He Scottish
75 ARGON #18 A Eng-Scot
74 GERMANIUM #32 Ge German
73 DYSPROSIUM #66 Dy French
72 NEODYMIUM #60 Nd Austrian
71 PRASEODYMIUM #59 Pr Austrian
70 GADOLINIUM #64 Gd Swiss
69 SAMARIUM #62 Sm French
68 HOLMIUM #67 Ho Swedish
67 SCANDIUM #21 Sc Swedish
66 THULIUM #69 Tm Swedish
65 YTTERBIUM #70 Yb Swiss
64 GALLIUM #31 Ga French
63 INDIUM #49 In German
62 THALLIUM #81 Tl British
61 RUBIDIUM #37 Rb German
60 CESIUM #55 Cs German
59 RUTHENIUM #44 Ru Russian
58 ERBIUM #68 Er Swedish
57 TERBIUM #65 Tb Swedish
56 LANTHANUM #57 La Swedish
55 VANADIUM #23 V Swedish
54 THORIUM #90 Th Swedish
53 BROMINE #35 Br French
52 ALUMINUM #13 Al Danish
51 SILICON #14 Si Swedish
50 SELENIUM #34 Se Swedish
49 CADMIUM #48 Cd German
48 LITHIUM #3 Li Swedish
47 IODINE #53 I French
46 BORON #5 B French
45 BARIUM #56 Ba English
44 STRONTIUM #38 Sr English
43 CALCIUM #20 Ca English
42 POTASSIUM #19 K English
41 SODIUM #11 Na English
40 MAGNESIUM #12 Mg English
39 IRIDIUM. #77 Ir English
38 OSMIUM #76 Os English
37 PALLADIUM #46 Rd English
36 RHODIUM #45 Rh English
35 CERIUM #58 Ce Swedish
34 TANTALUM #73 Ta Swedish
33 COLUMBIUM #41 Cb English
32 CHROMIUM #24 Cr French
31 BERYLLIUM #4 Be French
30 YTTRIUM #39 Y Finnish
29 TITANIUM #22 Ti English
28 ZIRCONIUM #40 Zr German
27 URANIUM #92 U German
26 TUNGSTEN #74 W Spanish
25 TELLURIUM #52 Te Austrian
24 MOLYBDENUM #42 Mo Swedish
23 MANGANESE #12 Mg Swedish
22 CHLORINE #17 Cl Swedish
21 OXYGEN #8 O English
20 NITROGEN #7 N Scottish
19 FLUORINE #9 F Swedish
18 HYDROGEN #1 H English
17 NICKEL #28 Nc Swedish
16 BISMUTH #83 Bi French
15 ZINC #30 Zn German
14 PLATINUM #78 Pt Spanish
13 COBALT #27 Co Swedish
12 PHOSPHORUS #15 P German
* Radioactive, No stable isotopes
NOTE: NUMBER BEFORE NAME OF ELEMENT INDICATES ORDER OF DISCOVERY. NUMBER FOLLOWING NAME IS THE ATOMIC NUMBER. LETTERS FOLLOWING ATOMIC NUMBER ARE THEIR SYMBOL'S. NATIONALITY LISTING IS THAT OF DISCOVERER.
XIMATE CUMULATIVE TOTAL OF KEY INVENTIONS OF SCIENCE AND TECHNOLOGY
450
1,450
10,000
1630 1650 1670 1690 1710 1730 1750 1770 1790 1810 1830 1850 1870 1890 1910 1930 1950 1970 A.D.

30

VENUS PROXIMITY DAY

One of my working assumptions which has proven successful so often as seemingly to qualify it as a reliable tenet is that "A problem adequately stated is a problem solved theoretically and immediately, and therefore subsequently to be solved, realistically." Others have probably stated the principle in many ways. The assumption is that the inevitability of a solution's realization is inherent in the interaction of human intellect and the constantly transformative evolution of physical universe. At first the, only subconsciously apprehended, approaching confluences of complex events make themselves known intuitively within the intellectual weather. Then comes a gradually awakening consciousness of the presence of new families of differentiating-out challenging concepts of every day prominence. It is with these randomly patterning families of separate concepts that evolution is about to deal integratively. As a now specific unitary problem it may be disposed of effectively when and if that unified problem becomes "adequately stated" and thereby comprehensibly solvable.

Assuming that my tenet is valid I am going to put on view statements of a number of once-seemingly isolated historical world events and conditions which my particular set of experiences teach me to recognize as, now being all in swift confluence soon to become popularly recognized, the world around, as constituting a unitary, contemporary problem the grand solution for which should become implicit in my statements.

This day--December 14, 1962, --witnesses the extraordinary event of an Earthian information gathering and radio reporting satellite coming for the first time into intimate reporting range of Venus, earth's nearest planet neighbor. This first solar system planetary reconnaissance event precipitates an awareness of how little we know about how man may successfully occupy earth and brings me to vigorous re-attack upon that most important problem of man in universe. If he can't make a success of life on earth he also may be unable to make himself a success anywhere else in the universe.

That realization brings us to scrutinize the few instances of men making a professional success of their meagerly conscious participation in the evolutionary events of universe as contactingly experienced around the surface of earth. In an ecology, generated by a conglomeration of obsolete yesterdays' conditioned reflexes, somewhat analogous to that of the barnacles, crabs, sea urchins, star fish and snails living around the bottom of the water ocean mantle of earth man now exists defensively around the bottom of the air ocean mantle of earth, but with one important difference. Whereas the barnacles and other water ocean denizen's large predatory enemies as yet exist and menace them, warranting their protective shells, and spiked armor, man has largely migrated from the jungle and has disturbed the "balance of nature" with his extra-corporeal artifacts to such an extent that practically all of his biological enemies, physically larger than he, have been exterminated or isolated and many of his biological enemies smaller than he, including many that are invisibly small, have been neutralized and his age old environmental-circumstance-enemy of metabolic sustenance want has been potentially vanquished wherefore his only residual enemies of note are the invisibly large unpredicted geophysical events of cataclysmic magnitude and his most prominently and almost continuously present enemy, himself.

The most competent class of professionals at present on earth are the medical scientists. In saying this I refer to the medical scientists themselves who are not to be confused with the incorporated political lobby professionals who have sprung up in this era of massive governments and massive corporations to exploit the unworldly vulnerability needs of various categories of preoccupied specialists. Typical are the doctors who have been persuaded by political lobby professionals to allow themselves to be organized, man-aged and represented by a large secretariat operating as The American Medical Association. Every group of graduate school professionals has its small percentage of keen but less adept practicing members who make more effective politicians than doctors. These borderline professionals are readily persuaded to "sacrifice" themselves for their profession in order to play parts in the political drama written for them by the self-perpetuating secretariat professionals. The real doctors themselves do not compete economically with one another. Though there has always been more work for doctors to do up to now and probably will be for some time to come than their numbers will permit; if world society became so well organized and healthy that doctors might no longer be needed, nobody would be happier than the doctors.

Long ago the medicine men of earth learned, firstly, that they themselves knew perilously little about their own subject; secondly, that their clients were incapable of adequate self-diagnosis; and thirdly, that the clients usually called in the doctors when their maladies were critically advanced with possibility of successful cure deteriorated.

At first individually and later collectively the doctors resolved to cope realistically with the three lessons they had learned. To do so effectively they realized that they must deal with the problems of human health on their own terms and without waiting for the commands of their overlords or moneyed patrons to engage them in their medical work.

In order to avoid the obvious handicaps imposed by the rampant ignorance, social and religious dogma and active suspicion and superstition of the times, the doctors initiated and self-financed the foundations of medical science without recourse to outside economic aid or authority. As scientists they sought for the generalized patterns and relationships that might permeate the myriad of varieties of special case experiences and conditions characterizing the medical case histories.

As generalists the doctors worked with all humanity without consideration of race, creed, color, station, geography, political or economic status. They soon discovered that all men were akin under the skin.

With joined forces and ever widening horizons of experience the doctors made scientific studies of the patterns of symptoms and circumstances and swiftly discovered a host of invisible enemies or friends of man and the general patterning of those invisible friends' and enemies’ tactical campaign strategies. Medical scientists gradually converted their ever more frequent victories and the latter's momentum of increasing economic credit into ever more comprehensive and anticipatory medical and sanitation strategies which greatly reduced the incidence of first one and then another of both the lethal and the less dangerous maladies of men.

When the doctors had established an inventory of generalized knowledge and objective techniques appropriate to that knowledge, they entered into a second derivative phase of medicine, that of cooperative specialization. Working as a coordinate army of special case experts they were held firmly together by their prime generalized training and could cover a far vaster territory yet in greater depth of effectiveness.

All the world now knows of the phenomenal and entirely supra-political and supra-racial bias success of the comprehensive, anticipatory, design scientists in the field of medicine. But the world does not tend to comprehend or remember that the doctors were once slaves of the overlords and that the first and most important step in the great victory of medical science was that of the doctors taking the initiative and foreswearing as prime motive the gaining of wealth. Some became wealthy but only incidentally. They foreswore wealth making as prime motive not only to avoid science vitiating hypocrisy but in order to avoid relapse into economic subservience to patron masters. We can understand the doctors' age-old conditioned reflex antipathy to even a benevolent government's proposed economic prerogatives.

But for all their good work the doctors' task must be summed up as preventing man from being an organic failure on earth. This does not, however, make him a success. Since the subject of our thought on this Venus Proximity Day is of the possibility of man's helping to make man a success on earth and since this task requires more than the functioning of medical scientists, we must look for the most prominent professional function, complementary to that of the medical man, which seems also to hold highest promise for realizing man's earthly success.

The most promising function would seem to be one which could most effectively and most expeditiously design the conversion of the total physical, intellectual, and historical resources of the earth from the exclusive service of only a minority of mankind to the service of approximately 100 per cent of humanity at vastly higher standards of living and degrees of elective occupation freedoms than any men have ever known.

The function we have just described is a human ecology transforming design function. It requires an architectural scientist--a new space age breed of architect. Fulfillment of this ecological transformation requires not only the highest scientific competence but the spontaneous ability to take and self-maintain the economic and social initiative in just such a magnificently successful cooperative enterprise as that of the early medical scientists. This initiative and its responsibilities can only be fulfilled by a spontaneous world coalition of a design science inclined and self-selecting class of university graduate students under the designation architectural design scientists organ-ized to specifically and comprehensively complement the medical design scientists.

We may better understand how this may come about if we adopt the anthropologists' viewpoint and definitions; and

> firstly, we packagingly equate the total physical and chemical, corporeally integral processes of men and their nervous system intercommunicated co-ordination with the words:
>
> > Integral Metabolic Organism of Man = The Design Domain of the Medical Scientist;
>
> and secondly, we packagingly equate the total physical and chemical complex of industrialization's world around resources processing and distribution system, supported by the integrated industrial tools' world net-work and its total communication system's intercoordination with the words:
>
> > Extra-Corporeal Metabolic Organism of Man = The Design Domain of the Architectural Scientist.

Considering how logically the above-stated responsibilities meet their

respectively differentiated internal and external organic functionings of man, one may well wonder why it is that the architect does not now hold the prime design initiative and is not at present functioning in the obviously desirable enterprise role of the architectural scientist concerned with establishment of a scientifically designed adaptation of the extra-corporeal metabolic organisms of man to provide highest man advantage in the constantly evoluting environment.

The first answer is that the architects are still functioning as economic and social slaves, as did the doctors before the latter long ago pulled themselves out of their serfdom by seizing the prime design initiative in respect to establishment of a scientifically designed adaptation of the integral metabolic organisms of man to provide highest man advantage in the constantly evoluting environment.

The second answer is that the active function of comprehensive designing of the extra-corporeal metabolic organisms of man (to adjust man to the constantly evoluting environment) which might have been served by an adequately self-disciplined architectural scientist was, until the end of the first third of the twentieth century, personally usurped by the physical and economic masters of men. The invisible prime designing world commerce banking masters were also the slave architects' absolute social rulers.

Prime design initiative was held in early times by the head tribesman and then by the great strong-arm, uniquely beweaponed, warrior leaders of early civilization. In most recent centuries the prime design initiative was held by the great masters of world commerce who held supra-national, invisible control over world armaments manu-facturing for both sides of international warring.

The historical chain of strong-arm and armaments masters of men conceived of progressively daring and magnificently designed grand scale strategies for controlling the physical environment modifications of their respective realms--and wishfully of their neighboring realms. At first their prime designing went into fortresses and walled domains and then into new magnitude offensive weaponry. Warrior kings ordered their court architects to detail and realize the kings' specific prime conceptioning in all matters concerning the investible physical capabilities and available resources of their realms.

As world wealth multiplied, the few early great monarchs were succeeded by larger numbers of feudal lords of ever increasing armed power. Power was decentralizing. These feudal lords continued to order their court architects to detail and realize the feudal lords' prime aggregate of conceptual designings for scheduling the effective investment of their realms' practically organizable, resource capabilities. If there was adequate surplus of time, materials, skill and labor for the architects to invest in aesthetic proportionment and surface detailings advertising the cultural majesty and religious devotion of the ruler--so much the better.

As the wealth multiplied ever faster it came to be reinvested in ventures beyond the limits of the realm and border fighting. It was invested in the building, out-.fitting, and manning of high seas enterprise ventures as a prime design conceptioning of the realm lords' ambition to exploit the secret information regarding far away riches as learned from explorers, travelers, and traders.

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1 See "Universal Requirements of a Dwelling Advantage," Architectural Design Magazine, London, England, March, 1960, pp. 101-110.

Thus, the era of world commerce and then the era of industrialization grew out of that prime designing of ships and of the ship building and operating technology as an integrated tool complex founded not on local resources but on the total known world around resources' physical, technical, cultural, and strategic.

It is of utmost importance to our understanding of the prime design initiative and its bearing on today's world problems for us to comprehend that creation and development of the ultimately world girdling high seas shipping also initiated the physical realization of world industrialization.

World industrialization was realized in the designing, producing and operating of the tool complexes with which to build ships, the building process of which ships became, many centuries earlier, the prototype of Detroit's modern moving line assembly and which end product ships themselves came to be second derivative tools whose reproductions, maintenance improvement, and world around resource integrating commerce in turn regenerated an intellect differentiated and integrated "chain redesigning action". in the industrial tools' regenerative improvement and development of world around tool integrating tool-network complexes. The latter have multiplied transformingly and have evoluted inexorably toward an ultimate, world embracing, computer instructed and automated, self-improving ecology embracing all of men's inanimate, extra corporeal organic functioning. Viewed as a whole, industrialization has developed into an extra corporeal organic man needing even more powerful scientific "doctors" than those now attending to the internal organic man.

To clarify this industrial tooling concept we must recognize that the crafts, agriculture, hunting and fishing all involved tools, but that these latter tools were all devices which could be invented (over and again) by an individual man starting nakedly in the wilderness having only his own limited experience and the local physical resources to inspire him and facilitate his invention's realization. We will speak of all those tools as "craft" tools. On the other hand we may define the tools of industrialization as all the devices which cannot be produced or operated or employed by one man and which require all the remembered experience relaying of all men, everywhere around the earth, and all of which multiple-man produced and operated and used industrial tools are interrelated and interresponsible for their progressively improving transformation.

A typical example of the industrial tool is the steamship "Queen Mary" which no one man could design, produce, operate, or use exclusively.

We may observe sum totally that the craft tools were inherently and historically the product of discontinuous, non-overlapping individual experiences all of which were local both in time and geographical resource considerations, speaking both physically and mentally; whereas the industrial tools are inherently and historically the product of continuously overlapping, cumulative, comprehensive omni-interrelated experiences of all men everywhere around the earth in all recorded time all designed to deal with the ever improving potentials of the progressively interrelated physical resources of universe.

The modern industrially produced carpenter's hammer integrally forged, alloy steel head, and (electrically insulated) handle may not be classed as a craft tool as was the easily shatterable stone head, wood fork handled hammer of eave man. The modern carpenter's hammer is an industrial tool for by definition, it cannot be produced from raw resources by one man.

By our prime definition the first industrial tool was the humanly conceived and spoken word, spoken by one man and understood by another, which invention would not have occurred except as the necessity of a plurality of men. It took at least two men to devise the first word. Man alone in the wilderness reflexes adequately without word tools. "In the beginning was the word"--might be changed to "In the beginning of industrialization was the word"--the first atmospheric wave propagating, ear diaphram receiving, physical formulation of an abstract teleologic device invented entirely by intellect's anticipatory conceptioning of its usefulness and by man's subsequent conscious (fading off into subconscious) disciplining of muscles and nerves.

In comparison to local fishing and trading vessels, the high seas' ships were such relatively large and complex vessels incorporating integral floating fortresses functions that the Leonardo da Vinci type court architects of the realm who had until then been assigned only complex dry land design problems such as that of a combined castle fortress and walled city planning or of fortresses-destroying mechanisms were now as-signed as naval architects to the secret designing and supervision of high seas ship building.

Experience soon taught that the ships were progressively improvable as they went from one country to another obtaining straighter and taller masts here and stronger and larger sails there, stronger ropes at another place and bronze for their cannons at yet another. The ships were designed for beaching out at foreign ports in order that they might be worked upon anywhere. The ships' crew included the skilled ships carpenters and riggers. Many of the great ships came in due course to circle the seas of the earth. When they finally came home at the end of a moving production line thousands of miles long, they were almost unrecognizable because of their improved parts and taller masts which made the ship a truly gallant whole. Furthermore, the ships brought home with them hold and deck cargoes of the better ship-building resources for building better ships at home. Thus, we see how ship building became the first "moving" production line--a moving production line that finally circled the earth. We also see how the ships became regeneratively self-improving.

Because of the continuous design improvement potentials of the moving line production system, as well as the importance of design lessons to be weathered at sea in storms and battles, the great court architects who had become naval architects often went off with the ships.

Thus, we have architecture dividing into two main classes: first, the naval architects who dealt at first hand with the dynamic complex tool engineering, mechanics, and structures and second, the landed architects who dealt secondarily with the static aesthetical celebration of the wealth realizations when the ships "came in. "

The naval architects went on to gain world geographical and cultural knowledge and fleet operations ability until as grand naval strategy designers, they from time to time emerge as admirals and first lords of sovereign Admiralties of the great sea-power nations.

Because of the enormous and unexpected additional drain of such extra-realm wealth investing in high seas ships and the frequent disasters which befell their venturing the old kings of their respective realms progressively lost control of their shipping enterprises, yielding them to the great new financial masters who with their (chattel mortgage protected) gold underwrote both the capital investments in ships and the, very long voyaging, mercantile ventures and their deferment of profit realizations far beyond the

seasonal cycles of the older and customary agricultural, animal husbandry, local fishing and home arts and crafts, wealth turn-over realization lags.

Though courageous and powerful sea captains and crews fought for the supremacy of the seas--the equipment and supplies and weapons with which they fought and the trade which they completed was all underwritten and gradually came to be strictly controlled by the powerful private bankers who through their loanable gold, essential to foreign trading with strangers by whom gold was most universally recognized and most easily test validated, became the world's new masters and in time took over the prime design prerogatives from the kings and powerful feudal lords. The same private bankers came thus to underwrite the fleets of many nations often of competing nations and thus found them going through secret sovereign bankruptcy proceedings taking over the world armaments and institutional industry. From this time on the great international banking masters, who made many, secondary investment, design concessions to the feudal leaders and politicians in order to have their strong feudal arms available when necessary, generated and developed the prime ecological patterning modifications of world man through their popularly invisible control of the money's underwriting of the increasingly larger capital magnitudes of the commerce and industry enterprises.

Through their increasingly invisible but increasingly powerful prime design authority educated by the integrating patterns of the many world enterprises which they underwrote and had to keep track of the finance masters ruled on how much of the precious steel so made would go into railroads, steamships, buildings, navies, and how much would go into making newer master tools again to produce larger amounts of steel. They also decreed what manner of architectural orders and aesthetics should outline and adorn both their shipping and landed building ventures. While the end results of 'the new masters' prime designing became increasingly visible in the new burgeoning of world commerce and the beginnings of landed industrialization as the shipyard and moving production line techniques crept back up the rivers and onto the land it is to be noted that the prime design authority found it increasingly expedient, in avoiding high seas or landed piracy or highjacking of their ventures, to conceal their prime design power as well as the comings and goings of their ships and their own personal identity and whereabouts and thus came to play a world-drama puppetry game in which kings and parliaments were their puppets. But it was essential to the success of their game that the kings and parliaments remained seemingly sovereign to the world's respective individual nation's populaces. The more invisible the new masters became the more powerful they found themselves to be while their puppets too seemed to increase their powers in the eyes of the world populace due to the real masters invisibility.

Prime designing by the international bankers was inherently supranational as well as invisible. They invested their ever self-augmenting tool and resource capabilities around the earth in such a manner as to control the exploitation at source of all the mineral wealth of earth then coming into usefulness in the tooling and instrumenting of the new industrialization's multiplyingly complex networks. ”Monopolize at the prime mineral and organic sources out of sight and out of mind of the centers of civilizing population” became one of their important strategems.

The international bankers also controlled the rates of monetary exchange which controlled the relative wages and relative standards of living of the various nations. They designed the scheme of annual payments between national economies by which they transferred their gold from vault to vault in London, Paris, or New York without allowing their gold to be jeopardized upon the pirate infested high seas.

Because those great masters of wealth had also one mortal enemy they could not deal with, death, by disease or age-failing body, they did not challenge the independent design science initiative which the medical scientists had seized, monopolized, and developed to far beyond the non-scientific comprehension of the bankers. The doctors alone knew how to stay the bankers' deaths or to give the bankers health with which to enjoy the riches and power they had won. But the old masters kept the landed architects and engineers functioning in their traditional capacities to do their bidding in detailing and realizing the differentiated out and unavoidably obvious parts of the great commercial masters' ever vaster overall designs.

To implement their supra-town, city, state, and nationally patterned system's controls the G. P. D. W. M. s, i. e., the Great Prime Designing World Masters, needed lawyer confidants whom they could trust as legal design detailers to cope with the complexities of world around customs and laws. Thus it happened that the G. P. D. W. M. s came to finance the building and maintenance and progressive expansion of universities, first giving special, extended, graduate educational advantages to lawyers and medical men. Later on the G. P. D. W. M. s confronted with burgeoning wealth management complexities, came to need super clerks--presidents and vice presidents they called these puppets--to run their increasingly gigantic establishments wherefore the bankers next underwrote graduate schools of business administration.

By the great financiers' deeds of gift stipulations all the brightest students were pushed or lured into graduate fields of specialization because the old masters, understanding better than any the power of divide-and-conquer tactics, went in for anticipator divide and conquer effected through early interception and diversion into specialization of any bright young men who might otherwise rise to challenge the great masters' supreme world designing authority. Such young bright ones would be detected at an early age and sent in the direction of highbred specialization that would guarantee their "minding their own business." Such specialization would divert their curiosity and possible comprehension of the bankers' comprehensive, complex, and obscurely phrased controls of world enterprise designing strategy. And the few bright ones who did not get caught in their specialization traps and did in due course catch on to their vast game were invited to become partners of the G. P. D. W. M. s. One of the offspring of the old masters once said to me, "Bucky, I am very fond of you and I must tell you frankly you will never be a success. You go around trying to simplify things when the first law of success is 'Never make things simple when you can make them complicated. '" All unexpectedly these old international banking masters of the world, who for a moment thought they had won the war, lost their earth-embracing controls as of World War One because of the inadequacy of their total supply of loanable gold, even when augmented by silver to match the newer and astronomically multiplying magnitudes of capital requirements for completion of the war effort in the U. S. A. and for the fabulous post-war scale of expanding industrial tooling and weaponry enterprises.

The finance masters sensing an historical reorientation of the fundamental meaning of wealth (due to the development of industrialization which was founded on man's progressive intellectual apprehension and mastery of energy, in its associative and dissociative states of matter and radiation, respectively) had foreseen the possibility of a shifting of the base of wealth from gold to energy and had been gradually shifting their fundamental controls over to control of the industrial energy supply which they also had hoped to monopolize through ownership and control of all the world's central power stations of electrical generation from coal and ownership of transmission lines and rights of way of that power as it passed over their monopolized wire conductors.

The old masters were greatly shaken however by the sudden emergence of petroleum as a far more fluid prime energy source than coal and the development of internal combustion engines fed by the flowing petroleum products all of which tended to swift decentralization of physical power control which of course vitiated their carefully developed power plans in important degree. While the masters of the new petroleum empires which soon arose have at times come close to taking over the old banking masters' comprehensive world prime designing controls the world scene growth of the great new communist power concurrent with the growth of the petroleum empires split world dominance in a prime economic dichotomy and further tended to sub-split the petroleum power itself into a plurality of gigantic but nonetheless internationally competitive secondary power groups. In the same way the communist empire tended and as yet tends to split into competitive sub-empires, at first bolsheviks, mensheviks, white and red, now into orthodox and revisionist, etc.

It is also worth digressing to mention briefly that in 1953, a third of a century after the world finance capitalists were gone, an attempt was made by a new and scientifically educated generation of would be world mastering (investment securities sales underwriting) bankers to re-establish prime world control by a bold but unsuccessful attempt to persuade democracies' leaders to hand over democracy's politically articulated checks and balances (almost subconsciously yet very firmly) rejected the subterfuge.

There was a far more fundamental reason, however, than the inadequacy of gold which brought about the pre-World War I banking masters' loss of terrestrial economic control. The far more fundamental reason was that 99 per cent of the variable factors, entering into control of all physical, industrial, and weaponry enterprise as of World War I and immediately subsequent years, had vanished from the sensorial ranges of the electro-magnetic frequency spectrum into the vastness of the infra and ultra sensorial physical-universe frequencies ranges of quantum physics, chemistry, and pure mathematic s.

As technology went from wire to wireless, from track to trackless and from visible to invisible controls in general, the old banking masters' nonscientifically disciplined brains could not comprehend what was going on in the myriad of scientific specializations' invisible advances.

Paradoxically it is to be remembered that in underwriting the new graduate schools of the universities the bankers themselves had shortsightedly invented, designed, and underwritten this sgecializations development. Bitter as it must have been to them to realize that they had organized their own undoing the bankers thus became impotent in the prime design function of conceiving the evolutionary prime designs and comprehensive systems, potentially to be realized from the new harvest of scientific specialization events. The lawyers, most of whom became specialists but a few of whom the great masters had allowed to become partial comprehensivists, to take seats by their masters' sides in the formulation and implementation of their grand strategy designs, likewise lacked adequate specialized scientific disciplines necessary to understand and break up the "log jams" of invisible scientific potentials.

In. 1929 the old masters died. The wheels of industry and commerce stopped. The world's people asked their political leaders to get them going again.

The people asked their political leaders to get the wheels going because the world's people never having known of the invisible grand masters believed that their

political state heads, whom the grand masters invisibly manipulated, were the real comprehensive grand masters. The political leaders who had played their parts well looked secretly to their old masters for instruction on how to get the wheels going again and found that the old masters had disappeared they knew not where. Having waited as long as they dared for the reappearance of their old invisibly operating masters, who failed to show up, the world's major nations' respective political leaders took over. There was nothing else that they could do.

The politicians who had far less scientific competence than the old masters but who realized that protracted control of their newly realized power could only be maintained by the man who held the gun on the backs of the men who held the guns and that the men who held the guns had by training the ability to talk with the scientists immediately passed the science potentials realizing problem over to their military establishments.

Thus the Army, Navy, and Air Force War Colleges, maintained for the post-graduate and post-world around military services' intensive studies by senior military strategists, who had been meticulously trained in comprehensive capability to hold effective liaison with the sciences, came to organize scientific procedures for comprehensive exploitation and progressive reinvestment of the inherently self-reaugmenting industry-science wealth. But the military had been trained to recognize and comprehend only the narrow weaponry "band" of potentials, within the vast generalized significance-spectrum range embracing full realization by industrialization of the new, scientific potentials, inventory.

Thus it happened that the grand comprehensive design science initiative went exclusively in the direction of bigger and bigger, faster and faster weaponry, while con-temporary political leaders not knowing that both the old masters and their entire breed were dead, as descendant political protagonists of the conventional old and familiar political systems controls of the old grand masters or of the latters' old adversaries--set out futilely to exploit the scientific potentials in weaponry intending to defend the old order against a theoretical but in fact utterly artificial enemy. This greatest nonsense of history came about, approximately as follows--

When in 1929 the old world commerce banking masters' controls went dead, a chain reaction series of bankruptcies occurred. It started at first with the farmers who had over-mortgaged their farms to buy the new post-World War I prime-mover, power decentralizing farm working machinery. The farmers over-produced with the new machinery and saw their market prices and profit margins dwindled and unable to make payments to the banks on the farm machinery purchases, the county banks foreclosed their mortgages on the farms. This was before the day of the time payments underwritten only by chattel mortgages on the machines. The chain reaction bankruptcies then closed the smaller county and town banks that had loaned on the farm mortgages and had found the foreclosed farms and buildings approximately worthless and unsaleable to a city-seeking and farm-abandoning population. Next the big western cities' banks who had discounted the notes of the smaller banks found their foreclosed properties in turn to be worthless. Finally the biggest banks in the eastern United States foreclosed on the great western cities' banks. By the time F. D. R. 's New Deal was elected three years after the 1929 crash the banks were failing at a rate of 5, 000 per day in the U. S. A.

As F.D.R. 's New Deal government took Congressionally accelerated office in view of the dire national emergency, F. D. R. decreed a national bank moratorium just as the last of the big eastern banks were about to collapse. The money was approximately all paper and it was found that the Great Bankers had nothing in the way of personal wealth

as it had always been maintained that they did have with which to pay off the depositors. It had all been a semantic and psychology build-up of never called masters' credits. Now this credit had blown its vacuum seal.

The New Deal intent upon a great deal of political and economic reform was nonetheless primarily intent upon rehabilitation of all that was economically valid in the history of the U. S. A. economy and ”our way of life. " F. D. R. did not intend, despite opposition charges to the contrary, to abandon our constitutionally established democracy and its fabulous legal continuity integrity.

What was done by the New Deal was also undertaken as far as possible on the crest of a popular democratic mandate, with the wave that provided the crest to be ridden, continually regenerated by popular re-education regarding the issues to be dealt with. F.D. R., inventing the "fireside radio chat, " was the first U. S. A. President to confide almost daily to "my friends"--who constituted the majority of the U. S. A. population, much to the pain of the most highly conditioned reflexes of the obsolete old order progeny who were inherently a minority.

It must be remembered that F. D. R. was a man of great personal wealth and had been brought up in familiarity with esoteric language of economics long ago invented by our old world banking and commerce masters to shoo off the dull ones. F. D. R. was a bright one who had escaped the specialization trap and if the crash had not come along or if he had been born earlier, he would probably have been invited to become a "Partner" of the G. P. D. W. M. s.

F. D. R. looked upon the American economy and "way of life" patterning as being possibly analogous to an obsolete and gigantic old battle ship but he also looked upon it as being a familiar ship omnisynchronized in its design with a quadrillion times a quadrillion conditioned reflexes of one hundred million American "grown-ups." He, therefore, set about to rehabilitate that familiar ship and its familiar language and appurtenances without examination of its bottom and structural theory framing. There was no time now to build a new ship of this size. Everything had stopped--"But everything" – the best efforts of the greatest administrative heads of the greatest corporations and all the admirals and generals and the previous President of the United States notwithstanding.

F. D. R. succeeded in rehabilitating the old ship and in reblowing life into its costly, hot air engine. As a consequence of that F.D.R. 's emergency decision, the American economy of today (1962) and the American "way of life" looks superficially much the way it has for 150 years. All the categories of "earning a living" have the same names. But the banker today, though he often wears the same striped pants of his pre-World War I prototype and drives up to the bank in his Cadillac is only a clerk. He will hate you if you say so but he has no vast hidden property with which he underwrites the bank's deposits. He cannot lend the bank's wealth in directions of his own discretion. He can loan its wealth only in strict accord with government written formulas so lopsided in favor of the bank that failure of the borrower automatically makes additional wealth for the bank. No risks are involved. The banks and the business executives of 1962 are all flunkies which they are beginning to realize but are not yet ready to admit publicly. The most daring degree of freedom of today's banker is that of his right to try to lure a depositor in another bank to switch his deposit over to the alluring banker’s depository.

When we examine the framing theory of the F.D. R. rehabilitated old ship, i. e., the history of the structure of the economic system of the United States, we

discover that so many fundamental changes have occurred that the ship that F. D. R. rehabilitated and all the categories of functioning within it altogether constitute a ghost haunted old "battle wagon. "

As historians have frequently shown, rich and powerful leaders of the early American Colonies such as George Washington led the American Revolution but had no intention in drawing up its Constitution of creating a direct democracy. The new government was organized in such a way that the powerful older land owners could keep the idealistic new hothouse seedling growth of democracy in good health through the wisdom of his feudal fathers who were not yet ready to let their direct-democracy-plant mature to be transplanted into the outdoor countryside as a regular life-sustaining prime growth. They hopefully foresaw such a time but felt that it must develop slowly.

Immediately after the development of the Constitution and the subsequent formulation of the Bill of Rights there developed the all important question as to whether or not the United States Government should have the prime design authority accruing to economic mastery of wealth. If the United States as a government were to be allowed to amalgamate the total capital credit authority of its citizenry and lands, it could and would exercise the prime design initiative. This was precisely what the founding fathers had quietly planned to postpone.

As a consequence of the exercise of the founding fathers controlling will in this matter Alexander Hamilton as their floor spokesman was able to develop precedent-making interpretation of the U. S. Constitutional volition in such a manner that it was arced Congressionally that the federation of the states was for the purpose of coordinate independence of action but that it was in no way a pooling of properties.

Hamilton successfully persuaded Congress to agree that the Federal Government would not have the sovereign capital authority to initiate articulation of capital credit volition and thereby to issue money. Money, it was agreed, was only a convenient token--medium of fractional exchange in citizens' equities underlain by real ponderous or immobile static property wealth, the wealth which belonged exclusively to private individual citizens.

It was further agreed that the Federal Government must borrow at interest from the privately owned banks, formed by property owning citizens, all moneys necessary to facilitate government business. The government must carefully budget its expenditures and must be careful to refund those expenditures through collection of taxes, excises and import customs revenues.

When and if the government's income-outgo budgets were properly balanced, then the government's borrowing capability was to be honored by the banks and the banks could sell revenue bonds predicated on the government budgeted tax collection solvency. Property acquired by the government was to have no appraised value and could not be borrowed upon. When we hear U. S. financial interests speaking through the conservative political voices demanding balancing of the budget, it is because enormous bond is-sues can be floated (with high revenue for the security brokers) only as the increasing federal indebtedness becomes legally balanced by revenues. Again and again mouth-watering and unbalanced government indebtedness piles up and whenever the new increment is tax balanced on the budget, the lucrative new federal financing issues are authorized.

What has not been clearly envisioned, comprehended, widely published, and

popularly recognized as yet is the fact that when the 1929-32 private banking bankruptcy occurred, was the fact that Hamilton's "Convention" or "interpretation" came to the end of its effectiveness. This fact changed the economic framework of America and more radically than would or could an outright political revolution. That this has not been recognized in any formal way is due firstly to F. D. R. 's rehabilitation of the old ghost ship, and secondly, to the fact that in this era of specialization such complex and comprehensive pictures are not readily grasped, and thirdly, it is due to the silence held upon the subject by the vast number of its temporary beneficiaries who intuitively would leave well enough alone.

The word ”banker" and the idea of banks is the same in the public mind a third of a century later as it was before the crash and before F. D. R. froze the banking debacle by his moratorium declaration on the day of inauguration of the New Deal and managed to reopen it again by the simple device of having the United States Government take the sovereign capital credit initiative and amalgamate the country’s industrially organized real capability wealth the astronomically vast industrial tool network and technological know how wealth that had come into being long after Hamilton, and therewith guarantee or underwrite all the future deposits of individuals up to $5, 000 which would take direct care of the voting citizenry and not of large scale speculative enterprise.

Inasmuch as the banks’ funds were invested by law at the time primarily in government revenue bonds or in mortgage underwritten private bonds or direct private property mortgages the government's next step was in effect to issue comprehensive guarantee of all the mortgages. To rehabilitate the mortgages the government loaned funds for the comprehensive repair and rehabilitation of all the buildings on the mortgaged lands and to rehabilitate the land values by government financing of all manner of flood and wind erosion controls, crop price guarantees, et al.

When the government became the prime underwriter, the Hamilton interpretation was automatically cancelled, for the government in fact became the wealth source of last recourse.

In the housecleaning that immediately ensued the bank reopenings and audits, it was discovered that the bank owners had only negligible percentages of the required underwriting money. The bankers had been operating on the public's admiring credit of their astuteness as private venture backers whereby the banks had competed to attract deposits encouraged by their apparent wealth, multiplying capabilities. Laws were passed by the New Deal Government completely divorcing all security selling and enterprise underwriting from bank functioning. Banks became strictly the depositories for people's earnings and savings. The funds could be loaned to the government or to corporations doing business with the government or on terms written by the government which involved capabilities for the certain recovery of the money.

In doing all this and more which we will soon examine the New Deal was able to avoid however the semblance of the traditionally associated concepts of socialism. It avoided the appearance of socialism through further rehabilitation of the "old ship" and its historically well known ship's "Watch, Quarters and Stations Bill" governing the crew and its function categories. To take care of the industrial production categories the government founded the Reconstruction Finance Corporation and as prime capitalist the government endowed that corporation with the largest funds that any corporation in history had ever possessed. The R. F. C. as it became known then set about to rehabilitate all the prime production, process, and service corporations of the United States economy. To do so the R. F. C. advanced capital to the corporations with which to retool

and expand the U. S. A. production to new levels of technical capability, capacity, and output.

Thus the government took over the prime design function, that of master-minding the direction in which the regenerative expenditures of wealth would take.

The corporate managements were loath to go along with their own corporate rehabilitation programs not that they were not glad to be reopened and for the moment solvent but because they thought it would deprive them of their administrative prerogative as the corporation's prime designer within its own domain. The corporation executives all had been put into their respective executive positions of power not by the government but by the boards of directors who in turn had been elected by the corporation stock-holders whose proxies the old world bankers' earning prestige had effectively managed to garner to be voted almost exclusively by the O. W. B. s in the annual meetings. The American corporation managements all said to the New Deal, "If you are willing to rehabilitate our corporation, this will be tantamount to socializing the corporations and inasmuch as we are not government appointees which we would have to be if you admitted the U. S. to be a socialist state (which we think it really is) we would not be re-elected to our management position unless you allow us to make profits that pay dividends that win for us the votes of our stockholders. " To solve this problem the New Deal agreed with the corporations that when the government placed major procurement orders with the corporations that the government negotiators would 'allow the corporations to include profits up to 12 per cent in their calculation of their bids and the submission of their bills of cost. The government stipulated, however, that the amount of profit up to the 12 per cent limit would have to be established with each negotiation by agreements of the respective contracting officers of the government and corporations respectively.

By the bank deposit guarantees, the R. F. C. and other innovations the New Deal was able without formally reversing the Hamilton convention to make the government the prime designing capitalist and to do so without visibly capitalizing the old-fashioned, static type property as national assets--the highways, canals, navy yards, forest reserves, etc.

The New Deal made the government the invisible prime designing capitalist by avoiding visible property capitalization while pretending that the government loan subsidized and tool rehabilitated corporations were successful going private enterprise institutions thorough warranting such credit which the government soon made them seem to be by the simple device of articulating the government's purchasing capability (which invisibly inferred the government's capital credit borrowing capability).

This invisible socialized capitalism worked as follows: When the government (which is we, the people) placed for instance $50 billion of annual orders with the quasi-private corporations (opened up and refinanced by we-the-people without strings for we later cancelled the obligations and allowed the corporations to buy the tools for $1.00) the corporations having so reliable a new vast customer as the government were able to go to the banks (which were we the people) to borrow the working funds with which to buy the raw materials and pay the wages (to we, the people) in order to produce the government-ordered goods.

The money that the corporations borrowed from the banks was, of course, the people's money. It was no longer a banker's private wealth or private credit re-source. When the goods were produced and delivered to the government, the government went to the banks and borrowed the people's money to pay the corporations which money

went through the corporations back to refund their loans to the banks. Thus we see the people's own money guaranteed by the people's wholly owned government circuiting alternately around through the corporations and then back again around through the government to the banks. Both the government as the people and the corporations by subsidy within the order pricing are forced each time to pay the banks large interest. The government's annual debt service is today in the neighborhood of $10 billion. The government orders also pay the corporation stockholders $5 billion in dividends at an average of 10 per cent profit negotiated between the government purchasing department lawyers and the corporations a direct subsidy to the individual stockholders all hidden away in the government orders as agreed upon between the government and the corporation management in a United States government treasury department ruling rather than by Congressional action.

The New Deal found it much more satisfactory to pay off the old lady stock-holders with dividends (the elderly women of America being the majority of shareholders of American corporations) than to have all these women giving up their bridge games and having to stand moaning and groaning in dole or bread lines.

The 50-billion-dollar orders issued by the government to its prime contractors paid wages and bills that soon went to the purchase of automobiles, ice boxes, etc., which brought about a second round of wages and purchases. The 50-billion-dollar original orders sent capital credit flowing into an economic-dollars irrigation system which pumped the dollars through approximately ten complete recyclings annually thus bringing the gross national product readings of approximately $500 billion or ten times $50 billion of original government order issuing. To make that wage flow secure, the government put a minimum wage rate in force and encouraged labor to up its general benefits demands and agreed to the high wage rates in the government purchase contracts thus indirectly and invisibly subsidizing the wage earner.

To encourage the corporations to regenerate their own increasing capacities and capabilities, when the corporations in the late 1930's balked at expending any of their own undistributed profits for the purchase of new machinery, the government agreed to ”loan" them the machinery and to allow the corporations to deduct the cost of all research and development from their earnings before calculating their income taxes. This rebating of taxes became another hidden subsidy. It would have been just the same had the corporations paid their taxes in full to the government and the government had then paid out the same amount in subsidies to the corporations, but the latter would have been to visibly underwrite their research and development and that is apparently what both the New Deal and the pseudo-private enterprise corporations did not wish to have visible.

When next the great newspapers found that they could not pay adequate wages while gathering and distributing the news at the price that the public could and would pay for newspapers unless the papers carried enough advertising, the government's Treasury Department ruled that "advertising" was research and development and thus in effect issued an additional seven to ten-billion-dollar-a-year subsidy to the corporations with the implicit instructions that the corporations must expend that money in advertising. That subsidy built modern Madison Avenue. Madison Avenue then spoke out through its advertising in the newspapers to say how America abhored socialism. The "old ship" picture was apparently becoming more realistic with every New Deal move.

Through the interest paid to the banks which distributed enormous wages not only for banking clerks, vice presidents, and directors but for more building of more banks and the wages of their building and through all the hidden tax deductible subsidies

and government purchase hidden automatic profits and through the freeing of insurance companies from enforced investment in mortgages and government bonds and allowing them to invest in and underwrite the pseudo-free enterprise prime contracting corporations and by guaranteeing new home building mortgages for 30 and more years, which in effect means government purchase of the homes and loaning of the home to the "owners" and by subsidizing, urban redevelopment, public housing, highway building, and by guaranteeing farm incomes and high labor wages and by subsidizing veterans and sending youth to college and giving vast research grants and scholarships to colleges, universities, et al., the government gradually arranged the total indirect socialization of America. In effect the government socialized the corporations rather than the people and the people kept on playing the same pre-crash name and categories games aboard and within the grand old ship, "Private Enterprise" just as they had played these categories games before it was discovered that bankers didn't have any money.

So effective has been both ”the game” and the general wealth regenerating scheme of the New Deal that general incomes have risen phenomenally in the third of a century since the great crash and by the time World War II was over the majority of U. S. citizens were so prosperous that they began to think of America as a land of a hundred million capitalists. By the time World War II was over and those who remembered the doings of the "thirties" were retiring or dying off, a new generation of management had come into office and approximately all America was convinced that the corporations were indeed true private enterprises. With World War II over the new era politicians, convinced that U.S. was a pure capitalistic private enterprise economy, were perplexed over the fact that the great war orders which had the economy rolling would no longer be in order. It was here that the U. S. political leaders threw their lateral passes of the prime designing initiative to their military "Defense" establishments. The latter, employing their "Naval, Air, Army War College" techniques of dealing analytically with total world logistical and ballistical capabilities as well as with the full chess game of potential strategic moves and counter moves, were enormously advantaged by the con-current development of the giant computers which could handle very large families of dynamically accelerating or decelerating variable factors and their complex parameters.

Advantaged by their mechanical brain controls the prime designers of the Military Defense's Posture Mannequins--for international show window installations by the largest industrial nations--realized--because their mechanical brains said so--that there was no peacetime validity whatever for their postures, or for their prime designing decision to reinvest the ever enlarging industrial capability wealth almost exclusively in weaponry systems (hot, warm, cool, and cold, designed to sweep out and control ever larger domains and, in due course, the domain of our immediate galaxy) unless the political leaders, who had given them the prime design responsibility, could justify the super defense mandate assumedly furnished them by the democratic electorate.

The super defense mandate itself could not be validated unless the political leaders and their political machines could demonstrate an equivalent prime design initiative and defense enterprise as being undertaken by a potential challenger to their preferred type of peace. Thus it came about that the prime designing initiative which the old banking masters had monopolized developed posthumous cell dichotomy and the prime design initiative now split into bipolar, world hemisphere, prime antagonisms' defenses.

At this stage of world sociological evolution there came into major play one of the earlier and great prime design inventions of the late international banking masters' initiation, suggested to them by their lawyer lieutenants – i. e. --the corporation--

the synthetic man who, if properly designed legally, can do no wrong, assertedly has a fantastic composite brain and foolproof enterprise ingenuity, can avoid almost any responsibilities and can be so large, long lived, rich and powerful that "he" can stay, dominate or even slay any single-handed human or little bands of humans that block the corporation's way without legal charge of murder because the corporation is obviously not a "real" man, ergo, cannot be a felon. The corporation needs no passport and can take up residence anywhere in the world or in many parts of the world simultaneously, effecting sum totally in coordination of its parts those tasks which might be prohibited in one or the other of its political residences. But no matter how "pure" the corporation may attempt to make its synthetic, scientific integrity image seem, that image is always inherently corrupt for as the corporation's directors will tell you, the corporation's first and only real purpose is to make money. If money can be made gracefully, that makes the corporate servants feel graceful and romantically idealistic but it is irrelevant.

Finding the corporations', advertisingly claimed, moral and financial greatness, ideological elegance and scientific capability ideal for political viability, the post-World War II governmental civilian defense directors as the prime designers of the military defense posture then set about to subsidize, to the point of complete socialization--i.e., government-guaranteed total livelihood--the approximately "one hundred" largest corporations of their respective hemispherical defense mandates as the prime, production and installations, contractors, for the practical purpose of realizing the military establishment's prime industrial wealth reinvesting designs as world around dominating, weaponry systems.

The hundred corporate grime contractors, employed by the unified, prime designing and merged army-navy-air-and-space war colleges' joint-chiefs-of-staff, who in earlier turn had been sent into play by the otherwise helpless and bewildered political world leaders, who in even earlier turn had been mandated by their respective electorates to--"get the wheels going and keep them going"--when the old banking masters died, then proceeded to inaugurate evoluting weaponry systems whose hitting range and power was in continual flux of expanding capability. Thus, the continual changes that the military prime designers turned over to the prime contractors brought about continually shifting patterns of sub-contracting down to the lowest echelon – the citizen who continually shifted his home base to conform with the shifting project allocation and industrial deployment patternings.

To carry out this vast social preoccupation and wealth regenerating, recirculatory system of the prime designing military it was also necessary to keep the educational system furnaces roaring in order to pour out brains capable of dealing with the myriad of technical and ever more momentarily valid specializations which as quickly as possible were transferred from human brains, muscle, and nervous system functioning into automated functioning wherefore the advanced educational furnaces had to be enlarged and intensified to produce the ever more cosmically ephemeral raw resources, "sophisticated" they called them, with which to prime design the latest round of supra-power, range and velocity defense system tools.

In the super excited social state of such colossal hemisphere defense com-petitions the possibility has been entirely overlooked that there might be some entirely different and far more effective way of employing the by now fabulous physical energy production capabilities of world society.

One such major "other" possibility is that which relates to one of the major

unattended functions vacated a third of a century ago by the old financial masters of the earth--that is the prime design prerogative as it can and may be applied exclusively to the promulgation of the successful evolution of peaceful expansions of man's physical capabilities toward accelerated realization of total physical success for all men. This was the function that the old masters deferred thinking about until such an almost impossible era as that of perpetually successful and unchallenged world supremacy of their grand design system. In this area of the vacated function which the financiers had never had the opportunity to exercise we find lingering today only the architect and engineer who are as yet operating on the momentum of their slave routines ever waiting for a master patron's voice to authorize them to tackle this and that local detailing task. These architect and engineer slaves readily mistake the corporate administration voices of to-day for those of their earlier masters and find themselves handsomely paid and favorably publicized.

It is not irrelevant to our search, for understanding the reasons for the over-long postponed self-establishment by architects of their design science initiative on a parity with medical science, to note that because architects sometimes draw or sculpt or speak freely for their own personal satisfaction that they also tend to think of themselves as extremely independent beings, at least outside of their earning-a-living hours. False magnification of the sense of freedom established first by their architectural training years and secondly by their extra-curricula expressions makes them overlook their economic imprisonment and belittles the compromising significance of many of their routine tasks, which they toss off as harmless whimsies or ignorance of business clients. The world of architecture is a superficially charming world. It draws youth of good will and creative dreams. It is, therefore, paradoxical that it is precisely in the world of the economic slave architects, engineers and industrial designers that we find all the evil practices of yesterday hidden away in the easy-virtue ethics of venerably ”accepted practices. "

Here it is that the corporation managers may hire non-scientific designers to steal their competitors' ideas as well as their superficial, corporate, promotional virtues. The architects and industrial designers are taught even as students to compete against one another in stealing the ideas and design inventions not only from each other but from successful postgraduate practitioners rather than being taught as are the young scientists, to make meticulous accrediting note of each and every item of the original work of others which they logically employ in their own problem solving. Thus, quite incidentally, the minute new steps to greater understanding of physical universe brought to bear by the acumen of each scientific development reporter come into exquisite visibility and as such become magnificently celebrated.

To understand the enormity of the as yet unrecognized and, therefore, unpunishable anti-social crimes that take place in the world of architectural, engineering, and industrial design in exploitation of the naive innocence of those A. E. I. slave designers, we must take major stock of the very largest fundamental changes that have taken place most recently in the cerebrations of man on earth.

The greatest of these all history's intellectual orientation changes is the at first scientific then technical then industrial and lastly political shift of mankind’s thinking frames from the Newtonian Norm of "At Rest," and inherent changelessness, as seemingly constituting the apparently fundamental law and order of nature and, therefore, to be most reverently, scientifically, technically, and economically served and conserved --shifting over to the Einsteinian Norm of "Continual Evolutionary Change" as the prime characteristic of nature which must be most reverently, scientifically, technically, and

economically served and conserved.

For long the political bases of bipartisanship were fashioned, on the conservative right, which, happily husbanded no change, being quite content with their "in" position, and, on the radically conservative left by the agitators for reform in the manner of sharing the changelessness of nature. But now as a consequence of the shift from the Newtonian to the Einsteinian both the right and left are immersed in, and mutually profiting in, the economic realization of "change" being normal. In reality the old political bases are utterly vanished. In the non-realistic static geographical frames of political representation the obsolete political paraphernalia still lingers, soon to be abandoned of realistic necessity and popular demand. All that is now at stake between the old political parties is a shift in patronage blessings to be derived from the commonly approved dynamic economic system, the shift over to which few laymen, politicians, or industrialists realize stems directly from Einstein.

Far more important to our immediate consideration, however, in respect to the shift from the now scientifically invalidated Newtonian changelessness concept of physical universe to Einstein's normal evolutionary change acceleration, is the opportunity of present and future humanity which has been essentially overlooked in the maelstrom of the historical shift, to wit:-- the following.

In the concept of changelessness the most impressive assets of man's existence were the seemingly "real" physical increments which could be "possessed" or occupied and guarded by man – and around which he has organized a vast body of law, governing that possession and the "rights" and "means" governing its transferred possession.

In the concept of constant inexorable change the most valuable assets of man are his utterly abstract, weightless "ideas" which permit his swift recognition and adjustment to the ever changing pattern. The most valuable ideas are those which not only comprehend the change but also the trendings of the change and anticipate the next important change events--as does the good driver of a car, a pilot of a plane, a captain of a ship – thereby enabling the safe and satisfactory dynamic, forward, transformative processing of man in evolutionary universe.

In the industrial era the meaning of wealth has also been radically transformed in concert with the cosmological revolution. Wealth which used to mean "real" inert physical property now means the industrially organized capability of man to deal with forward events of evolution. Pertinent to that meaning of wealth is the physicists' Law of Conservation of Energy" which states that "energy may be neither created nor destroyed. " Energy is finite and inexhaustible because non-destructible. Energy as radiation and energy as matter are intertransformable, as well as inexhaustible and it is control of their organized intertransforming that constitutes industrialization and forward capability of man. The energy factor' of wealth is inexhaustible. The intellectual factor of wealth is inherently self-multiplicative. Every time intellect makes an energy control experiment--intellect learns more. What it learns that it adds to the wealth is definable as a valid idea. Ideas are the multipliers of wealth--valid ideas that are reduced to demonstrable practice by the individual are the essence of wealth.

The most prodigious and continuously displayed want-ads of the last decade have been those of the prime contractors' corporations and their multitude of sub-contractors--of scientific specialty developments and manufacturing corporations-- clamorings for scientific and engineering designers even though there are no such

academic degree categories and no such courses in the scientific or technical educational systems for the simple reason that this objective – a new and unprecedented design function in the frontiers of science and technology--is inherently either exploratorily successful or inventive. Any man may explore but to be exploratorily successful in science is worth a Nobel Laureate and to invent is legally "an act of God. " Neither successful exploration nor invention may be anticipatorily contracted for nor taught. But that "impossibility" is exactly what the prime contractors have contracted to produce on behalf of the national defense's prime weaponry system's design initiative authorities which specious contracture it is wishfully hoped may be swiftly enough gratified by 80-billion-dollar-a-year expenditures in laboratories, tools, instruments, and in mammoth research personnel acquisitions, wherefore the prime contractors, admonished by the prime designing military to avoid any Congressional investigation embarrassments occasionable by sub-subcontracture with non-politically tidy parties no matter how excitingly promising their inventive reputation, sub-contract with the most Ph. D. degreed and scientifically named, specialty sub-contracting corporations who open their personnel hunting offices on all the university campuses seeking to harvest at the earliest possible moment the total crop of bright young ones most probable to make successful explorations and inventions all predicated on the statistical theory that if one hires and implements enough personnel, then the one-in-a-million, right-bright idea men will be caught in the contractors' nets.

The human generated literally weightless and ephemeral ideas and inventions despite enactment of patent and copyright laws have not as yet been even mildly protected by such property laws as safeguard the so called real, physical, and inanimate equities. People are jailed for stealing a loaf of bread. They are rewarded for stealing ideas.

While inventions and new "fangled" ideas were anathema to the Newtonian era's assumption of changelessness as normal, quite clearly good new ideas and inventions, which are reducible to practice and which also demonstrate greater efficiency, are now in reality the most valuable "properties" of the Einsteinian age.

For every workable invention the individual "digs" his brain and works a thousand "dry holes." In 1925--in the last few minutes life of the old masters' world power--and eight years after the income tax was invented, at the request of the old masters, according to a published statement of a major producer in the petroleum industry.

> Congress gave to all mining industries a tax deduction rate designed to repay them for an amount equal to the capital they exhaust producing their minerals and to encourage them to look for new reserves.
>
> Hates differ, based on the scarcity of the minerals and on the difficulty in finding them. The petroleum rate is 27 1/2 per cent; for sulphur and other strategic minerals it is 28 per cent; for copper, iron, and materials for cement it is 15 per cent; for coal and salt, 10 per cent; and for sand, gravel, and shell, 5 per cent.
>
> Why most for oil? Because it is hardest and most expensive to find. Only one in nine test wells finds any oil or gas; only one in 44 finds enough to permit the operator to break even.
>
> In the publishing world of New York idea stealing is called "brain picking. "

Nothing is so easy to steal as the right-bright idea. The department manager steals his subordinate's--Joe's--idea and wins favor with the vice president who in turn steals the idea from his department manager and sells it as his own to the company president. In turn the company president steals the idea, makes it his own, presents it to the board of directors and gains himself a. twenty-five-thousand-a-year raise, because the company earns a million more by virtue of Joe's idea.

In the preindustrial continental isolations of yesterday nations' local conceits and deceits could go unchallenged for centuries. But today's false premises and self-deceits both public and private fall swiftly apart in the revealing light of scientific investigation and competition. Intellectual integrity will win tomorrow's battles with accelerating inexorability. Political and commercial sham and false premise institutions will vanish with startling rapidity.

It is dawningly in evidence that world society is about to discover the intrinsic value of fundamental ideas and that the present slave functionings of architects, engineers, industrial designers, interior decorators, fashion designers, advertising copy-writers, public relations innovators and manipulators, as corporation hireable thieves of individually invented ideas successfully promoted by competitor corporations probably will, in the not distant future, come to be considered morally and civilly reprehensible. But for the moment the whole designing profession deals only in the superficially innocuous paraphernalia of the now fallacious and obsolete Newtonian changelessness concept which yesterday was rendered livably interesting only through the superficial changes in fashion, styles, and orders of interior and exterior decorating or in engineered nuances of physical "differences" and "individualities. "

So complex is this whole picture and so conditioned are the social reflexes in respect to the maelstrom of concept transformations that it is all too easy to understand why it has happened that the static – or unchangeable, earth-anchored type of space conception designers--the architects, et al. --were not called in by the prime or sub-contractors of the Space Age's acceleratingly changing contractual obligations to help them in their outer space invasion requirements to do ever more with less in order to produce the corollary condition of the most highly compacted energy capabilities, deliverable at the greatest distances, with the greatest accuracy and remote control niceties, with the least effort, in the shortest time.

While the space age blasts its satellites into orbit, mesmerized, everyday social preoccupations are essentially with the irrelevant past's changeless, romance-engendering and enchanting remoteness. Politicians become more earnest politicians. Pretentious governmental and corporate bureaucracies exploit the historical prime de-sign initiative by playing games of hide and seek contractual procedures, at hundred billion dollar expense leaps of "enlightened" guessing competitions with their curtains' obscured ideological adversaries.

While that most paradoxical chapter of all history is being written the great opportunity is overlooked that the architects and engineers and professional designers in general now could go back to school and learn the fundamentals of chemistry, physics, economics, general systems theory, logistics, ecology, and scientific history thereafter taking as prototype the long ago successful comprehensive initiative taken by the doctors and many artists and poets individually throughout all time whereby the architects, engineers, and designers might take the oath of organized professional dedication to world man’s service as did the doctors and prepare themselves, on their own service-inspired initiative, to deal competently and effectively with rendering man's external,

extra-corporeal tool complex organization fit to adapt total man to survive and prosper in the evolutionary acceleration of universe, thus offsetting all the economic evils of uncoordinated enterprise anarchy without killing enterprise and in fact greatly increasing the wealth generating capability of individual enterprise within their design scientists' comprehensive, commonwealth generating, world systems.

The historical economic clock points to this moment as appropriate for such design science initiative taking. The world stock markets present clearly the viewpoint of world industry and enterprise-riskers and co-riskers. Throughout the whole history of stock markets bleak war news always made the markets go up, for the news meant that the weaponry and munitions expenditures would be vastly increased. In the 1962 Cuba-U.S. A. -U. S. S. R. crises in which the atomic warfare of World War Three came nearest to breaking out for the first time in history the stock markets dropped, which means that for the first time in history man's greatest financial wager is on the production of peace generating industry and not on war. The combined economic and world psychological climates are ripe for the reorientation of the world's prime design initiative from weaponry to livingry.

I said at the outset that if I could bring all the converging factors into evidence that we might be able to state the problem properly and if so that the greatest problem of our day might be to bring that problem with all its complex ramifications into focus.

To start off with it is demonstrated in the array of events which we have touched on that we don't have to "earn a living" anymore. The "living" has all been earned for us forever. Industrialization's wealth is cumulative in contradistinction to the inherently terminal, discontinuous, temporary wealth of the craft eras of civilization such as the Bronze Age or Stone Age. If we only understand how that cumulative industrial wealth has come about, we could stop playing obsolete games, but that is a task that cannot be accomplished by political and social reforms. Man is so deeply conditioned in his reflexes by his milleniums of slave functioning that he has too many inferiority complexes to yield to political reformation. The obsolete games will be abandoned only when realistic, happier, and more interesting games come along to displace the obsolete games. That coming along of the better games is the prime designing responsibility of the new profession the architectural scientists whose birth we hope and think we are witnessing and the possibility of which we are going all-out to aid.

It is mainly to be recognized by the architectural scientist that playing the game as America and Europe were doing at mid-Twentieth Century was fine for America and Europe but these game-playing industrial countries were operating at so relatively low an efficiency of performance per units of invested resources that North America with seven per cent of the world's population and Europe with 25 per cent together with a world around set of scattered city populations consisting of eight per cent of the world's population, altogether totalling 40 per cent of the world's population were using 100 per cent of the world's industrial metals. It is also mainly to be recognized that these "game" playing countries thought that there was no other way to play their game with equally satisfactory standards of living and degree of freedom results. So thinking, they assumed that other people were "just out of luck. "

These countries on their own private governmental initiative would not have done anything about altering the overall performance per cent's of invested resources. Therefore, the same a priori organic intelligence that makes human babies satisfactorily despite the ignorance of the human baby factory managers is seen to be inexorably at

work in the external organic development of man and is apparently intent upon upping the overall efficiency of the performance per units of invested resources to such a degree that all of humanity may be served by the same total world inventory of meltable and reinvestible industrial metals at higher standards of living enjoyed at higher degrees of freedom than any man has as yet known. (See Chart 30, page 30 of illustrations, Buckminster Fuller, by John McHale, George Brazillier Publishing Company, 1962.) In order to accomplish this external organic birth of a total world industrially advantaged man ”nature" or the universe inventing and evolutingly operating comprehensive intelligence set the "communism" playing industrializationist competitively against the "capitalist” playing industrializationist in a super game of the radically threatened annihilation of one another against which each must develop its retaliatory devastating capability. This became a competitive race to send the most hitting power at the greatest speed and with greatest accuracy to the most targets at the greatest distance all of which required a phenomenal step-up in doing more with less. And inasmuch as the intelligence feedback of their computer implemented and progressively automated competitive systems became inherently self-accelerating and self-augmenting the rate of evolutionary step-ups of the competition capabilities brought about an ever swifter rate of obsolescence of the progressive stage tools of doing more with less, which having been progressively tooled up for the respective massive retaliatory capabilities of both the "communists" and the "capitalists,” provided an unexpected industrial mass productive capability biproduct which was the re-application of the principles of doing more with less to the home front living needs, not only of their own economies but of the economies of the other 60 per cent of underprivileged humanity whose allegiance to these respective causes both the "communists" and "capitalists” were courting. Altogether, the biproduct curve of this unexpected livingry advance promises 100 per cent industrialization of all humanity realized out of the same inventory of metals now serving 44 per cent of humanity to be realized within another thirty years, or one generation of mankind. It is this curve of inexorable acceleration being accomplished by the universal intelligence integrity that may conceivably be recognized and directly served by the architectural scientists. If the latter become competent enough in their comprehension of this total picture to be able to seize the world initiative in undertaking its conscious realization then as a biproduct of their so doing, they will put the world effectively on notice not only of their undertaking but of the comprehensive picture of world developments and the childish game playing in such an educationally effective way that world civilization will become increasingly intrigued with the new game of playing it "straight" and the high tide of hazard of world atomic and biological war-faring will swiftly recede and presently disappear.

It is a prime principle of the dynamism of industrial wealth that the more that it is used, the more that it multiplies its wealth of organized and unlimited universal energy capability. No concept could be more diametrically opposed to the concept of swiftly exhaustible and entropically wearoutable static property "thingness” wealth which as yet dominates the dogmatic arguments of political reactionaries. Theirs is the concept of a national debt which is continually increasing as an accounting of the supposed swift depletion of yesterday’s static property bounty. The fact is that the current $300 billion U. S. Federal debt and the $700 billion private corporate and individual indebtedness is like a paper accounting game whose total trillion dollar "indebtedness” is more than balanced by the synergetic totality of integrally organized and going industrial capability which means that if we burned up all the present books of U. S. financial accounts (not the books of economic account) tomorrow all the rivers and dams, all the veins and lumps of coal, and the muscles and brains, and topsoil and seed, and the super-markets and their well-filled shelves, all the people and all the knowledge and experience and their power and tools, machinery, buildings, highways, wires, rails, radio stations and T. V. s, and all the rest would be there, we would have to tell everybody that the

accounts were destroyed or we could just give everybody and every corporation new ac-counts and credit limits so that they would not use things up faster than they could be produced until we are given time to produce bigger and faster machines which we will certainly very shortly do. Everything would go right on working. We might even issue tickets to use all the facilities instead of distributing that 4 per cent interest on yesterday's trillion dollar paper debt which interest amounts to forty billion dollars annually which is one hundred and thirty-three million dollars per day (which means one dollar distributable to each U. S. adult per day to help him pay his carfare and telephone calls and newspaper for which we tax him one dollar per day for the privilege of living in the U. S. democracy). Of course this one hundred and thirty-three million dollars per day fictitiously organized interest is not now being distributed per capita and is being issued to a relatively small group who eventually put into broad circulation for the whole of the economy is dynamic and money "deposited" in the bank amounts to immediately loanable paper imprinted digits which fly out of the bank instantly. The only essentially important part of this game as played either by the capitalists or the communists is that you keep on opening the science-built main valve of universal energy flowing into the regenerative industrial organism whose educational and technological feedback multiplies in capability wealth a millionfold faster than do guinea pigs reproduce and multiply. The industrial science illiterates whom "the game" dignifies with the name reactionaries call this process "spending" which is an obsolete Newtonian static norm expression. While Americans were slow to catch on to the regenerative characteristic of industrial wealth in contradistinction to the static property wealth of preindustrial era economics, they should have been adequately educated by the performance of Russia and the dictator organized pre-World War II Germany, whose performance was predicated upon the Russian observation that the U. S. economy in the days leading up to World War I and during World War *I* when the hard goods purchases from the U. S. A. industrial economy by warring Europe began to exceed by one then two then three fold the value of all the bankers' gold in the world. All the world had been convinced up to then that there was no wealth as such extant in the world greater than that of all the gold of all the bankers. Russia in revolution saw that the U. S.A. democracy coming into the war to save democracy taking up its throttle and dredge mining and manufacturing and producing tools and more tools and goods without regard to money limits. The bankers had bought from America all they had money to buy and all that they had the nerve to ask for on credit above their total bank accounted wealth and as yet they hadn't scratched the new tooled up synergetic production capability of industrial America. To get the rest of this capacity put into play on the old banker master's side, they had to get America into the war and did so whereat America just up and said well what do we need now to win the war and the bankers and the general and admirals replied "full industrial capacity production including ships and men to get that production to the European front. " In the one year of 1917 America mined, refined, manufactured, and produced more copper than in the entire cumulative history of all men's copper mining and refining all over the earth. This was typical of the new energy wealth spigot that was tapped. After the Americans had produced and delivered to Europe hard and soft goods exceeding by five-fold the total pre-1914 wealth of all the bankers' gold, the bankers seeing that the war was soon to be won said to the Americans, "How are you going to pay for all this?" "Pay for it?" America queried in astonishment, "We have produced this from our own natural wealth. " "Oh, no, " said the bankers, "you forgot Alexander Hamilton. You as a government do not have any money and your government is going to have to borrow from us, the banks, (which the bankers did not admit were empty having been "spent" several times over before getting America in on its own) in order to clean up your war accounts. " So America then invented the Liberty Loan Bonds and the income tax with which to meet this surprise demand. The war was over. America retired into America and into enjoying its new toy, the automobile. But Russia which had on its revolution

retired from the war watched America unwittingly articulate this fabulous, limitless, new wealth of energy universe realizable through the synergetics of industrialization production.

Of course, Russia had to have industrialization as soon as possible and (naming themselves, U. S. S. R., after the U. S. A. heroes of this drama which the Russians credited the Americans with as a consciously brilliant new contribution, rather than the inadvertent act of an "all-out" good will and "join-up" spirit of American democracy) they established their progressive five-year-plan stages of industrial tool acquisitions. If Russia had not seen this new industrial wealth-generating demonstration of the U. S. A. and had simply applied socialism (as Communism) to their essentially farming economy, they would have multiplied the sixteen million who died by starvation in their first fifteen years' operation by severalfold, and there would be no Russia as we know it today. Russia today is a direct product of industrialization, rather than socialism, which apparently takes no account of what type of political system employs it.

The U. S. A. 's unwitting example of industrial wealth generation was then emulated by Hitler's Germany and Mussolini's Italy which rose to industrial energy might sufficient to almost knock the world out in only twenty years from their utter bankruptcy of the 1918 military defeat.

That our inadvertent industrial success has been realized despite our fundamental ignorance of the synergetics of industrialization is fully documented by our pre-occupation with this "game" today in which we are as yet able to deceive ourselves into believing that wealth comes from bankers and that people in Cadillacs are of a superior stock to people in Ramblers. America and Americans are wonderful but they have been as naive as they have been fortunate, fortunate as the unwitting beneficiaries of all these milleniums of cumulative scientific and technical experiences that went into the slow gestation of industrialization--conceived in Asia milleniums earlier, born in Europe, and dropped as a foundling on America's colonial doorstep, which grew to manhood in 1917, mistaken by its foster parents in the U. S. A. for just another business venture of old-world commerce and agricultural economies.

What does all this add up to? It adds up to the fact that there is ample wealth being generated by industrialization to be able to take care of everybody aboard the ship in an increasingly handsome manner. This is because science has tapped and technology has put the plumbing on enough of the unlimited energy sources of universe to run that energy in and through enough prime movers to produce whatever man needs. The only limit is tool capacity and scientifically and engineeringly disciplined knowhow. We do not need to tax ourselves. That's just part of the "game." The wealth issues not from out of bank deposits' printed numerals but from the tooled energy flow whose increased flow is inadvertently augmented by the Defense Departments of the major governments.

It also adds up to the fact that America was advanced enough industrially, at the time of the New Deal take-over after the 1929 Crash, to be able to undertake this comprehensive support of all its citizenry. If the New Deal had simply said, "There is enough to go around and we are going to go into direct socialism, " there would not have been enough to keep people busy. They would have had to stand around in lines to receive their dole which would have been soul-destroying even if the dole was of high standard. It also adds up to the fact that in Russia they did not have enough or approximately none of the industrialization at the time of their revolution. They have never had up to now enough of the universal energy tapped and plumbed in through an industrial organism adequate to take care of everybody's needs. After 46 years of their successive

industrial stage planning, Russia is approaching adequacy of industrial plant to take care of all its citizenry.

China has started to climb the ladder of industrialization, and because of the advanced knowhow at this moment of history, will climb that ladder of industrialization more rapidly than it has ever been ascended before, possibly in one-half the time per capita that will be required for Russia's half century overall requirement for only a quarter of a billion people. China started with half a billion and will have a billion when she is industrialized. All of our stocktaking adds up to say that energy harnessing and industrialization are the only differences between the unsuccessfully scrounging-along craft-tooled stone age man and the present high economic success of the United States. The difference isn't a political system or "the game" most attractive to the playing by the respective world economics. Russia calls it "socialism, " America calls it ”capitalism, " but it is "industrialization" itself which uniquely spells out the difference between pre-1917 Russia and pre-1775 America.

Take away the industrialization from either and leave both their present populations and call it socialism or capitalism, both countries would witness 100'mil-lion deaths by starvation, far more devastation than would be wrought by atomic bombing. For that matter it would be the major phase of devastation that would occur as a consequence of an atomic bomb exchange. Those that would be killed by the bombs would be the lucky ones, for those that lived would see their industrial machinery so devastated as to be unable to support the hundreds of millions who survived the bombing whether or not they were in the bombed areas.

This whole essay touches briefly on what amounts to the fundamental categories of information which govern the total challenge to the architectural scientist.

It will not be alone sufficient for the architectural scientist to design ways in which the total resources of the earth may adequately sustain 100 per cent of humanity though that is a good beginning.

It also will be necessary for the architectural scientist to spell out and de-sign the way in which computer-articulated comprehensive automation will produce and distribute high standard sustenance to any man anywhere without impeding the degree of freedom with which man may explore his earth and universe.

The architectural scientist will have to design the conversion of all the cities of the earth into mammoth universities. In order to keep everyone busy in the most worthwhile way, the architectural scientist will have to provide means for inhibiting the whole world population into a vast educational system. This educational system must be designed to include a regeneratingly improving documentary television programming. The universities will in effect become a manufacturing industry for the production of the intelligence generating and regenerating tools.

The architectural scientist will have to assume the occupation by man of the three-quarters of his earth’s surface heretofore approximately unoccupied by man in the ocean depths and polar regions. Designing the environmental controlling means to make the increased occupation of the earth a comfortable and enjoyable experience.

It goes almost without saying that the architectural scientist will also have to design the means of occupying the moon and other planets as well as the means of constructing our own artificial way station planets.

The architectural scientist will have to provide for the vastly increased exploration backwards into man's earlier history and into the history of earth and universe. There is probably a physical, intellectual and mathematical law which requires that man explore backwardly in balancing degree with his forward explorations and formulations.

The architectural scientist may through adequate and competent search and research joined with the psychologists, poets, and artists come to the realization that all men being children, such games as "capitalism" or "communism" though utterly obsolete have demonstrably romantic inspirational reflex stimulation and may have to be resorted to for some decades to come in order to keep man safely preoccupied while his new orientation in universe and its now unschedulable new potentials and realizations emerge.

The architectural scientist will have to design the pioneering establishments of complex production, installation, maintenance, removal, and reinstallation, service capabilities on a global basis in respect to large and small environment controls, operating at an air deliverably tooled-up level of anticipatory capability and overall economic efficiency beyond any known present conceptioning. This new omni-deployable environment controlling, sanitary and metabolic-process-facilities service establishment will immediately inherit on earth the space-medicine-developed sanitary and metabolic process equipment for which billions of dollars are now being spent as one of the key requirements for putting men into space and onto the moon for protracted periods. The exquisitely light-weight, compact equipment that will be necessary to solution of the "closed circuit" metabolic survival of man will provide the little black tack box prototype for mass produced earth distribution of an autonomous and deployed geodesic dome dwelling machine service industry as an extension of the telephone company, telephone booth deployment program.

If, as I am intuitively inclined to expect, the university youth of the world were to seize now the overall design initiative, no longer waiting to be retained professionally by clients, and were to effectively employ the total reorientation of fundamental concepts in respect to the harvest of knowledge accruing to all the vast heritage of man's experience on earth, as well as to the scientific probing of the invisible ramifications of physical universe, in the formulating of their comprehensively designed ecological and logistical world planning and were thus enabled to demonstrate that it is irrefutably feasible and practical to convert the world's total mineral and chemical resources, which are now engaged in servicing only a minority of mankind--at the industrial network level of effectiveness and satisfaction--into swiftly realizable servicing of 100 per cent of humanity, at higher levels of adequacy, effectiveness, and satisfaction than have ever been known to any man or have been dreamt of by any man, then in a soon to ensue major world political crises, the student's previously and widely published, integrated physical world retooling design, certified through its experimental reductions-to-practice wherever critical technical functions were theretofore unproven, to be practicably operatable at a comprehensively effective level will be adopted and implemented by world society mandate.

When the world's resources thus are rendered adequate by design competence to the service of 100 per cent of humanity, at highly advanced standards of living and enjoyment of total earth, the long world history of warfaring, which has ever been predicated upon the assumption that there is not enough to go around and that only the most powerful minority could survive, would be forever terminated.

So long as the world's people remain preoccupied with their exclusively

local survival problems, and egocentric commitments have top priority, while leaving dangerous world problems to solution only by man's political leaders within the latters' narrow range of available and short-term expediencies, the warring will continue be-cause political leaders are neither disciplined in physical invention and design revolution capabilities nor empowered to consider, let alone undertake, coordinate world enterprise involving total abrogation of the world's local sovereignties as well as time involvements beyond the political leaderships prerogative limits.

So long as youth negatively importunes its political leaders to forego military defense strategies while youth fails to see its own positive potential in its opportunity to seize the prime world design initiative and its responsibility to institute self-disciplined education in world resources and human need trend studies, and thereafter its responsibility to redesign the physical operations tooling of man to render that tooling adequate and appropriate to the 100 per cent ecological success of world society just so long will man remain frustrated and in ever more imminent danger of race annihilation.

Emergence from the abyss of economic and political frustrations may only be realized through intellectual competence and calmly disciplined comprehensive foresight, articulated through design science. When this is done by self-emancipating young world manhood, there will be a spontaneous, natural, and lasting world peace in respect to the economic and political affairs of men on earth.

THE WAVE TRANSFORMATIONS OF THE CITY[1]

Viewed from a ship entering New York Harbor or from a plane coming in over the city, New York appears as an enormous complex of hard, permanent towers – crystalline asparagus. But these "permanents" are as impermanent as women's hairdos. New York City's permanent-wave architecture is in fact a progressively rippling dynamic wave system. The last half-century has seen three successive replacements of would-be permanent New York City buildings.

New York is a continual evolutionary process of evacuations, demolitions, removals, temporarily vacant lots, new installations, and repeat. This process is identical in principle to the annual rotation of crops in farm acreage--plowing, planting the new seed, harvesting, plowing under, and putting in another type of crop.

New York's dynamic pattern of continually accelerating transformation was entirely unpremeditated by its static-minded, permanence-intending designers and their patrons. Up to the time when its earliest skyscrapers were built (the first was the Tower Building at 50 Broadway, completed in 1889 and demolished in 1914), its stone buildings, fine residences, banks, and commercial structures were thought of by architects, owners, and the public as "permanent" monuments of their conceivers' era. And the building arts being the most laggard of all men's activities, this conception of buildings as "permanent" still persists in most men's minds. Most people look upon the building operations blocking New York's streets – the piles of sand and brick, the huge cranes fishing steel girders from curb-parked trucks – as temporary annoyances, soon to disappear in a static peace. They still think of permanence as normal, a hangover from the Newtonian view of the universe. But those who have lived in and with New York since the beginning of this century have literally experienced living with Einsteinian relativity.

Said Newton, in the first phase of his first law of motion, "A body persists in a state of rest" (and then, as an after-thought, "or in a line of motion") except as it is affected by another body. This Newtonian norm of "at rest," which means without change, has long been the base line of all our economic charts. From this point of view all events and their growth curves are abnormal. On such charts the curves of industrial and economic performance rise abnormally above, or more normally fall hack to, or parallel with, the base-line norm of "no change." The would-be conservators of peace and of economic health have throughout history sought to "iron out" the abnormal humps, to "return to normal," to no change.

Einstein's relativity theory, evolved early in the century, made the static verities of Newtonian mechanics untenable. But it took almost a half-century for the dynamics of Einstein's relativity to emerge in the daily papers as the atomic bomb, followed by a pattern of dynamic events clearly demonstrating that accelerating change is normal – just as normal as the human appetite for news of the accelerating accomplishment of breakthroughs that swiftly expand man's domain in the universe.

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[1]Extracted from "New York as a Focus of Energy" by R. B. Fuller, in The New York Guidebook, edited by John A. Kouwenhoven, published by Dell Publishing Co., Inc., 1964.

To the Newtonian conservative, the deliberately accelerated obsolescence of structures and equipment, such as we see everywhere about us in contemporary New York, constitutes waste. To the Einsteinian conservative, obsolete structures and equipment are a new mine of selectively concentrated chemical elements--a fundamental re-source of the industrial commonwealth. The materials from this mine are the means of realizing ever more advanced design out of our improving scientific potentials. As a consequence, metal scrap and plastic scrap now recirculate increasingly.

New inventions increase our productive capacity per man-hour and per pound of resource – our ”performance capability, “ as it is called. Every time we mine obsolete structures or equipment for metal or plastic to use in improved designs, we get increased performance out of the same tonnage of fundamental chemical resources. Which suggests, for instance, that we should take all the obsolete two-ton automobiles off the road, melt them up, and produce from the resulting scrap twice as many one-ton automobiles, each of higher “capability” than the former cars, in terms of performance per passenger and of fuel-gallons per safely accomplished higher-velocity mile.

All the world's great cities that grew up prior to New York were products of the Newtonian ”no change" norms. Their romance lies in their preoccupation with man’s historical, bastioned past. What makes New York City the "most important something" in all history is that long before the atomic bomb hit the front page, this city had become the first great Einsteinian reality. Its romance is its living manifestation of history continually in the making. Its streets and districts gradually grow, swell, transform, and disappear altogether. In the "gay '90s" New York’s great exposition and sports building on Madison Square was known as Madison Square Garden. In 1924, the owners of that building built a new modern Madison Square Garden 1 1/4 miles north of Madison Square, on 8th Avenue. New York's Bowery, now the deadbeats' lingering threshold to death, was once the most splendid of growing New York's districts and boasted its Bowery Savings Bank. The Bowery Savings Bank now has its main office 5 miles north of the Bowery on E. 42nd Street. The Madison Avenue of the "gay ’90s" meant the area between Madison Square and 42nd Street, dominated by the J. P. Morgan residence at 38th and Madison. Madison Avenue of the first half of the twentieth century referred to the great shopping section from 42nd Street to 72nd Street, dominated at its base by Brooks Brothers, the Biltmore Hotel, and the Roosevelt Hotel. So attractive did the Madison Avenue vantage appear to so many corporate newcomers that they, in effect, have pulled down all the old buildings and thus terminated all the old enterprises that constituted Madison Avenue. They have built a new canyon in the universe, whose preoccupation with the abstract function of shaping men's conditionable reflexes, through advertising, has caused the words "Madison Avenue" to hold an entirely new meaning--having nothing to do with a physical avenue itself but with their ”corporate image”--the collective archpropagandist, proselytizer, inducer, and seducer.

Propaganda, like most of New York’s manufactured products, has little weight or physical substance. Pittsburgh produces steel; Chicago warehouses wheat, steel, and cattle. New York manufactures pattern abstractions. London's stock market, the Paris Bourse, and other world exchanges long predate New York in the exchange of abstract enterprise equities, but New York today centralizes all the world's anticipatory discounting of forwardly reckonable values.

The United Nations' world headquarters came naturally to New York as the world's most concentrated pattern-processing and exchanging center. New York is today the world's chief publishing headquarters, its leading drama and art market. One Oklahoma stockyard, last year, collected and sent forward to the slaughter house a nose-to-tail chain of cattle 550 miles long. New York’s 2, 000, 000 typewriters and calculating

machines last year produced rows of letters and figures long enough to run twenty ribbons between the planets Earth and Venus when these two are in closest proximity.

The ideas in which New York traffics emanate from all around the earth. It is the world's greatest import-export idea exchange. New York is not an idea factory, nor an idea mine, nor an idea garden, but it is the world's point of highest velocity in idea exchanging. As such, New York is the world's greatest traffic center in hopes and fears, valid or invalid.

There are but relatively few native New Yorkers. Its population is transient. The average residence is three years. Visitors to New York from around the world frequently assert antipathy to New York's coldness and bigness. They have not seen the New York we have been describing. They have seen one frame of a moving picture. It looks static. Only the old-time New Yorkers can know the great transforming dynamics and, more importantly, the city's myriad of rich abstract resources. Because pure abstractions such as love, hate, happiness, and inspiration are as invisible as they are nonmerchandisable, all the real meaning of New York is both invisible and nonmarketed. The lucky few millions who are old-time New Yorkers usually love New York passionately for they know not why specifically.

While the statistical voices warn us that the world population threatens to crowd itself off the earth, it is comforting to discover that New York City's buildings could contain the whole population of the earth with no more crowding than that experienced at a cocktail party – not room for anyone to lie down but all under cover. New York is so knit together with underground wires, tubes, cables, and pipes – that in effect Manhattan Island could be lifted in one piece and stood upon end, its roadways and tunnels acting as its supporting columns with Battery Park on top and Harlem at its base. In such a position its subways would become elevators and its elevators subway shuttles.

Its street level is not the bottom level of New York. Legal statutes adopted by early Knickerbocker burghers required that when the utility companies dug up its streets and inserted pipes, cables, and subways, they should thereafter put all the same earth back where they found it and the city would then resurface it. This the public utilities have done to the letter. The earth tucked back into the street is no more the earth's natural top crust than is the earth tucked into the flower pots high above in Manhattan's skyscraper apartments. The concrete and steel intrusions, below the streets and buildings, have become so multitudinous and penetrate at so many levels that they reach hundreds of feet below the theoretical surface. Like an iceberg, structural and mechanical Manhattan is now chiefly below the surface.

Old-time New Yorkers remember the unique commercial districts--the leather district around Gold Street; the tea and spice districts along Water, Front, and Pearl Streets; the cotton and linen district on White Street; the machinery exchanges of Lafayette Street; and the great Gansevoort, Washington, and Manhattan market districts. These districts have been almost wholly diffused into uptown invisible districts. The real long-time New Yorker knows, however, that nothing has gone from New York and that its interests have multiplied a thousandfold. The unique vortexes continually transform and interchange.

Old-world church and cathedral spires were originally conceived and built to reach high above the surrounding houses and stores. In New York one can look down from on high into a deep valley wherein miniscule spires reach up from the bottom like fine jewelry spicules, for, unlike business enterprises, the churches have usually been unable

to move and have been swallowed by the commercial avalanche, being no longer the centers of their parish dwellings. But their spires as yet inspire when, in our thoughts, our eyes wander down into those New York deeps wherein approximately all that is physically left of yesterday is wedded with the physical of today, and we remember that we are as yet "quick" and not dead, and that yesterday only the dead were normal, and that New York City is now being synchronized with the dynamism of the quick whose norm is Einstein's C^2, that is 186,000 times 186,000 miles per second, the normal rate at which we see. "I lift up mine eyes unto the hills whence cometh my help"--possibly because, of all our faculties, it is only our eyes that can apprehend the distant presence of the high hills – a presence of which we are informed by radiation from the sun, reflected from the hills to our eyes at 186,000 miles per second, all of which seems so instantaneous that we mistakenly say that we "lift our eyes." And we know that no man – no mere human being--invented that velocity, nor its reliable regularity throughout the full spectrum range of all electromagnetic wave phenomena, nor the regularity of its ultra-high frequency inter-trafficking.

Men of yesterday looked outward self-helplessly to the macrocosm, praying for miraculous salvation; today they look inward self-disciplinedly to the nuclear microcosm for vast sources of reliable physical power. What men thought they understood yesterday of their local experiences seemed regular, orderly, and logical; what they did not comprehend, extending outward to the macrocosm and inward to the microcosm, they thought of as turbulent, random, and chaotic.

Men of the Einstein Age are discovering the universal orderliness of constant, comprehensive transformation, utterly transcendental in the exquisite and magnificent orderliness of its wavelength and frequency when compared to the crude, disorderly, conscious thinking and articulation of mere humans.

And as the bees intent upon their honey-commerce are utterly unaware of the pollination-function of their bumbling tails, which inadvertently and unbeknownst to the bees service the organization of tomorrow's flowers and honey sources, so are the little local real estate manipulators and separate venture builders who redot the New York City map utterly unaware of their part in the – only retrospectively scannable – comprehensive orderliness of New York City's transformative growth. That growth is an invisible function of all men's experience of all history, translated now into the world-surrounding, dynamically functioning industrial network-system in which New York City is, for the moment, the most radiant communication-relaying center on planet Earth.

GEOSOCIAL REVOLUTION

Synopsis

A half century of subconsciously developing world revolution is now crossing the threshold into human consciousness and ultimate popular support. The heretofore subconscious world revolution may well become the conscious focus of effort of the International Cooperation Year.

The ICY-1965 itself has been indirectly occasioned by the subconsciously occurring techno-scientific revolution and its myriad of separate world around transformations of human ecology.

The unheralded human ecology transformations have developed only as inadvertent, unanticipated, interactions of individually undertaken uncoordinated inventions.

The independent, physical environment reforming inventions have integrated, figuratively speaking, as streamliningly divided, double-decked, banked and clover-leafed lifeways of human behaviours. These lifeways permit ever increasing numbers of humans to survive logically and sense-satisfyingly without mutually frustrating interferences.

There are two main classes of inventions, – those which increase and those which decrease the degrees of freedoms. Because men are born immobolized, there are few invention opportunities for his increased immobilization. These are prisons, traps, straight-jackets, handcuffs, and caskets. On the other hand, there are an infinity of opportunities to invent man's increased mobilization – all the way up to the speed of light-186, 000 mps. and in all directions. Means-of-increased-freedom inventing is irreversible.

Inventions occur when individuals, frustrated by circumstance, eschew negative blaming and undertake positive physical environment reforms rather than abstract human reforms. The latter depend precariously only upon moral, ethical and legal.codes which are enforceable only by negative penalties.

The silent preoccupations of the artist-scientist, whose inventions subsequently permit mankind to realize his innate potentials, without interference with others, are in marked contrast to political behaviourisms. Political theories apparently assume that there is no alternative to the word, fist and bullet battles between opposing ideologies. Each ideology seeks to reform man. They scheme and labor to impose their respective viewpoints by omni-interfering political, moral, psychological persuasions, furtive corruptions, bullyings, or punishments.

Both professional and amateur spokesmen for society apparently assume that the political battles will persist until man annihilates himself. The only considered alternative, happy or unhappy according to the individual's viewpoint, is that one bias or another will gain sufficient advantage to be able to dictate the terms of mankind's reprieve from total extinction. We don't agree. We think that there is a third eventuality wherein the political chaos will fade out – in ways entirely unpremeditated by political man – as the invention order looms in. Geosocial Revolution explores the possibility that the non-political surprise has already occurred and will soon be increasingly visible to all.

GEOSOCIAL REVOLUTION

Introduction

The International Cooperation Year of the United Nations came into being as a consequence of the great and surprising success of the two International Geophysical Year-wherein world scientists transcending political ideologies established an historical beach-head in the integrity of the emerging World Man's behavior.

The International Cooperating of Humanistic concerns is far more difficult and complex. Each human is a whole universe and there are now over three billion of them around the world.

Science is inherently observational and theoretical. Science is committed only to the discovery of energy and mathematical behaviours of physical universe. It is left to the integrity of internationally cooperating technology and humanities to advantageously integrate the scientific findings with human behaviours. ICY-1965 must invent objective applications of the discovered knowledge in such ways for instance as, hopefully, never to exhaust the new found resources while also turning them to physical improvement of man's survival. It is also left to internationally cooperating technology to formulate effective strategies for increasing the physical advantages while decreasing the physical inter-restraints of both individual and collective humanity. ICY technology must at the same time safeguard future humanity's welfaring.

It becomes swiftly clear that to make equivalent contributions to those of IGY, ICY must develop technological strategems which will have the same powerful scientific foundations as those of the Geophysical Years.

Through employment of the scientifically gained data and the generalized physical principles therefrom derived, it behooves the Internationally Cooperating Technology of ICY to establish a continuously self-increasing, per capita, metabolic (energy process) advantage of humanity over its a priori and forever evoluting environment. The cry goes up: "Haven't you ever heard of the Second Law of Thermodynamics which predicts the inexorable energy loss of entropy--from all local systems of universe? You can't increase advantages!" (Entropy is also known mathematically as the "Law of Increase of the Random Elements) The answer goes back: "Have you never heard of the Law of Conservation of Energy, which says – in terms of the empirically indicated finite physical universe--'energy may neither be created nor lost'." Energy is shown experimentally as only accomplishing disassociation here through entirely orderly regrouping or association there. Energy transactions are 100 per cent accountable. Every action has its reaction and resultant, and every nuclear component has its positive or negative opposite with each reversing every characteristic of the other. In this dynamically opposed system the Geosocial Year can find the scientific fundamentals of its logical extension of the work of the Geophysical Years. The scientific connector between the IGY and the ICY lies in the answer to the question: has man a function in the universe and if so, what is it? Norbert Wiener and others said "Yes." We will now trace that connection and function.

In dynamical balance with the inside-outing, expanding universe, man witnesses Earth as a collecting or outside-inning, contracting phase, of universe. In addition to its daily sun radiation income Earth receives a continually increasing inventory of radiation in its lethal, energy concentrates sifting, sorting, and accumulating Van Allen Belts. The succession of concentric terrestrial spheres, e. g.; ionosphere, troposphere et al., constitute an extraordinary series of random-to-orderly sorting, shunting, partially accumulating

and partially forwarding--inwardly and finally to benign state in the biosphere--of Earth's continual, universal, energy income receipts. Earth also receives an additional one hundred thousand tons of stardust daily. This randomly deposited dust apparently consists of all the 92 regeneratively patterning, chemical elements in approximately the same order of relative abundance as the relative abundance of those elements in the thus far inventoried reaches of universe. The biological life on Earth is inherently anti-entropic for it negotiates the chemical sorting out of the Earth crust's chemical element inventory and rearranges the atoms in elegantly ordered molecular compound patternings. Of all the biological anti-entropics, i. e., random-to-orderly arrangers, man's intellect is by far the most active, exquisite, and effective agent thus far in evidence in universe. Through intellect, man constantly succeeds in inventing technological means of doing evermore orderly – i. e., more efficient, local universe, energy tasks with ever less units of investments of the (what may be only apparently) "randomly" occurring resources of energy, as atomic matter, or energy, as channeled electro-magnetics.

During the International Geophysical Year, world around science coordinatingly charted vast physical pattern behaviors within and around Earth, such as magnetic fields and comprehensive world earthquake patternings. All of the vast geophysical systems were sponanteously acknowledged by scientific man to be operative in nature, before men discovered and charted their behaviors.

Man--the scientist – has no ego problem in acknowledging the a priori existence in universe of a myriad of energy patterns whose existence and behaviors constitute the life permitting and sustaining energy environment.

Contrariwise, man--the humanist--feels it degrading to his ego to acknowledge the a priori existence of social and economic patternings operative around Earth which develop, evolve, and transform transcendentally to his conscious contriving. To do so seems to admit to a naive subscription to super-natural phenomena. Man's vanity tends swiftly to lay personal, corporate, partisan, or national claim upon all the man-advantaging events and equally swift claim to exoneration from any and all humanly disadvantageous events. This positive and negative ego claiming is an historically conditioned social reflex, which springs directly from man's fear of death in face of all the yesterdays' 99 per cent probability of premature and painful demise. When yesterday's environment failed to disclose, superficially, the means by which 99 per cent might survive or avoid deterioration and pain, a few by superior physical strength, cunning, and insensitivity could command the 1 percent survival support for themselves and a few associates. Though spontaneous, positive-negative ego claiming probably developed in many ways, a typical cause was that which showed that the most brazen pretense and artifice frequently persuaded the dull brains of the strong-armed survival-commanding bullies, that the latter's chances of maintaining
their survival would be enhanced by adding the persuading individuals, at least temporarily, to their band of supportable cohorts. This rationalized myth-formulating was for various causes grafted deeply in the human defense mechanism as a post-natal, reflex system, relayingly triggered from life to life – usually in the earliest childhood of those whose spontaneous trust in the integrity of understanding between themselves and their parents was repeatingly violated to critical degree. To gain workable understandings for moment to moment situations they invented, at least temporarily effective stories.

Human myths and self-deceptive rationalizations have so permeated custom and culture as, thus far historically, to have prevented the social scientists from "seeing themselves" with sufficient objectivity to permit their differentiating out from the social developments all those larger patterns of human behavior which were not consciously premeditated by men. The scientists recognize the individual's subconsciously controlled behaviors, but over and above outright human panic at catastrophe, the unconsciously articulated self-

starterings and coordination controls of group behaviors are sometimes not well, and often not at all, understood.

For technology and the humanities of the I. C. Y. to match in any way the integrities of pattern discovering demonstrated throughout by the physical scientists, the technologists and humanists of the I. C. Y. will have to concentrate on the geosocial, instead of the egosocial. The I. C. Y. participants, at the outset, will have to acknowledge that mankind, like all the other living species, has its ultra-shortsighted, built-in "desire" drives, as well as its longer distance ”needs," both of which cause each species to pursue its ”honey" as does the bumblebee, while inadvertently and unconsciously performing myriads of other tasks designed by nature, which unknown to the separate creature species are all essential to realization of the regenerative continuance of the much larger survival support conditions for all life. Thus does the bumblebee’s un-viewed, unwitting, bumbling tail bump into and knock off male pollen, which it later, and again inadvertently, knocks off upon the female, botanical organs thus unconsciously participating in a vastly complex ecological interaction of the many energy processing bio-chemical "gears" of the total life system, dynamically constituted by all the living species. The myriad inadvertencies of all the living species have sum totally provided a metabolically sustaining and regenerative topsoil process which – it is realized now, but only by our retrospectively gained knowledge – has kept man regeneratively alive on Earth for at least two million years, while ever improving his physical survival advantages and increasing his longevity.

This vast "game playing" of life has also indirectly occasioned, not only the regenerative multiplication of human beings, but also a progressively increasing percentage who survive in conditions of ever improving physical advantage. It is probable that 99 per cent of all history's human babies have been inadvertently conceived as a consequence only of the human's preoccupation with their momentary ”desire" drives. That man in his rationalizations has explained this regenerative drive to himself only mythically and negatively as the "original sin" wraps up all the ego-claiming or disclaiming into one, typical, nonsense conditioned, reflex package, which the I. C.Y. cooperators must discard altogether in order to free their brains and minds to identify the vast human ecology transforming forces comprehensively in operation about Earth.

The human ecology transforming forces are as real and as important to life on Earth as are the Van Allen Radiation Inhibiting Belts surrounding Earth. The human ecology transforming forces are nonetheless as foreign to man's consciousness as have been the Van Allen Belts, both of which have been unknown to man’s knowledge throughout all but the last decades of the known two million years of man's presence on Earth.

Geosocial Revolution is a tentative inventory of those heretofore invisible, techno-economic, world-force-fields now looming tentatively into view. These hereto-fore invisible, evolutionary systems' tidalwaves once discovered and studied apparently disclose nature's scheme, not only for successfully sustaining human life on Earth – despite the inertial negatives and shortsightedness of man's arrogant ignorance – but also the scheme by which nature will permit man to henceforth participate consciously in ever less meager degree in his prosperous continuance on Earth, which he will occupy as a planetary base for his larger operations in universe. These forces and their trendings become the logical pattern developments to be served by all those taking the conscious initiative in promulgating world man's comprehensive advantaging through the International Cooperation Year.

GEOSOCIAL REVOLUTION

Though dwarfing all other of history's revolutions in relative magnitude of transformation of human affairs in universe, the vital characteristics and overall involvements of the twentieth century revolution have gone on entirely unapprehended for one half of a century. So vast and historically unfamiliar are the revolution's ramifications, that the narrow foci of contemporary specializations have failed to perceive, recognize, categorize, and integrate its widely ranging components. Though everyone recognizes that a "World Revolution of some kind is going on"--such a concept is exclusively a post-world-war-two cognition. Meetings of intellectual, business, and government leaders are convened with increasing frequency on the subject of the "impingement of science and technology on human affairs." These meetings demonstrate that the nature of the greatest revolution in history, which had been developing powerfully for a half century before the meetings, is only now entering the comprehending aware-ness of man. Th title of the meetings disclose that men are only now asking questions, which seek to understand the specific nature of the revolution.

Because the revolution's characteristics have not even now been defined, we can say that its first half century has been as subconsciously operative, in respect to world society's thoughts and deliberations., as are a child's day-to-day size growth and the transforming pattern of the Earth's magnetic field, both transcendental to the child's thoughts and plans. Though articulated piecemeal by men themselves, it is safe to say that the first half century of this greatest world revolution has developed without men's conscious awareness either of its existence or of their part in it.

It was possible for this invisibly developing revolution to happen because every separate event was--in respect to the revolution--entirely unpremeditated by man --ergo inadvertent. Each unplanned revolution interlinkage was entirely uncorrelated with the other inadvertencies.

Since the revolution has developed inexorably without benefit of man's conscious planning it must, in due course, be recognized as constituting sum totally a process of nature as transcendental to man's consciously assumed responsibilities as are the Earth's seasons, whose behaviors however may some day be consciously modified by man. In the same way, the great twentieth century revolution's comprehensively uncontrolled development may come under progressively favorable modification and control by man. Such inexorable, overwhelming and invisibly developing events of nature are of the same order of importance as are conception, birth, and death--they constitute in fact total social conceptioning and rebirth with total death or obsolescence of the outworn concepts of social preoccupations.

The human inadvertencies, which altogether add up to the world history's greatest single revolution in human affairs, were executed, separately, each unbeknownst to the others, by a hundred thousand (approximately) of the world's industrial corporations--private or state--the abstract, limited human liability inventions of lawyers or government planners--which during the last half century undertook, corporately, as prime or subcontractors, to supply all the world's most powerful nations with the multi-trillion dollar price tagged flow of technological goods, which altogether

constituted the swiftly evoluting weaponry systems of those nations. The contracts included the invention, research, development, and production of all the swiftly transforming evolution in support mechanisms, consisting of the tools-that-made-the-tools that eventually made and maintained as operative the omni-automated, design regenerating, massive retaliation capabilities, in comprehensive world-space weaponry systems.

The inadvertencies, which unknowingly initiated the transcendental revolution, occurred as, one by one in the course of events, each of the world around corporations' separate contracts were terminated by the world nations' defense departments--due to the progressive obsoleting of their products by the next invention-generations in the swiftly evoluting weapons and tool designs. The inadvertencies occurred as each of the previous weaponry or tools-to-make-tools-to-make-weapons contractors made separate, fortuitous, corporately independent reorientations of their survival strategies and contrived new end-products of their as yet only semi-obsolete, tooled-up, and scientifically staffed production capabilities--converting them from the outpouring of weaponry systems devices to production of the myriad of mechanical and structural items, gadgets, and knickknacks for the "home front"--the "everyday-living" market--which latter we have, for economy of expression, designated comprehensively as "livingry"--in contradistinction to scientific technology's original focus of all of its productive capability in "weaponry. "

Weaponry, born of man's necessity to anticipate high frequency life or death crises in a world of seeming universal inadequacy of vital essentials--best phrased by Darwin as "survival of the fittest"--always had priority of access to the highest performance physical and cerebral resources present within mankind's as yet discovered and comprehended environment.

Priorities for weaponry required sacrifice of access to resources for all the non-priority claiming individual human needs and desires, the seemingly deferrable and less important survival and development activities. As engineers have learned, every action has its reaction as well as resultants, wherefore all priorities must involve anti-priorities. The home-front has always been the antipriority area. From man's person-al home and family life the reserves of effort, savings, and anticipatory capability to meet inexorable crises have always been commandeered to meet the seemingly common enemy. Therefore highest priorities have only been invoked to establish the highest scientific-industrialization capabilities which alone could best produce ever higher, swifter, more powerful, longer distance, and more accurately hitting weaponry for anticipatory defense of the "have" minorities against the "have-not" majorities, who--in desperation of birth into a world of seemingly overpowering inadequacy of metabolic -sustenance and regeneration of life--must periodically join their have-not numbers to revolt against the inferior-numbered "haves. " Thus far in history weaponry has always been accorded priority over livingry.

That scientific industrialization would have a by-product capability to produce livingry was not foreseen. Nor was it foreseen that the development of scientific industrialization to produce special end-product weaponry would generate a comprehensive train of ever more generalized tools to make the tools, which finally made the special tools, that made the ever more fleeting special models of the latest weaponry. The vast generalized tool base of the scientific industrialization which would accrue inadvertently as a consequence of the focusing of both enterprise and government subsidies exclusively upon the end products--the special weapons--was utterly unforeseen.

It was thought by yesterday's "Ins" that their fortresses would be forever

impregnable.

Battleships, it was thought, would be good for generations. It was not realized that every battleship would be obsolete before it was finished. The integrated consequences of all the separate, fortuitous, uncoordinated reorientations of all the world's weaponry producing contractors, applying their do-vastly-more-with-vastly-less capabilities to man's domestic needs was to effect an utterly unplanned alteration of man's historical relationship to his environment. Ecology is the name for the science which studies the patterns of life in respect to the environment. The human ecological transformation consequences of the Twentieth Century Revolution are so enormous that in the last generation of man on Earth, they have increased one hundred-fold the hitherto unvarying, multi-million year, man-on-Earth, average mileage of a human lifetime's total locomotion--which was approximately 30, 000 miles--and has already become 3, 000, 000 miles for millions of humans--and will increase that lifetime mileage one thousand-fold in the present generation and million-fold it in the next.

So great has been the fundamental ignorance of man and so formidable has been the improbability of happy survival of the preponderance of mankind, that his conditioned reflexes would never have permitted mankind's lucid, world around foresight nor his adequately accredited, organized generations of coordinated work, sacrifice, and dedication to be amassed to the degree necessary to his accomplishment, peace-fully, and consciously of the present level of scientific industrialization capabilities and world around resources integration--at which level it now is becoming visible for the first time that man can and may become a comprehensive and continuing physical success in the universe.

As with the bumblebee--of our introduction--preoccupied with his honey seeking--whose tail inadvertently brushes about the pollens to fertilize the botanical members of the omni-regenerative metabolic processes of the total integrated ecologies of all species--so have fear motivated man's negative preoccupations, in weaponry anticipations, inadvertently established the positively reactive technological mastery of universal energies to the degree adequate to elimination of the want which originally had necessitated the weapons.

Specifically--the revolution of inadvertencies has resulted, all unplanned, in doing so much more-with-so-much-less that--despite swiftly multiplying world population and swiftly dwindling per capita metallic resources--that the percentage of all man-kind participating--at the standard-of-living of a modern U. S. A. industrial worker's family (or better), --one so much improved in physical advantages as to have been undreamed of even by the world's richest and most powerful men of 1900 A. D. --has risen from less than one per cent of all humanity to forty-four per cent within the first two-thirds of the twentieth century. Thus almost one-half of all humanity--whose total yesterdays were poverty stricken, illiterate, diseased, and ruthlessly exploited by the "fortunate" strong arm few--has been suddenly and inadvertently catalyzed into a pattern of physical success. This success of the 44 per cent is probably also to be achieved for 100 per cent of humanity well before the twentieth century's close.

No world leaders planned this integrated success of man--neither economists nor philosophers predicted it. None gave their lives for it--consciously. Unconsciously, however, everyone in all history gave their lives for it. There is, therefore, a deep subconscious passion in man which now stimulates his intuitions to strike for realization of the historically held "impossible" and now looming reality of physical success for all humanity.

While the first half of this revolution was unrecognized and uncoordinated--ergo only subconsciously achieved--the second half will be consciously coordinated--for man is now beginning to realize vaguely, but nonetheless realistically, that he need not wait upon the politically organized, fear-mandated-defense underwriting of science and technology – to accelerate the doing of more with less in weaponry only, which is only thereafter to be second-handed into his piecemeal domestic advantaging a quarter of a century--i. e., a human generation--later, and only thereafter in turn to multiply the numbers of humanity to be served at ever higher standard, with ever less resources per each and every function. Despite the inexorably gaining bounty of the previously unapprehended revolution, the majority of humans are as yet poverty stricken ”Have Nots. " But there is now fortunately visible a means of swiftly accelerating the process of converting the remainder of humanity to high standard "Haveness." This is the specific task to which the U. N. ’s International Cooperation Year must address itself.

While the powerful, scientific, computer ’implemented theory of Generalized Systems Controls governed the consciously integrated weapons delivery systems, the inadvertent, uncoordinated, fortuitous reorientation of the contractors' tooled-up capabilities to exploit the separate human home-needs markets was never advantaged by the efficiency of a generalized livingry coordinating system, nor by the latter day powerful expansion and refinement--at the astronomical scope and level of generalized systems theory capabilities realizable only through computerization.

Unlike the home building market, both the communications industry (--"Tel and Tel"--) and the transportation industry have benefited by the general systems controls adopted to weaponry systems, simply because mails, telephones, telegraphs, cables, wireless, railroads, ships, autos, and trucks were--and as yet are--vital parts of the operational weapons delivery and support systems themselves.

Though today American Telephone and Telegraph and General Motors Corporation are far out in front in computerized general systems controls of their respective operations, Henry Ford, Sr., was the pioneer in the long range, world around, historical development of the application of the tools-to-make-tools system of mass production to large end product tools, such as the motorized road vehicles – for mass production had long before been applied to small things, such as pins, army rifles, and watches. The pre-mass production use of the principle of the moving production line, and its large scale jigs, fixtures, templates, and massive power tools and cranes was developed centuries earlier in the production of ships on cradles on marine railways whose launched hulls moved around to outfitting docks, and around the world to receive their final full rigged capabilities.

In the twentieth century’s fifty years of world revolution generating inadvertencies, all that the separate prime weaponry technology contractors attempted – in turning to domestic outlets for their government financed capability-augmentations – was to produce domestic items suitable for profitable processing by their unique tools. Giant electric generators, steam boilers, electric lights, radios, oil burners, refrigerators, air conditioners were originally developed and used only as battleship equipment. Such items were easily converted to domestic use. But many of the potentially useful domestic field capabilities were not originally obvious.

The prime technology contractors’ reorientations to domestic products were usually successful because their advanced technology could, for instance, readily re-place the inferior materials used in yesterday's individual building components without altering the familiar building forms and procedures in any fundamental way. They

produced improved wall panels, partitions, office furniture, stoves, window hardware, aluminum shingles, etc.

But no emergency mandated authority existed, such as the national defense or the military--in respect to the vast weapons-delivery-systems of the integrated national defense systems of the U. S. S. R. or U. S. A. --to comprehensively organize and oversee the industrial contractors' scientific development and production capabilities under a comprehensively coordinated world system, designed specifically to make all men on Earth a physical success--while at the same time increasing each individual's degrees of freedom while also ever lessening their inter-trespassing upon one another --and to do so without at the same time raping Earth of its fundamental resources or robbing man of inspiring antiquities or of further restimulating environmental challenges and riches, both abstract and physical.

No scientifically informed and popularly mandated authority existed or as yet exists which adequately comprehends the immediately developing overall world revolution in design science concepts and world scale logistical capabilities development. Such an authority must first emerge to effectively convert the building world from the most ignorant and self-corrupting exploitation of all the yesterday's ever desperate needs of man--to be now converted into the most comprehensively effective and successful enjoyment of life in universe by all of humanity. As we shall see, such an authority is even now emergent in the I. C. Y. and other developments.

Yesterday's scientifically organized weaponry contractors--whose whole development had been subsidized and developed by the national defense authorities--never had to risk their judgment on the selection of the weaponry items to be produced. That was the prerogative of the national defense authorities whose reasons were often obscured by top-secret classifications. When the prime technology contractors converted their exploitable tool-ups into production of livingry items, they assumed that all the building items had been wisely selected for production.

The ex-weaponry, prime contractors are the cast-off, long-time "kept mistresses" of the sovereign nations. The ex-prime contractors familiar with the grand strategies of the intimately coordinated, scientifically evolved and unitarily commanded national and allied defense systems--assumed that their new master, the building industry, like their old master, the National Defense Department, must of course have a grand, logically coordinate strategy. Both the weaponry and ex-weaponry contractors have assumed, therefore, that their long preoccupation with weaponry was, and is as yet, alone responsible for their ignorance of the building industry's organizational ramifications and general scientific conceptioning. Naively the weaponry contractors say, "All industries must of course be governed by a comprehensive system." They don't know that the unsystematized, happenstance building activity was so inefficient and uncoordinated that it went utterly bankrupt in 1929; and that ever since its real-estator operated, anarchistic plunging is entirely subsidized by several hundred billion dollars underwriting of the U. S. Government, because the building activity's overall, unplanned mushrooming and technical inefficiency has no true objectives against which to measure its gains, ergo no possible innate profits and enterprise attractions. The real estate world is a capital cash-in and is sustained only by capital loss. Real estators buzzard the dilemmas of humanity's constantly increasing dwelling and workspace needs by bull-dozing orchards, laying in water and sewer lines, and throwing up boxes. Their overall unplanned exploitation is so shortsightedly costly to society that the multi-hundred billion dollar government mortgage guarantee underwriting is in reality a commonwealth capital loss that is adjusted progressively by generation long deferments of the ultimate

reckoning of the cost to world society and its progeny. These deferments are accomplished by local and federal government bond issues, guarantees, etc. The multi hundred billion dollar real loss that is mounting will never be paid off nor recoverable.

The indebtedness is carried however on the government books as a momentarily lucrative debt-service generator that drives vast billions of interest payment dollars annually into the macro-cities banking systems' expansion--and into the latter to a ridiculous degree in which colossally sumptuous branch banks are erected in almost every "big city" block. New York, New York, has possibly more big name branch banks than 5 and 10¢ stores.

The prime technology contractors, veering from weaponry into livingry, accept blindly the "so-called" building "industry's" product categories as having been scientifically conceived--whereas the fact is that livingry as the historical antipriority is a bedlam of less-with-more make-do's, fortuitously contrived with the lowest capability resource left-overs, wrapped up in religious, and aesthetic orders of classical-modern interior and exterior symbolic distinction superficialities.

No Ph.D. scientist has ever been retained to consider the general systems theory governing establishment of the potentially successful, life of all men around Earth – let alone retained to look at a toilet. No architect or builder knows what buildings weigh--they have never heard of performance per pound.

The rocket capsule that will keep man living successfully in space for protracted periods, entirely remote from the sewer and other service mains, will be the first "scientific dwelling" in history. The prototype of the little 300 pound black box, which will reduce the metabolic regenerative system, as now operative on Earth from a one mile diameter ecologically accomplished chemical-energy exchange complex, to a four foot diameter rocket capsule energy regenerating accessory, will cost in the neighborhood of seven billion dollars. Once produced and successfully "operative, " its replicas may be mass reproduced for $2 per pound, i. e., for $600. With such an integrated chemical-energy regenerator taking care of all sanitary and energy generating requirements of family living, men may deploy almost invisibly to the remote beauty spots about the Earth in air-delivered geodesically enclosed dwelling machines and survive with only helicopter and TV intercommunication at luxuriously simplified high standards of living--operative at negligible land anchorage cost similar to telephone service charges.

Because of the dawning awareness that the weaponry phase and its quarter century lag can be eliminated, this second half of the tool invention revolution is to be identified as the consciously undertaken continuance of the accelerated doing more with less by world society as world society led by I. C. Y. becomes aware that man's comprehensive physical success is not only possible, but that it can only be accomplished through design science competence. To do so, design science now emergent in university research activities encouraged by I. C. Y. will first develop the comprehensive, computerized programming of the general livingry system. World coordination of the design systems development is to be administered--as will be seen later--by spontaneously self-organized university students whose world around design science coordinating authority, because of the inherent primacy of physical capability in energy universe, will progressively displace the sovereign nation's political authorities who, until yesterday, have administered the regeneratively self-improving more with less system, exclusively on behalf of their respective separate national defenses, on the assumption that there was not enough of world resources to take care of even one half of humanity, .

wherefore, it was also assumed that: War for survival was and would be forever a necessary characteristic of mankind.

This, the ultimate revolution, now to be resolved only by scientific inventing and engineering competence of the young world in general, instead of by the now outmoded and obsolete political initiatives, will swiftly bring about high standard survival for all and thereby the elimination of the former political recourse only to preparatorily acquired weaponry and to the now untenable assumption that survival can only be justified by elimination--on the battlefield or in the slums' lower velocity rot-rate--of the unsupportable excess of human population.

Through design science, the common success of all men is guaranteed which, for the first time in history, eliminates the factors – to contend with which--all the world nations' defense systems were established.

Responsibility for development of the scientific invention competence is being spontaneously assumed, in ever increasing degree, since 1961, by the world around students in the professions--at first in architecture, engineering, and science. They are now being joined by university students of all kinds and will not be vastly encouraged by I. C. Y. support of their initiative.

Politics will play its future part which, however, is only a secondary service--a stewardess function--of polite supervision of the passengers' "adjusting of their seat belts" for the great world "take-off" for physical success of all mankind. But be-fore the inventing youth can seize the initiative from world politicians to make the great flight to comprehensive success, they must--figuratively speaking, only--first state clearly to themselves and to the world what the design science problem consists of. The problem includes the parameters of generalized, anticipatory, comprehensive system theory. Students will then invent, calculate, and design (a) the development, (b) production, and (c) operational tune-up of the million-types-of-parts prototype of the as yet nonexistent "one-thousand passenger, vertical take-off, rocket ships. " Within this hypothetical invention we package the myriad of do-more-with-less, design science inventions, innovations or reorganizations with which the revolution can be won for all humanity--within twenty years, if all goes well--and as it is now augured by the swiftly progressive realization of the true nature of the problem by the world students.

Paris, France, July, 1965, will be a prime focus of the largest world travel in the history of man. Paris will provide in July a most spectacular world stage. Upon this stage the I. C. Y. technology committee and the comprehensive world economies initiative seizing students have chosen to inaugurate their Design Science Revolution. They will do so under the auspices of their International Union of Architects, the only world organization of professional architecture whose members co-represent all sides of all the political curtains. As the university students present their first stage statement of their five stage, ten year overall, planned world design revolution, they will have an extraordinary opportunity to catch the world's attention with their surprisingly discovered and lucid truth that." "The one and only world revolution which is omnipolitically tolerable is now underway and is visible to all the world at the I. C. Y. encouraged students' exhibit at the International Union of Architects' Eighth World Congress now meeting right here in Paris. "

This is a superb opportunity to clarify for all humanity that the fundamental and prior problem of man's surviving successfully on this little sun-orbiting space ship, "Earth, " cannot be solved by political theory and is not to be left to the politician's

ultimate lever--war--hot, subversive, cold, or cool.

Because the revolution is so large, selection by man of the natural and best, timing and place for public birth of its conscious promulgation is difficult to judge. Paris 1965 may not be the right ripe moment. If so, the I. C. Y. and the students will make presentation after presentation the world around, until the concept of the scale and import of the revolution are publicly realized. Both the I. C. Y. technology committee and the students see that the world's prime, vital problem bears repeating a million times. It is: How to triple swiftly, safely, and satisfyingly, the overall performance realizations per pound, kilowatts, and manhours of the world's comprehensive resources. To do so will render those resources--which at the present design level can support only 44 per cent of humanity--capable of supporting 100 per cent of humanity's increasing population at higher standards of living than any human minority or single individual has ever known or dreamed of, To thus concentrate on the mastery of the physical service of man will also have its inadvertent profit increment, for to master the physical--intellectually--will bring into human intercourse a level of integrity of exploration of the metaphysical capabilities of man and the metaphysical ramifications of universe also heretofore undreamed of by man.

Science and engineering say this is eminently feasible. lt is feasible because the world's economy is now operating at an appallingly low overall mechanical efficiency level in which the machines realize, in energy work done, only one twenty-fifth--i. e., 4 per cent of the potential of the thus wastefully consumed energy, while the structures of the environmental controls, housing the machines and the regenerative human ecology, realize less than 1 per cent overall structural efficiency in respect to the now known structural capabilities in cubic feet, per ounces of materials controlled, per units of labor time, and per given protection or advantage function; i.e., we could build one hundred comparably volumed and useful buildings out of the same weight, time, and energy resource units now ignorantly processed into one building. But this relative performance advance involves comprehensive building system reorganizations.

In contradistinction to that miniscule 4 per cent overall mechanical efficiency and 1 per cent overall structural efficiency now realized by world man, the automobiles' reciprocating engines are 15 per cent efficient. The new gas turbines are 30 per cent efficient. Coal burning turbo electric generators are 40 per cent efficient. Jet engines are 60 per cent efficient. Combined desalination and electric power generating atomic reactors are 72 per cent efficient. The new fuel cells are 80 per cent efficient. Organized design science competence, general systems control, and employment of man's normal rate of inventive evolution can swiftly triple the overall resource effectiveness, and that's it. Instead of living on his million year deposited savings account of fossil fuel energy, man can, with larger installation and comprehensive planning, succeed in living on his vast daily energy income account in gravitational energy generated watershed and tidal dams, sun power et al. Thus, this and future generations may conserve the fossil fuel hydrocarbon energy savings to be passed on from generation to generation as an emergency "cushion. "

Typified by the University of California's 1964-65 New Year's Berkeley Campus outbreak, the present twenty-one year old junior class university students--everywhere around the Earth – are the World-War- Two babies. Most frequently, as babies, their fathers were away at the war and their mothers away at the munitions works. The superlative wartime spirit of social cooperation which must have inspired the children's foster parents and baby sitters to undertake the care and nurturing of those babies may have satisfied to unique degree the baby's and children's innate trust,

the most critical and most easily damaged of all the socially coordinate spontaneous behaviorisms of new born life--which, if damaged usually results in school dropouts and juvenile delinquency. The World War Two babies' subsequent childhoods were spent with their "G.I." student parents at universities. The attempt of their parents to learn more --to speak better--to use their heads instead of their muscles to win their livelihood was, as has been learned also through behavioral science, a most powerful influence on their childhood's favorable development of intelligence. 1965's twenty-one-year-olds are also the first babies reared by the "third parent, " television, which brought them world news every hour with greater frequency and regularity than they received their milk. They think "world. " They think and demand justice for all humanity, with no exceptions! The world students are the world revolutionaries. Th y are also the most literate students of all history as well as the first "world minded, "ergo, nationally unbiased, as well as the healthiest students in history. Altogether, theirs will be the most powerful and constructive revolution in all history.

In the prime of life, realizing their first individual independence and bursting with logical and realistic idealism, the students are everywhere confronted with yesterday's science fiction, now operative as today's practical reality.

Firstly, the students comprehend that any invention can be realized.

Secondly, the students find themselves confronted with the concurrent news of the majority of the world people being as yet faced with starvation, ignorance, and suffering.

Thirdly, the students are confronted with an ideological struggle of the world's major political systems, the major protagonists of which, in idealistically convinced self-righteousness, alike exploit to the limit men's lethal dilemmas by every manner of subversive and guerrilla warring. Each assumes that the poverty stricken peoples' problems can only be solved by political organization. Each seeks to prove its respective political system to be superior to the others'. Each hopes to gain the largest world support for their equally lopsided and mutually obsolete political biases. Each spends far more to frustrate the other side than they spend in developing any realistic plans to make the world work. Each pours its technology only into weapons. Each distributes lethal weapons en masse to people who only want to eat, love, speculate, and laugh. This homogenization of negatives hides the fact that no political system can, by virtue of its ideology alone, make man a physical success. Both sides, as yet, assume Thomas Malthus' and Marx's fundamental resource inadequacy to hold true and claim their respective systems to be most just under the assumed mutually exclusive economic survival alternatives imposed by fundamental inadequacies.

But---take the technological tools of industrialization away from U. S. A., Russia, France, China, England, West Germany, Japan, and Italy and leave them all their respective ideologies and, within six months, two billion world humans will die of starvation. Contrariwise, take away from those eight sovereign states all their political ideologies and political leaders and leave them their industrial tools and human operators and their habitual daily production and distribution system network tasks and no more will starve than are starving now. New gap-filling pro tern leaders would spring up everywhere, overnight, with emergency gained authority who would make things work as well and probably better.

Only as a consequence of such politically transcendental and industrially informed observation is it now philosophically, scientifically, and mundanely visible

that the only difference between all of the unsuccessful yesterdays and the half successful today is the presence of the world-around industrial network and its regeneratively multiplying scientific and technical know-how.

World society is as yet unappreciative of industrialization's significance. Its super-evolutionary stature and the nature of its comprehensive functioning are as yet obscured by thick overlays of essentially irrelevant theories of its political and economic profit involvements. World students will, in due course, discover that world industrialization is an evolutionary transformation, as fundamental as that of caterpillars into butterflies, Man's originally internal and corporeally integral functions and organic processes are inventively externalized by man, altogether to provide a world around metabolic regeneration system of mutually sustaining significance only. For instance, great cities are organic components of the world industrialization. Into the cities evoluting continuity, new human lives are born and lives die out as are little coral animals, in and out of coral reefs. Industrialization constitutes continuous man. Each new life is born to be stimulated positively or negatively into making direct or indirect, conscious or subconscious contributions to the evolutionary increase of the industrial common-wealth's metabolic and metaphysical regeneration capabilities.

Uncomprehending industrialization as constituting inexorable accelerating evolution everywhere around the world, the students demand impatiently that the world be made to work, right now! However, as with the older population, the students' re-flexes have been originally and overpoweringly conditioned by their childhood experiences of being at first helpless babies, utterly dependent on their parents' responsibility and authority. Both as child and as youth, their reflexes have been conditioned to think of problems as being solvable only by some higher authority – their father--the school teacher--the family doctor or the family priest. For this obvious reason, they now assume that the world problems can only be solved by their respective Rig (political) Papas and by the latter's political initiative. But the students don't as yet understand that the man-date of political leaders stems from an inherently debilitating bias – the exclusive protection of their respective national or political groups.

As we have already observed, due to the inordinately low level of mechanical efficiency of the world's production and distribution system, as now designed and operative, not even one-half of humanity can now survive for half its potential life span, – though it is eminently feasible by design to triple the mechanical efficiency level and thus take care handsomely of 100 per cent of humanity. The problem is primarily one of performance upgrading by scientific inventions. However, the true technical nature of the problem is overwhelmingly obscured by the individuals' millenniums long, reflex conditioned reliance only upon whichever political individual happens to be the most powerfully emergent claimant to being the "champion" of his- community and nation's cause. It is assumed by man's historical conditioning that the strongest political leader-ships are morally ordained to lead society into periodic warring for survival only of the "fittest. "

Many factors have operated to bring about such fatalistic, social reflexing. Much vulnerability of society arises from misplaced social confidence in the soundness of its primary educational concepts. For instance, major reflex conditioning of society springs from the universal, elementary schooling of children with Greek geometry's definition of a triangle (or of a circle or any polygon) as "the area bound by a closed line"--in the case of the triangle "the area is bound by a closed line of three edges and three angles. " In the days of the Greek geometers' formulations, the Earth was thought of as a plane whose lines ran outward horizontally to nowhere. Outside the triangle lay

ultimate wilderness--then chaos, then infinity. Today we know that the Earth and all systems are finite. The law of conservation of energy says "Energy may neither be created nor lost. " The physical universe is a finite system. Earth is a finite sphere. The surface of a sphere is a unit area; any closed line such as a circle or a triangle set upon a sphere, subdivides the whole sphere's surface into two sub areas--i. e., the two areas on both sides of the line. The Earth's equator subdivides Earth into northern and southern hemispheres. When a small triangle is scribed on the Earth, the remainder of the Earth's surface is also a unit area defined by the same closed line of three edges and three angles – with the angles greater than 180 degrees.

Dogmatic teaching of Greek plane geometry in elementary school produces an exclusive--only-one-side-of-the-line bias whereby the "inside" area, which is "our" area, is also a finite and valid area. It is inferred by the Greek geometry that all the surface "outside" in an infinite, unbounded area, ergo uncontrollable, is ultimately chaotic and unreliable. To each elementary school student--carelessly misinformed in many ways, such as: "the sun goes down and rises, " the world as yet seems realistically to stretch away horizontally to infinity, despite the students mildly contradictory geographical training. It is easy for the students to be trapped by the "one-side-of-the-line bias. " Ergo--they automatically assume that "the other fellow is wrong." This bias is a typically debilitating consequence of dogmatically accepted axioms, many of which though now proven invalid through scientific experiment continue to be taught to hundreds of millions of young students.

The politicians are forever faced with the ultimate, axiomatic, Malthusian economics--the "you or me" decisions, "because there is not enough for both of us." Politicians therefore are not only inherently but also debilitatingly biased. In spite of their ghost writers' political speeches--rising at times to altruistic heights--politicians are always realistically maneuvering for the next election or supreme council meeting. Despite superb dreams of some political leaders, compromising deals have usually had highest priority in their ultimate ways-and-means decision making.

Those politicians who undertake altruistic and idealistic solutions of the "only you or I can live--not both" dilemmas, always fail because of the heretofore, seemingly "forever, " lethal, economic assumption of a fundamental world resource inadequacy--as thus far in history designedly employed, and as thus far understood, either popularly or by the non-inventively thinking economic experts.

In the Design Science Revolution world students have at last glimpsed the realization that they no longer must leave the solution of the world's problems to the politicians or to anyone else other than themselves. The world's students have glimpse-realized that with the same. inalienable right as that of anal inventing individuals--i. e., with poetic license only--without guns or weapons of any kind--employing only their intellect, which is weightless--they can seize the economic initiative and institute the tool and network design revolution and its also realistically designed performance up-grading of the world resources to serve 100 per cent of humanity instead of 44 per cent.

Practicing professional architects and architectural students may say, "This is not in the architectural curriculum. What authority decreed that architectural students might be allowed to take the design initiative in redesigning all the industrial tools? Who is going to pay us?"

The answer is, "What authority told the Wright Brothers to invent the air-plane? Who told the Bell Laboratory scientist to discover the transistor? Who told

Bell to invent the telephone? And if you make a good invention, all the world will pay you for it over and over again. "

Initiative springs only from within the individual. Initiative can neither be created nor delegated. It can only be vacated. Initiative can only be taken by the individual on his own self-conviction of the necessity to overcome his conditioned reflexing which has accustomed him theretofore always to yield authority to the wisdom of others. Initiative is only innate and highly perishable.

WASN'T ALL THIS VISIBLE BEFORE? Why hasn't the whole world been consciously disciplined to coordinate such a do-more-with-less design revolution?

The answer is: the generalized do-more-with-less principle has only be-come meagerly visible to anyone in the last three decades, and only importantly evident to a few more in the last decade. It has emerged, all unpredicted by any economists of history, through the accelerated evolution and mass production of doing more-with-less primarily in weaponry. It is the result of mass production of the means of production, which in turn was brought about only by the historically unprecedented "massive retaliation" strategy of the 1950's and 1960's, which in turn became possible of realization--for the first time in history--only with the advent of the invisible scientific tidal wave of atomics, electronics, and computerization. Doing vastly more with vastly and invisibly less, is known technically as ephemeralization. The mass production of electronic controls inaugurated automation. With automation has come--just now--a dawning awareness of the invisible avalanche of ephemeralization.

Until World War Two saw the Maginot Line swept over, as though it did not exist--mankind's dry land civilizations had always conceived of their safety as being dependent upon ever more massive fortifications! The heavier and bigger, the more secure! No one knew or cared how much weight was piled up. Even today, neither architects nor their clients nor the public has any thought of how much buildings weigh. Massive masonry and "deep window reveals" were the "most wanted" residential architectural features of the 1920's.

What swept over the world's historically most massive and deeply founded fortification, the Maginot Line in 1940, was the German's bringing out onto man's dry land of the, theretofore exclusively seaborne and seakept secret strategy of doing vastly more with invisibly less--the tanks were submarines climbing out upon the land, the airplanes were the destroyers with wings--stunned mankind called it the Blitzkrieg. The do-more-with-less blitzkrieg machines didn't have to "take" the fort. They ran right over it. They commanded the whole economy's circulatory system. There was no greater hitting power anywhere to still their omnipresent killing power.

Mankind, conditioned only to look for more to do his tasks, was utterly confused by the blitzkrieg. He kept looking for a bigger rather than a smaller explanation. This was the popular historical turning point. Throughout all of known history, 99 per cent of humanity occupied only the dry land--whose arable portion amounted to only about 5 per cent of the surface of planet "earth"--the other 1 per cent of humanity occupied 75 per cent of Earth's surface, the great, treacherous, watery one ocean world. Realizing that ships may deliver magnitudes of cargo tonnages thousands fold that transportable on the backs of men or animals, the 1 per cent of world population who became high-seas merchantmen, or pirates, mastered the other 99 per cent of human population by controlling all the sea lanes of the world commerce and thereby the world's wealth integrations. The great pirates became supreme. The secret of their mastery lay in

the secrets of shipbuilding, handling, and navigation, in which the basic limits of floatability--or displacement--meant that whoever could build-in the highest overall performance with the least weight and effort, could float-mobilize the greatest and swiftest hitting power to command the seaways and their merchantmen, and thereby run the world.

The ethereal, strength secrets of ship, airplane, and rocketry building have 'never been even mildly understood by the only massively impressed brains of land men, i. e., 99 per cent of humanity. Up to 1932, the calculation records of all naval ships were methodically destroyed by all the admiralties of all the navies of the world. How many Americans are familiar with the name of Webb Institute, the premiere source of the U. S. A. 's great naval architects?

That man might do more with less was thought of by the "landlubbers', " economic experts as nonsense. Up to and through World War Two, more-with-less used to be conceived of as impossible and jokingly referred to as "lifting oneself up by one's own bootstraps"--we don't hear of the expression now. But it is only since World War Two that we haven't heard it. The public press has not yet noticed the obsolescence of that historically devastating cliche.

A key part of ephemeralization's acceleration has been played by the return of approximately all of the world's metallic scrap into complete reuse. This scrap recirculation released by progressive obsolescence of earlier inventions by newer more efficient ones was utterly unrecognized by either economists, businessmen, politicians, -- or even the world's metal monopolizing cartels up to 1940--as constituting a fundamental factor in the doing more with less process. It is approximately unknown even today that the World's total mined metals resources recirculate every 22 1/2 years. This surprising condition occurred as follows: the quantity of the prime metals--iron, copper--mined and put into circulation during the years 1917, 1918, 1919 of World War One --was threefold the total cumulative quantity of those metals mined in all previous history. The vast new, recirculating resource did not come into play historically until 22 1/2 years later, i. e., in 1940, 41, and 42, which was well into the years of World War Two. In the onrush of war, the vast new scrap arrivals were unnoticed (except by the few who had predicted its arrival). The economists assumed this scrap metals arrival to be a normal part of the enormously stepped up war production in general--"probably" they thought, "the scrap has been sacrificed by patriots throwing 'their all' into the breech. "

Economists, politicians, and financial market speculators as yet think of today's and tomorrow's metallic resources as only existing in mines. They have al-together missed that the metals once mined go into eternal recirculation--chemical elements never become second-hand and shop-worn. All that is needed is energy and know-how to free them in pristine purity for further tasks. The United States has no tin mines--yet it has a tin reserve in aircraft and rocket production's soft tools--greater than the ore reserve in Bolivia's great tin mines.

Only 14 per cent of all the copper mined historically by man is not at present recirculating. And that 14 per cent which went to the ocean bottom in munitions ships will soon be recovered and put into the circulation.

During World War Two and during Eisenhower's cold war metallic stock piling, ostensibly for swift and massive retaliation capabilities, the great mine owners realized a contrived bonanza, as the otherwise adequately recirculating metals were augmented by a two-folding again of history's all time mining rate. Employing the

22 1/2 years "recirculation yardstick," we may safely predict that from July, 1966 to 1975, the world's recirculating, scrap derived, metals resources, coming uninvited onto the world's metal markets, will be more than doubled again. This massive metal's supply will render the design science conversion of the world's resources--from the service of only 40 per cent of humanity, to service of 100 per cent of the world's population--a facile matter.

The world's metals cartels, the older 'have' countries and the newest industrial nations--as yet uninformed regarding this newly emerging scrap recirculation--now reconnoiter to control as surreptitiously as possible the metallic resources originally buried by nature within the distantly deployed, world-around lands of the now newly "emerged nations." Their uninformed economic premise is that the integrity of expansion of the industrial giants will soon depend largely upon the as-yet-undeveloped and unmined, "tantalizingly rich" metallic resources of those many small nations. All those so assuming will be "rudely awakened" when (a) the avalanche of unexpected scrap of World War Two plus (b) the dropping market enforced, cold war, stockpile cash-in of the national holders of the unused metals will suddenly dump such an abundance of metals on the world markets that, when combined with (c) the doing three-fold more per pound technology--concurrently coming into the domestic technology--with (d) the converted weaponry producers vastly higher performance, tool capabilities--the 100 per cent industrialization of world man will probably be realized without further development of those .new nations'. as yet unmined metals, resources. The latter will become the reserves for the future generations' "rainy days." This enormous, self-augmentation of industrialization's doing-unprecedentedly-more with unbelievably-less which is about to take place. all unannounced, is the big economic surprise that will bring about final abandonment of the cold warring now being insinuated into the small nations' theaters as, not too invisibly, puppeted by all the big nations of all political biases.

There are several other major economic world trends which are as surprising as they are vast which are also heading full-speed to integrate with and compound the "big economic surprise" which will sum totally render man on Earth an "overnight" total physical success.

Of top importance among the events trending to compound as the big surprise is the trend of big business to move its headquarters permanently out of the country – out of the U. S. A. --out of any sovereign nation. In the official language of the U. S. Department of Commerce, there are two kinds of U.S. Foreign investments--direct and indirect.

Indirect foreign investment consists of U.S.A. citizens and corporations buying and owning of equities in countries outside the U. S. A.

Direct foreign investment consists of capital investments by U. S. A. corporations in land, buildings and machinery for foreign manufacture and commerce.

At the beginning of the twentieth century, the U. S. A. had three and one half billion of our present "F.D.R." dollars worth of direst foreign investments--this amount increased slowly for a third of a century, to eight billion of our present "F. D. R." dollars worth. by the time of the 1929 crash. U. S. A. 's D. F. I. then diminished to seven billion and held there for thirteen years until, in 1942, when the U. S. A. 's second World Warring required much foreign production activity which the U. S, A. entrusted in entirety to its private enterprise's operation and management.

Since 1942, the direct foreign investments of the U.S.A. have zoomed ten-fold from seven to over seventy billion "F, D. R." dollars worth, which equals the value of all the gold that has been mined in all history--of which 42 billion "F. D.R." dollars is the total value of that portion which functions as monetary gold. The U.S.A. 's Direct Foreign Investments also equal in value the seventy billion dollars worth of the entire electrical energy generating and distributing industry's capital equipment as now owned by the combined public and private sectors of the continental United States.

The original U.S.A. born corporations' direct foreign investments are now doubling every seven years. Unabated, they will probably double to one hundred and fifty billion dollars by 1972.

In 1964, the seventy billion U. S.A. Direct Foreign Investments earned four and one half billion dollars net after paying all taxes. That is just over 6 1/2% net.

Largest earner from direct foreign investment was General Motors, whose one half billion dollars--constituting one-third of its total 1964 earnings from all sources of one billion and a half dollars net profit after taxes--came from its foreign operations, despite that much less than one-third of its total capital investments have been made outside the U. S.A. So powerful is this trend of big U. S. corporations that in 1964, $4 out of every $5 that the U, S.A. 's 100 largest corporations put into new capital equipment investments went into their foreign operations.

Quite clearly, as I. B. M. 's International operations chairman, Arthur Watson, says--"the trend is already a reality and big business is no longer 'national' in character but is identifiable only as a 'world' phenomenon."

Watson says that it is now as inappropriate to speak of 'England trading with Spain'--or of world commerce as a 'country trading with a country'--as it would be to speak of the myriad mideast coast U. S. A. commerce events as consisting of states trading with states, i. e. 'New York State trading with New Jersey'--with their trade balances only adjusted annually with gold bullion transfers. Despite big businesses' new efficiencies the world's sovereign political states as yet operate with utterly out-worn international accounting customs, inherited unquestioningly by world society--from the great pirates method of avoiding hijacking of their gold on the high seas by trading for a whole-at-a-time on credit leaving their high rank 'sovereign ambassadors' as hostages in the foreign capitals, to insure their annual trade balancing, which took place only 'across the counter' or 'down the street' between the large banks in the world's well guarded capital cities.

The post 1942 pattern of the foreign industrial corporations' upsurge is quite different from the old foreign mine and oil well exploitations in which the 'U.S. or European corporations took away wealth from the foreign countries. The new trend brings wealth into the foreign countries. The old pattern became intolerable to most of the exploited countries who seized the wells and mines and operated them for their own account as, for instance, did Iran or Mexico.

In addition to prohibiting foreign operators from taking away their wealth, Mexico will not allow any foreign corporations to export automobiles or other major manufactured items into Mexico. They require that the foreign corporations shall manufacture in Mexico. The Mercedes auto for instance is popular in Mexico due to its world-around acknowledged excellence of performance. The Mercedes Company like General Motors must manufacture their cars in Mexico exclusively for Mexican consumption. They must give the Mexican government and Mexican investors the majority

of the shares in their Mexican manufacturing corporation. But General Motors, Mercedes et. al. can, for good value given, and without depriving the foreign operation, take out enough profit to make the sum of all their many separate foreign earnings a fabulous amount. Ergo, the foreign countries prosper and get the benefit of the know-how of a world-powerful research and development program, to an extent greater than they could develop for themselves. The Mexican's could produce an "Inca" car or a "Montezuma V8" but these products could not have the mature world corporation's know-how, service-ability or competitive earning value.

It is improbable that these new era world companies ever will be seized by the countries as the countries are already the majority share owners and are realizing greater wealth and technical advantage earnings, from General Motors' world experienced, production management and research development, than they could possibly make on their own.

This general exodus of the world industry giants from sovereign protection of their respective countries of origin will in due course altogether eliminate big business lobbying for continuance of their respective earlier domestic 'protection' – in a way of custom tariffs – and even indirectly through passport controls, just as intra-New Jersey-New York state customs and passports have become utterly impractical of maintainance as state sovereignty devices.

As the big corporations graduate to world status they enter countries whose wages are far below U. S.A. wage scales. Because of the world corporations economic lessons learned in their "school days" in the U. S.A., – e. g. that the higher and wider the wages distributed the more prolific and profitable the mass production – the big world corporations policy--now managed more and more by computer determinations regarding "which is the most profitable strategy – this or that?" – will promote progressive increase in foreign wage rates and in time-payment finance to accelerate world buying. This world corporations' around-the-world, wages step-up to final parity with U.S.A. wages will not be occasioned by the U.S.A. labor unions instituting world operations--a difficult task due to passports and other restrictions – but all unexpectedly by computer fiat because it will be promoted profitably by the world corporations' C. I. T. type investment operations, it will take only a decade to develop world wage rate parities thus eliminating the fundamental frustration of economic development in India, etc.

In the meantime, the low foreign wages will make it impossible for the U.S.A. labor to compete with the world industry operations without committing economic suicide by quartering their wage rates. Instead U. S.A. labor will have to recognize that its direct objective of raising labor's income share of progressively multiplying industrial wealth augmentations was only inadvertently, the means of its doing something much bigger and more important for world industrialization and humanity which was the key to making U.S. mass production industry successful. Labor's inadvertent contribution to world industrialization success was that its widely distributed and stepped-up wage rates made possible mass purchasing which made mass production of any good prototype a fundamental economic success. To consolidate its gains and to stride forward into the new era, U. S.A. labor will have to let automation articulate briskly its flourishing trends in order to greatly advance the production of the organized energy -wealth-capability and thereby to make possible the residual, smaller U. S.A. producers' ability to compete favorably in world markets. Thus U.S.A. labor will have to persuade the U. S.A. Congress to underwrite fifty million lucrative university scholarships with life benefits of every type in order to persuade labors 'rank and file' to unblock and mandate full-cry automation.

The only limitation to such a commitment is the ability to produce the goods which will be commanded by this steady buying power, and that exactly is what automation alone can do! The same scholarships will have to be given also to all the tens of millions of job holding bureaucrats – federal, state and corporate--as the international and inter-state tariffs and personal taxes are progressively eliminated "on advise" of the computers – as to the most favorable strategies for generating, distributing and regenerating the greatest possible real "energy intellect" – capability commonwealth in the shortest possible time.

In order to make universities adequate to the avalanche load, a 'great teachers' documentary producing television revolution in education must take place. First thing will be to give all the faculty "deadwood" of all colleges and universities super research "fellowships" – to be operative anywhere off campus.

Through computer analysis the private vs. public sectors' "best-interest" differentiations will trend to disappear. As they diminish the inhibition by invitation – already commenced – of the world-production-corporations' enterprises, into the previously, exclusively "socialist" lands will swiftly increase. With such, socialist invited, world-type corporation's automated enterprise installations advantageously operative in socialist lands, will come the supra-bounteous, incentive-held options on capital share values, which will gain swiftly as world-around accredited and computer evaluated relative wealth augmenting. In order to stimulate and properly reward those who initiate and sustain--the commonwealth multiplying – ever higher standards of performance in any and all prosocial advantage directions, – options on shares in the world industry corporations will be purchasable out of the lucrative "fellowship" incomes, by the computer detected and designated individuals who prove to be real-wealth augmentors of "important" magnitude.

All such vast considerations of "wealth" generation and regenerative distribution must start with both scientific and popular recognition of the extraordinary potential-capability value of the human beings which themselves constitute a priori, automated and metabolicly self-regenerating, brain controlled, growth mechanisms. The wealth comprehending must also recognize the extraordinary potentials of the natural environment., if properly understood as a complex of complementary patterns which if properly manipulated can support total man life. Next in importance in the consideration of the factors necessary to man's realization of nature's potential wealth, comes man's experimental discovery of the leverage principle – as man accidentally steps upon the long end of a log, lying across another log, with the short end of the stepped-on log lying under a third log too great for man's lifting by the combined muscles of his back legs, and arms. Man sees and realizes, as he steps on the log, that his relatively light weight is easily lifting the far heavier log. After much lever exploiting experience, man next arranges a set of lever arms around a hub and places this wheel of paddle-tipped levers in a waterfall and is able to link up the turning water-wheel shaft by pulleys, belts and gears – which are all lever principle devices--to do sustained work greater than he can do with his own muscles and that the .linkage of free energies to levers belittles his miniscule short period efforts. With these interlinkages of the lever and channelled energy man is now in the wealth making business, which is to use his brain to get nature's vast energy patterns to do the energy work of supporting and regenerating him.

All this is possible because the true wealth of world man is mathematically inventoriable as his physically organized ability to protect and satisfy his forward, inexorable, metabolic and intellectual regeneration needs – which forwardly established, metabolic regeneration capability wealth is statable in per capita forward days, safely and adequately anticipated.

The physical abilities which can anticipatorily furnish the metabolic regeneration capabilities consist of three main components, – two of which consist of energy, while the third consists of physically weightless, intellectual know-how.

The first energy component is energy as matter out of which man fashions all his tools, each of which is a development of the fulcrum and lever or the mechanical advantage principle.

The second energy component is 'free' energy as radiation or gravity, which may be channeled and focused electro-magnetically, and otherwise, to impinge on the advantage-ends. of the levers to do the forward metabolic regeneration work. Intellect shunts the free energy patterns of universe – external to man – to impinge on the big, automated leverage, work complex by using man's miniscule physical (muscular and brain reflex) capabilities, only as self-starter and coordinator mechanisms, which self starter efforts are amplifiable by the "advantage" principle are pyramided relayingly, to finally in turn, start-up and coordinate the latest-biggest, system machines – by making first the small scale tools that make the bigger tools, which in turn mass produce the ever bigger and more prolific – brain-reflex emulating – automated tools.

Of this regenerative energy-wealth-intellect-know-how operation, it may be said that the scientists assure us, by the experimentally derived law of conservation of energy, that "energy may neither be lost nor created." They also assure us that the physical universe is finite--and consists exclusively of energy – therefore, the energy content of wealth is inexhaustible; ergo, irreducible. They also assure us that experiment shows that the intellectual know-how content of wealth is only increasable, for every time intellect is employed experimentally, it learns more. It can't learn less. If it learns that what it guessed "might work" doesn't work – that is learning more; ergo, wealth, which cannot decrease physically and can only increase intellectually can sum totally only multiply.

Real-wealth is irreversibly self-augmenting.

Real-wealth cannot be used to alter yesterday.

Real-wealth can only be used to alter today and tomorrow.

The more and faster wealth is employed, the more and faster it must multiply.

Wealth has naught to do with the intrinsic value 'money', as metallic specie – as silver, copper or gold coinage. Gold, silver and copper have, however, a myriad of uniquely excellent technological function advantages for man – for instance, in the formulation of energy-tool capabilities – that is as function #l in the three-fold wealth constituency – energy (M) energy (C) and intellect. Incidentally, there is a challenge to the mathematical physicists to integrate the four fundamental, threefold constituent formulations. Einstein's $E = MC^2$; Gibb's (phase rule) f = n – r + 2; Euler's (topological) V = E – F + 2; and our own wealth 1 aw W= 2E + I (where W is wealth, E is energy and I is intellect). The probably ultimate identification of functions of these formulas with one another--as disclosing one generalizable 1 aw for only superficially different aspects of the same fundamentals
of universe behaviorism – will bring about an enormous acceleration in the computerized establishment of man's real wealth functioning and its regenerative investibility, and thereby establishment of total man's physical success in universe.

It is an inherent characteristic of man's intellect organized energy wealth that the larger the numbers served, the more swiftly the apparatus is amortized and becomes

improvingly replaceable.

The larger the interactive energy wealth system, the more efficiently does it operate. This is comprehended when we observe experimentally that when we double the linear dimensions of a system, we four-fold its surface, while eight-folding its volume; ergo, as we double size, we consistently halve the areas of surface through which the eight-folded and contained energies may escape – e. g. the larger the sun – or any star--the lower the entropic rate, and the longer does it conserve its energy. The larger the iceberg, the slower the rate of its melting, for it can only melt by inhibiting energy as heat from the rest of the universe, which it can only do through its surface. As the iceberg melts, its volume shrinks at a velocity of the third power V^3 while its surface shrinks only a V^2, therefore, as it melts the rative amount of the volume as yet to be melted decreases much more rapidly than the amount of the surface area through which the energy – as heat to melt it, – can be admitted. The smaller the ice mass in a given atmosphere the faster does it melt. As the iceberg grows smaller it melts faster. Conversely generalizing: as energy systems grow larger they lose energy more slowly.

The combined energy and intellect wealth may be distributed from the natural energy sources, which are frequently remote from where men need to use the energy, wherefore the transmission of energy is intimate to the omni-directional realizations of wealth by all men everywhere.

In the transmission of energy by man from its generative source to work for other men at distances around the earth away from the energy sources, there are great differences in the efficiency, capacity and speed of the known alternative technologies of energy transmission--i. e. by: (A) continuous or batched; (B) solid, powered, liquid gaseous or electrical; (C) vesseled, boated, railroaded, piped, wired or wirelessed.

All transmission systems involve original capital investments of the energy-intellect-time, wealth to produce the transmission tools and further working capital of energy plus intellectual time wealth to cover operating costs.

When we account the annual rates for amortizing the original capital – tools and structures as well as the operating costs and continuous, lifelong, social overhead of commonwealth responsibilities and functions--as now customarily articulated by taxes – and compare the net delivered energy costs, volume and velocity advantages of the alternate energy transmission systems, we find that electrical energy delivered today by wire (and tomorrow possibly by radio, or light, or laser beams) – is by far the most efficient, pro-fuse and speedy wealth distributing system.

The history of increase of voltages, distances and volumes of electrical energy transmission has been tied directly to the progressive limits of practically manufacturable, installable and maintainable equipment that could be realized from the comprehensive conversions of pure science's (subjective) discoveries into objective use technologies, as also modified by the physical ("material") resources becoming progressively available to industrial use. (We put material into quotes for nuclear physics has clearly demonstrated that there are no "solid" things or "matter" in the sense in which man uses the word.)

Generally speaking, the higher the voltage, the greater both the volumes at which and the distances to which electrical energy can be transmitted. By the use of transformers, electrical energy generated at safely workable low voltages may be stepped-up to high voltage levels for transmission, and stepped-down at the receiving ends for safe domestic and industrial use.

High voltage electrical transmission systems require many safe-guarding devices, for protection of both the public and the generating and transmitting systems – themselves-- against the otherwise disastrous voltage and wattage overloadings occasioned by the relatively frequent interactions of lightning with the conducting lines and switch yards. The systems need extraordinarily effective overloaded circuit breakers, as well as insulators to support the conduction lines.

The two most limiting factors in recent years in the constant effort to increase the safe, feasible and economic electrical conduction has been (A) the limit of insulator effectiveness, and (B) the complex design and fabrication of adequately large conduction lines. The costly ceramics research occasioned by re-entry problems of space vehicles, plus the large quantities of the most plentiful and economically conducting metals--aluminum and copper – now available, has provided new high capacity electrical transmission insulators, and higher voltage capacity in general.

High voltage conductance – heretofore primarily at 138, 000 kilo volts, and at 230, 000 kilo volts, --has represented the maximum level of high voltage transmission feasibility of the last two decades. The transmission distances theoretically permitted by the highest of these voltages was in 1936--1,400 miles, but due to fluorescent line losses, the practically profitable distance was only 340 miles. Hoover Dam to Los Angeles was a typically practical limit. Because of this 340 mile limit, industrial network systems of the major urban centers of the U. S.A. were too remote from one another to permit economically favorable integration hook-ups. Energy systems, as we have observed, are greatly benefited when the inter-linkage is economically feasible. In addition to the "geometrical relativity" aims of energy conservation occurring as size is increased the benefit of integration comes also from the law of averages, which allows the otherwise unused, but necessarily maintained total generating capacities to flow from one system to the other, to satisfy one another's non-simultaneous supply shortages. The costs go down, and the profits go up rapidly with transmission network integrations.

Technological improvements are now permitting transmission voltage step-ups of importantly improved magnitude--to 380,000, to 500,000 and to 1,000, 000 kilo volts (one million kilo volts, is one billion volts). This net era transmission is spoken of in the electrical industry as U. H.V. --"ultra high voltage. "

Contracted U. H.V. installations are now underway throughout the U. S. A. which, within a decade will, for the first time, completely interconnect the U.S.A. 's electrical generation and transmission systems, bringing such important cost reductions and profit increases, that both the public and private ownership sectors are being vastly advantaged. The continental integrating agreements underlying the physical network interlinkings have been accomplished without public notice of its taking place, despite that the total networks so integrated represent a capital value of seventy billion dollars. So satisfactory to both public and private sectors has this new development become, that the political voices of yesterday's vitriolic dissention between public and private sectors have been entirely stilled. They were inherently stilled because the mergers were not arrived at through the opinions of directors but by the multi computer cross-checked assurance of the mutual profits only to be arrived at by such merger. A pre-knowledge of this silently arrived at private-public sectors merging of the yesterday dividend sides' respective "best interests" to common bonanza accord, which took place during 1962-63 in the electrical transmission industry could readily have forecast the 1964 presidential election of Johnson.

The by-product physical advantages for society of the integrated U.S.A. 's continental, energy network will be many, not the least of which will be the removal of the fuel burning prime movers of the generating systems from the major cities. Up to now, coal has been delivered by rail from Pennsylvania mines to New York City at lower energy cost than it could be transmitted by wire at 230,000 KV. The coal smoke of the electrical generation stations has been the prime smog maker of greater N.Y. C. With U. H.V., energy will go from Pennsylvania coal field generators to New York City at an overall 33% energy cost reduction as compared with the previous railroading of the coal. This direct cost reduction will be minor in comparison to the indirect cost reductions, such as the dust deposit accelerated depreciation of all manner of goods or of lung impairments, etc. This U. H.V. long distance energy transmissions as from generators in New Foundland to N.Y. City will mean elimination of smog, not only from N.Y. C. but from the majority of all world cities.

Step-ups to one million kilo volts makes most economically feasible the inter-continental linkage not only of Europe, Asia and Africa, but also of the American continents and in the not distant future of North America linked over or under, the Bearing Straits, with Kamchatka and thence with both the Russian and Chinese networks. This will occur in time to greatly accelerate the Eastern Siberian and above all the swift Oriental, energy-intellect-wealth distribution step-ups.

The energy-intellect-wealth advantage accruing to these last interlinkages will be the optimum because they will interlink the low night-time loads of the progressively shadowed hemisphere of the rotating earth with the high daytime loads of the progressively illuminated hemisphere.

It is now clearly indicated that the energy wealth advantages accruing to both private and public sectors will be so vast as to tend swiftly to cancel out the ideological differences of the respective beneficiary peoples' previous sovereign political system advantages. "If that's socialism – I'm a socialist" is the new enterprise capitalists ejaculation, and "if that's capitalism – it's ideal for the commonwealth augmentation of the masses" is the socialists ejaculation as they integrate their respectively contributed network facilities.

These new and vastly increased energy-wealth generating capabilities will convert to positive account the world's energy wealth now on negative account – in the inventories of atomic energy invested in destructive missiles. With the energy-intellect-wealth integrations, the human desire drive for realizable physical success will swiftly out-distance man's fear motivated weaponry build-up. There will be many energy harvesting, generating, and transmitting reorganizations. For instance, lead by Le Tourneau's final success in developing the diesel electric all-wheel drives of large earth movers, the electric propulsion of short-haul vehicles in all urban work, combined with the swift advances in energy-storage batteries, will go on in the next decades to eliminate carbon monoxide fumes from cities.

During World War Two there was greater need for hydrocarbon products than could be supplied by the petroleum industry, experiments were conducted at the United States Bureau of Standards--using the three most popular automobile engines – which were fueled with alchohol instead of gasoline. They worked with high efficiency and only minor carburetor modifications. The alchohols came from the canes and grasses. Because of exhaustion of petroleum refining capacities during World War Two, it was also necessary to allow the production of large amounts of alchohol from sugar and grains in order to produce sufficient butyl and neoprene, to in turn produce synthetic rubber products –

especially auto, truck and plane tires. All unexpectedly, the synthetics provided far greater tire mileage performance than had the previous tire rubbers.

By the experimental developments of World War Two, it was clearly demonstrated that it is technically possible for world society to live at highest conceivable standards while using only its daily energy income from the ”push-pulls" of star radiation and gravity, while at the same time conserving the fossil fuels and atomic fuel 'savings' of the ages. It was evidenced that all the daily hydro-carbon income of cosmically generated radiation’s photosynthesis and metabolic energy harvesting in all the greenery of nature may be converted into storable alchohols from which energy as alchohol, energy as fuels, foods or plastics may be chemically realized – en masse.

In the next decade’s worldizing of industrial production systems and energy generating and transmission systems, we will witness the surprise solution to the establishment of world citizenship occasioned swiftly and simply by multiplication of world passenger traffic to magnitudes which will necessitate credit-card type passports and automation of omni-border clearances; plus the amplification of the efficiencies accruing to 'common market'.

Compounding all the trends herewith related makes clear that the highest priority task of the International Cooperation Year will be the dissemination to all the world’s peoples of the kinds of integrated trend, experiment, invention and development information that we are considering in this review – of the Geosoeial Revolution – whereby total humanity can now become physically successful, if it doesn't, through over extended and tolerated ignorance, frustrate the trends.

The important news to be disseminated continually integrates productively with other news as we realize for instance that all the energy, generation and distribution range, gaining will be coupled economically with desalination programs which can employ all the by-product heat of the electrical generating systems to reduce the generation costs of the world networks to even more important degree – while at the same time bringing the world's deserts into ever green operation as the most efficient sun radiation harvesting and storing system of the metabolic wealth – optionally convertible thereafter into food, fuel or plastics.

While all the metabolic gains are taking place, favorable- changes in population trends will be realized. Biological population is apparently operative on a quantum basis. Nature increases the seed and fertilization starts in inverse proportion to the probability of successful growth and survival of each of the ecologically complementary species – of all of life on Earth. As the chances for maple trees to survive decrease, nature starts more maple tree seeds whirling off in their rotor-ships to find plantable sites.

The full range of energy events of universe impinging upon man as hurricanes, earthquakes or mild weather changes, or even milder mosquito bites, are organized by nature on a quantum basis, whereby the more severe the energy event, the less frequent its occurrence, and conversely the milder and less disturbing, the more frequent are the energy events. Earthquakes are far less frequent than fleas, and novae less frequent than tornadoes.

In the same way, the human population’s starts, gains and recessions are geared directly to changing survival and birth rate probabilities. The first seventeenth century European colonists in America had an average of thirteen children per family. As the first waterworks and sewer systems came into use, improving the sanitary conditions and survival probability, the numbers of children per family swiftly decreased (only reversing momentarily in meager degree to rectify the abnormal death rates of warfaring) until with full industrialization attained in America, the birth rate is not at l. 9 children per family.

The more industrialized a country becomes, the more rapidly does its birth rate decrease. North America, Europe and Russia's population birth rates are all de-creasing, and tend toward swifter decline. The increase in longevity in those countries, through control of diseases is alone responsible for their only temporary population adjustment increases. World population will first stabilize, then finally decrease as industrialization swiftly amplifies to serve all of humanity. What is developing on a long-range basis is that once born, some men will probably live in excellent health and vigor to great age – possibly ad infinitum.

The rate at which each successive country, entering industrialization, accomplishes the full industrialization magnitudes, per capita, accomplished by the earlier industrializing economies, constantly accelerates. Russia inaugurated its industrialization tool-ups as the U. S.A. came to the old world pirates' 1929 financial crash (occasioned by the U. S. A. 's original industrial exploiter's too short-sighted initiatives which fiasco switched the prime initiative from private banking into public underwriting of the wholesale advances of technological evolution). In the early 1930's Russia purchased the prototype production plants – for all phases of industrialization – from the U. S.A. 's temporarily unemployed industrial giants, as well as from other major European industrial economies. Russia did not buy the equipment used by the U.S.A. one hundred years earlier when the U. S.A. was starting to industrialize. Russia insisted upon obtaining only the most advanced equipment known to be realizable in the 1930's. As a consequence, within only 50 years, Russia accomplished (approximate) parity with the U. S. A. ’s industrial, per capita, levels. Despite Russia's high level industrialization, its living standard potential is as yet unrealized by its citizenry, due to the cold war's weaponry diversion of Russia's energy, intellect capital wealth. Russia accomplished in 50 years the magnitude of industrialization which took the U.S.A. 100 years.

China entered industrialization in 1949 at the computer-automation-atomic energy movement of history and started her tooling and instrumentation at that level. China never made or flew a reciprocating engine and propeller driven airplane. It started in the aeronautical industry with jets. China probably will accomplish her prime industrialization in 25 years – i. e. by 1974, nine years from now. As each of the national industrializations has been accompanied by a constantly lowering birth rate, China's birth rate will hence-forth decrease rapidly. China has already established effective birth control. India's, Africa's, South and Central America's industrializations will swiftly follow. The world population increase to "explosion" magnitude will never occur, but will decelerate to industrially manageable magnitude as the, as yet undreamed of higher standards of living are realized.

India, Africa, Central and South America will achieve full industrialization by 1980 when (at the most disturbing prognostication rates) the world population will have reached only 5 billion, its final peak before full industrializations declining rate sets in. At that population peak, there will be an average of 6 1/2 acres of dry land, and nineteen acres of water-covered earth for each human. The present figures are 10 acres of dry land, and 30 acres of water-covered earth. The water-covered acres average a mile deep, the peak population will not come near the critical limit of metabolic supportability of man on Earth.

Having climbed, figuratively speaking, to the top of the prognostication mountain range, we will now enjoy our swift ski-run back to where we started. Poised at the peak of the 'run', we take our last big look around. First we see that it will be the I. C.Y. 's fore-most task to clarify that: the world peoples’ conceptual realization that the ability to do more with less in weaponry can also be applied to livingry, is a brand new realization. It is the mid-twentieth century's most miraculous bonanza as realized from the cosmic treasury of the heretofore undiscovered generalized principle which apparently govern the

evolutionary operation of universe. When the world peoples' two major politicians, from the maximumly opposed ideologies, Khruschev and Eisenhower, met at Geneva in 1954, it was put in utterly surprising evidence for the first time in history that by some theretofore unnoticed miracle, it had come-to-pass that the science and commerce world bookkeeping figures suddenly revealed that all mankind might after all be permitted,--contrary to Malthus and Darwin's "survival only of the fittest" – to be a (metabolically regenerative), comprehensive, physical success on Earth. Men can't as yet believe that fact to a degree sufficient to persuade them to simultaneously drop all their weaponry, or their (both say--"only retalliatorily maintained") defenses, or their altogether totally obsolete bankruptcy type economic accountings. But men's imminent and total physical success is now fact, and it makes the capability of shooting rockets to the moon miniscule in overall significance. Not a bad thing to have "hanging over your head" – success!

Doing more with less--ephemeralization – while only using recirculating scrap material resources, has never even been thought of by politicians--let along adopted by them – as constituting a realistic political strategy. They have had always to "make do" with the most obvious and familiar "what-have you's". But ephemeralization is here, and the world students are the first to develop a strategically oriented awareness of its significance, an awareness which is now accelerating and is soon to attain world revolution magnitude.

To man's unfavorably impressed amazement, he has now seen, developed, and made "operational" in the weaponry arts, a package of electronic and computerized rockets, weighing less than the weight of one navy destroyer, suddenly displacing all the navies and armies of the earth in a million-fold more effective hitting power. Using his scientists-furnished data, President Johnson likened the relative magnitude gain of this new striking force, to the graduation from one candle light to the radiation of the sun. Man is either uncomprehending, or has become congealed in his fascination with such a suddenly emergent destructive potential and has therefore failed almost entirely to see the significance of this epoch-making capability to do every task related to man's physical success on earth in fractions of 1% of the time, energy and resources involvement per units of realized performance of each and every task as heretofore required throughout all history.

It is the I. C.Y. 's and the world students' immediate task to reorient man – from his suicidal fixity only on the negative killing aspect of "doing infinitely more, with infinitely less" – to the- realization that the design invention revolution now empowers man to become a comprehensive, metabolically regenerative success in universe.

At Paris in July 1965, the world news reporters may readily catch on that design science's GEOSOCIAL REVOLUTION is indeed capable of supplanting the political initiative and may indeed eliminate the seemingly irremediable world impasses. The newsmen may even see that the design revolution is civilization's last change. They may also discover that it is history's greatest news story. But, if the newsmen do not catch on in Paris – somewhere soon thereafter they will make the 'historic 'double-take' and report it to the world – for it is indeed history's greatest and most welcome news. Then design science's popular revolution will start rolling as more and more of the world's millions of students put themselves to work in design science cooperatives on the world's university campuses. Thus the students will stop using their heads as punching bags, and will start to use them in the most effective functioning for which their heads were designed; i. e. to design the now, for the first time, designable physical success of all men around Earth!

It is clearly the function of politics to consolidate the scientific and industrial gains Political battling for justice, as in the present struggle for the full citizens' rights, not only for all the U. S. A. 's population, hut for all the world population, is highly valid. But the right to vote cannot alone feed stomachs. Only the design science revolution can solve the problems of clothing, housing, transporting, intercommunicating and educating all humanity, --thereby to permit omni-integrating world society to have positives instead of negatives for which to vote.

The problems of private vs. public sectors is the same problem as socialism vs. private enterprise, and the same problem as man vs. men,

The individual has unique capabilities as do pluralities of men have unique capabilities. It takes two to make a baby. It takes only one to make a discovery. World society soon will comprehend and resolve these unique function differentiations and – avoiding their interferences--profit by their mutually regenerative interfunctioning. Two-headed men might make good football quarterbacks, on the defensive, but they would never be able to dodge-run "slalom" in spontaneously superb coordination through a broken field. Ships of the sea and air are coordinate tool extensions of their captains. Democratic determinations of air, or sea, ship handling, accomplished only after passenger debate, opinionated speech-making, and final majority vote would sink any ship before it reached a safe port. It is essential that world society learn to differentiate clearly which functions of man or of men are naturally most reliably and usefully operative under various tooled or nontooled--industrialized or non-industrialized conditions. "Don't speak to the motorman" is a workably sound idea as "Do speak to the ticket seller."

Individuals invented the radio and the airplane. Invention is an individual function. The world thereby contracted to an intimacy of all humans who had theretofore been utterly remote and unaware of one another. The airplane and radio put the politicians to work adjusting man to the intimate ecological change brought about by the inventions. It is the individuals who invent refrigeration and all the technology necessary to make the world work. It is industry's job to convert the inventions to wealth generating functions. The politician's job is to 'weed' the garden planted by the inventors and cultivated by industry--to get rid of all that is obsolete or untrue in order to allow the bounty to flourish. Politicians are not scientific inventors. The invention and systems-design revolution must come before the political adjustments.

Revolution by design and invention is the only revolution tolerable to all men, all societies, and all political systems anywhere. Every nation welcomed the invention of the airplane, and refrigeration. Every nation welcomed and employed the transistor. All will welcome technically economic desalinization! All the world, properly informed of the significance of the students' Design and Invention Revolution, will applaud and support the initiative, thus seized by the world's youth.

The newspapers and periodicals of various host countries, having worked hard to get world conventions to take place within their respective countries, automatically welcome the conveners. Paris, and France will of course welcome the biennial Congress of the International Union of Architects in its domestic press publications. However, none of the business transacted during any of the past Architects' World Congresses has ever been of sufficient interest to the world newsmen to be put on the international wire and wireless "services" as 'news'.

As before in Mexico City, London, Moscow, Madrid, etc., again in 1965 the French press will welcome the U. I. A. Congress, but there will be no world news emanating from the Congress as precipitated by its official topic--"Architectural Education." But the International Cooperation Year and the students of the world, using the U.I.A.'s Congress as a springboard, do have a story--the greatest – ”The world can be made to work success-fully for all, and we know how to do it." If the I. C. Y. doesn’t say it, and the students don't say it, and the world goes on assuming itself to be an inherently self-frustrating system, then ignorant submission to the inertia of our lethally conditioned reflexes will soon push the buttons of Armaggedon. We, however, are betting that the Earthians will WAKE UP AND WIN.

APPENDIX A

A RESOLUTION APPROPRIATE TO THE ARCHITECTURAL EDUCATION THEME OF THE VIII WORLD CONGRESS OF THE UIA IN PA;RIS, FRANCE, 1965.

Suggested for reading and distribution to the delegates during the congress for possible inclusion on the agenda of formal resolution procedures.

Submitted by: R. Buckminster Fuller

It has been noted by recent congresses of architects that their professional employment pattern is bulging in the direction of regional and town planning and vice versa; regional planners are of necessity increasingly drawn into architectural undertakings. It has been noted also that architecture is trending swiftly toward general environment controlling problems. Recently the University of California's Department of Architecture was renamed and enlarged under the title "College of Environmental Design." Environmental design has also brought architecture into the realm of general ecology, while again (vice versa) bringing ecologists and anthropologists into the general curricula of architectural schools as well as into consultation by practicing architects. As a direct part of the same trending, the most recent world congresses of professional geographers noted an importantly increasing trend of their employment in regional and own planning activities.

With the world-around building of the next score of years doubling that of all history before us and the architects' work already deployed through modern transportation and communication, architectural offices which yesterday found themselves for the first time occupied in the design of buildings outside of their home territory are now being retained to build all around the world. The world-around architectural undertakings are trending from one building undertakings to design of whole new towns and regions. Ergo-the increasing needs for geographers, ecologists, geologists, climatologists, sociologists, international economists, et al.

Furthermore, the astronautics, defense, social welfare and health subsidies of major nations, now going increasingly into behavioral science researches, have brought discovery by behavioral scientists of the profound effect of environment upon human behavior. It has been found for instance, that 80% of the capacity to improve I.Q. has been brought into play before seven years of age and that the probability of becoming a success in higher education vs. becoming a 'drop-out' is now undoubtedly attributable almost in entirety to the environmental factors of the first seven years of life. * This has drawn the architects' environment controlling knowledge and designing capabilities into close couple with the behavioral scientists' research and development work. Lastly, the close couple of architecture and engineering has long been obvious. Architecture is now being joined with advanced science.

The foregoing comprehensive integration of professional art and science activities has inaugurated a unifying trend in advanced architectural research towards reoccupation with general systems theory. The importance and power of general systems theory as applied to contemporary large scale planning problems becomes ever more apparent as the adequacy of private or public client opinion, – as the design authority,

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"Stability and Change in Human Characteristics" by Benjamin S. Bloom, published, J. Wiley, 1964.

dwindles and is replaced by joint private and government undertakings in which large teams of scientists and humanists now collaborate as the, computer informed, prime clients.

Ergo: It will be appropriate to introduce a measure in the VIII Congress of the U.I.A under the congress theme of "Architectural Education", resolving that the U.I.A. recommend to the national architectural societies, comprising the world-around official membership of the U.I.A. that the national societies in turn recommend curricula changes to their university architectural schools; these changes to be adopted by the national architectural societies' professional accrediting boards, whereby, in addition to the presently established wet of architectural disciplines, an important new percentage of the architectural curriculum be devoted, firstly, to general systems theory and, secondly, to acquisition by the architectural students of ecological, geo-graphical, behavioral and industrial economics capabilities.

The wisdom of such U.I.A. recommendation will become ever more apparent as the emerging nations and the lesser developed older nations find that their economic well-being is vitally dependent on their becoming integral participants in the world's industrial network. The emerging nations bid fair to become the major clients of the world's architects.

Agriculture, fishing and craft permit non-industrialized survival in isolation only when geographical, geological and ecological circumstances are propitious. These conditions of independent survival are not characteristic of the emerging lesser developed nations whose lesser development was initially accounted by their low yield environment.

Participation in industrialization cannot be exclusive due to the idiosyncrasies of the world's industrial resource distribution. For example, Ghana is rich in manganese – with no iron or coal it cannot make steel, without this developed capability manganese is just so much useless geography. To be useful the manganese will have to be exported to steel-making countries. Ghana's bounty of bauxite plus the Volta Dam power will make more aluminum than Ghana can use. This too must be exported. Both will bring Ghana buying power to participate in the industrialization. Altogether, this means intimate tie-up of all countries with world industrialization.

At the present point of development of the world industrial network, no one nation is or can be wholly self-sufficient in those resources necessary to sustain the full industrial process. The evolution of industry has merged cities, states and nations into complex networks. Full industrialization.ultimately requires complete integration of world resources effort and wisdom. Industrialization is successful in direction proportion to the number served. As automation reduces man's participation in industry as a producer it increases his importance to the total systems economic efficiency – as a consumer. The larger the system the more economically it functions – this portends comprehensive world network integrations with ever greater benefit for all.

The VIII U.I.A. Congress occurs at the critical moment of reorientation of World Architectural responsibilities.

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N. B.: All of the books listed above as published may be obtained from the Gotham Book Mart, 41 West 47th St., New York City, New York. If any of these are temporarily or permanently out of print, Gotham Book Mart makes 'a practice of advertising for second-hand copies and can usually obtain them at small premium.