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Subject: *Dialectical, Non-Standard "Natural"-Numbers' Arithmetic & contra-Boolean Algebra* [Heuristic, Intensional-Intuitional Calculi for the Catalysis of Conceptual Discovery and Theory-Formation in the Natural and Social Sciences]: *Solving for the Successor System*.

Dear web-user, viewing the **www.dialectics.org** website,

This [*revised and expanded*] introductory letter and its two *Supplements* provide an overall introduction to *Dialectical Ideography*, and to the mission of **Foundation *Encyclopedia Dialectica***. *But why do we believe that any of this should be of any interest to you?* That question, we can answer. This letter contains our answer. As to whether this material is *in fact* of interest to *you*, only you can judge.

Our goal is to help avert the renewed, global, and *final* Dark Age that threatens Terran humanity, this time, with *total extinction*: not just with local "genocides", but with a global '*humanocide*', culminating the ['*psycho-historically*' *foreseeable*] **historical emergence, convergence,** and '*historical singularity*', for planet Earth, of '*capitalist anti-capitalism*' and '*human anti-humanism*', as captured in '**The Psycho-Historical Equations**' of *dialectical ideography*. All of our efforts, our very lives, are dedicated to *discovering* means to overcome the gathering undertow of that new Dark Age, and to *applying* those means, *nonviolently but effectively*, in accord with '*The Seldonian Imperative*', the ethical imperative to act so as to avert, if possible, the collective agony of human-societal social-reproductive catastrophes, or, if too late to completely avert said catastrophes, *to reduce both their severity and their duration*. *Nonviolence is a key to that effectiveness, for violence corrupts, converting its initiators into the very evil which they had intended to overcome.*

As a result, we have embarked upon a project that has bridged, across the gulf of the last Dark Age, the most advanced «*problematiques*» of the ancient and modern worlds, appropriating the '*meta-fractal*' self-similarity of their different, successive scales of «*problematique*» so as to resume some final and neglected, zenith breakthroughs within the ancient Alexandrian flowering of humanity's ancient Mediterranean civilization, in relation to what has developed subsequently, and in a way which assimilates also the wealth of that subsequent development. This has led to a rediscovery, in a higher, modernized, and less Parmenidean, more Heraclitean form, of Plato's lost «*arithmos eidetikos*», his "*arithmetic of ideas*" or "**arithmetic of dialectics**". This «*arithmos*» is alluded to in his extant writings, but its full exposition is nowhere to be found in those portions of Plato's opus which survived the last Dark Age. It has been '*psycho-archaeologically*' *reassembled* in a seminal study by Jacob Klein: "While the numbers with which the arithmetician deals, the *arithmoi* [assemblages of units -- F.*E.D.*] *mathematikoi* or *monadikoi* [abstract, generic, *qualitatively homogeneous* "monads" or *units* -- F.*E.D.*] are capable of being counted up, i.e., added, so that, for instance, eight *monads* [eight *abstract units, unities, or a-toms* -- F.*E.D.*] and ten *monads* make precisely eighteen monads together, the *assemblages* of *eide* [of 'mental *seeings*' or mental *visions*; of "ideas" -- F.*E.D.*], the "*arithmoi eidetikoi*" [*assemblages, ensembles, "'sets'"*, or [*sub-*]*totalities* of *qualitatively heterogeneous* ideas or «*eide*» -- F.*E.D.*], cannot enter into any "community" with one another [i.e., are '*non-reductive*', "'*nonlinear*'", "non-superpositioning", "*non-additive*", '*non-addable*', or "*non-amalgamative*" -- F.*E.D.*]. *Their monads are all of different kind* [i.e., are '*categorially*', ontologically, *qualitatively unequal* -- F.*E.D.*] and can be brought "together" only "partially", namely only insofar as they happen to *belong* to one and the same assemblage, whereas insofar as they are "entirely bounded off" from one another...they are incapable of being thrown together, *in-comparable* [incapable of being *counted* as replications of the same *unit*[y] or *monad*; incomparable *quantitatively* -- F.*E.D.*]... .The *monads* which constitute an "*eidetic number*", i.e., *an assemblage of ideas*, are nothing but a conjunction of eide which *belong together*. They *belong together* because they belong to one and the same *eidos* [singular form of «*eide*»: *one particular 'internal / interior seeing', vision, or «ιδεα»* -- F.*E.D.*] *of a higher order*, namely a "class" or *genos* [akin to the grouping of multiple *species* into a single *genus* in classical 'taxonomics' -- F.*E.D.*]. But all will together be able to "partake" in this *genos* (as for instance, "human being", "horse", "dog", etc., partake in "animal") *without "partitioning"* it *among the* (*finitely*) *many* eide *and without losing their indivisible unity only if the* genos *itself exhibits the mode of being of an* **arithmos** [singular form of «*arithmoi*»: a single assemblage of units -- F.*E.D.*]. Only the *arithmos* structure with its special *koinon* [commonality -- F.*E.D.*] character is able to guarantee the essential traits of the community of *eide* demanded by *dialectic*; the indivisibility [*a-tom*-icity or '*un-cut*-ability' -- F.*E.D.*] of the single "monads" which form the *arithmos* assemblage, the limitedness of this *assemblage of monads* as expressed in the joining of many monads into one assemblage, i.e., into one idea, and *the untouchable integrity* of this *higher idea* as well. What the single *eide* have "in common" is theirs only *in their community* and is not something which is to be found "beside" and "outside"...them. ...The unity and determinacy of the *arithmos* assemblage is here rooted in the *content* of the idea..., that *content* which the *logos* [*word; rational speech; ratio* -- F.*E.D.*] reaches in its characteristic activity of uncovering foundations "*analytically*". A special kind of [*all-of-one-kind, generic-units-based*-- F.*E.D.*] number of a particular nature is not needed in this realm, as it was among *the dianoetic numbers* [the «*arithmoi monadikoi*» -- F.*E.D.*]..., to provide a foundation for this *unity*. In fact, it is impossible that any kinds of number corresponding to those of *the dianoetic realm* [*the realm of 'dia-noesis', i.e., of 'pre-/sub-dialectical' thinking* -- F.*E.D.*] should exist here, since each *eidetic number is*, by virtue of its *eidetic character* [«*eide*»-*character* or idea-nature -- F.*E.D.*], *unique in kind* [i.e., *qualitatively* unique/distinct/*heterogeneous* -- F.*E.D.*], just as each of its "*monads*" has not only *unity* but also *uniqueness*. For each idea is characterized by being always the same and simply *singular* [∴ *additively idempotent* -- F.*E.D.*] in contrast to the unlimitedly many *homogeneous monads* of the realm of mathematical number, which can be rearranged as often as desired into definite numbers. ...The "pure" mathematical monads are, to be sure, differentiated from the single objects of sense by being outside of change and time, but they are not different in this sense -- that *they occur in multitudes and are of the same kind* (Aristotle, *Metaphysics* B 6, 1002 b 15 f.: [Mathematical objects] differ not at all in being *many* and of the *same kind*...), whereas each eidos is, by contrast, *unreproducible* [hence modelable by idempotent addition, or '*non-addability*' -- F.*E.D.*] and truly one (Metaphysics A 6, 987 b 15 ff.: "*Mathematical objects* differ from *objects of sense* in being everlasting and unchanged, from *the eide*, on the other hand, in being many and alike, while an eidos is *each by itself one only*"...). In consequence, as Aristotle reports (e.g., Metaphysics A 6, 987b b 14 ff. and N 3, 1090 b 35 f.), there are *three kinds of arithmoi*: (1) the *arithmos eidetikos* -- *idea-number*, (2) the *arithmos aisthetos* -- sensible number, (3) and "between"...these, the *arithmos mathematikos* or *monadikos* -- mathematical and *monadic number*, which shares with the first its "purity" and "changelessness" [here Aristotle reflects only the early, more 'Parmenidean', Plato, not the later, «*autokinesis*» Plato -- F.*E.D.*] and with the second its manyness and reproducibility. Here the "*aisthetic*" ["*sensible*" or *sensuous* -- F.*E.D.*] *number* represents nothing but the things themselves which happen to be present for *aisthesis* [*sense perception* -- F.*E.D.*] in this number. The mathematical numbers form an independent domain of objects of study which the *dianoia* [*the faculty of 'pre-/sub-dialectical' thinking* -- F.*E.D.*] reaches by noting that its own activity finds its exemplary fulfillment in "reckoning [i.e., account-giving] and counting"...The *eidetic number*, finally, indicates the *mode of being of the noeton* [that which *exists "for" thought; the object of thought; the idea*[*t*]*-object* -- F.*E.D.*] *as such* -- *it defines the* eidos *ontologically as a being which has multiple relations to other* eide *in accordance with their particular nature* [i.e., *in accord with their content* -- F.*E.D.*] *and which is nevertheless in itself altogether indivisible. The Platonic theory* of the *arithmoi eidetikoi* is *known to us in these terms only from the Aristotelian polemic against it* (cf., above all, Metaphysics M 6-9)." [Excerpts, Jacob Klein, *Greek Mathematical Thought and the Origin of Algebra*, [NY: Dover, 1992], pp. 89-91, **bold** *italic* **emphasis** *added by* F.*E.D.*].

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Plato may have already embarked upon an axiomatization of these three arithmetics, circa 380 B.C.E., even prior to Euclid of Alexandria's axiomatization of geometry, circa 300 B.C.E.: "Plato seems to have realized *the gulf between arithmetic and geometry*, and it has been *conjectured* that he may have tried to bridge it by *his concept of number* and by the *establishment of number upon a firm axiomatic basis similar to that which was built up in the nineteenth century independently of geometry*; but we cannot be sure, because *these thoughts do not occur in his exoteric writings* and *were not advanced by his successors*. If Plato made *an attempt to arithmetize mathematics* in this sense, *he was the last of the ancients to do so*, and the problem remained for modern analysis to solve. *The thought of Aristotle we shall find diametrically opposed to any such conceptions. It has been suggested that Plato's thought was so opposed by the polemic of Aristotle that it was not even mentioned by Euclid*. Certain it is *that in Euclid there is no indication of such a view of the relation of arithmetic to geometry*; but *the evidence is insufficient to warrant the assertion that*, in this connection, *it was the authority of Aristotle which held back for two thousand years a transformation which the Academy sought to complete*." [Carl B. Boyer, *The History of the Calculus and its Conceptual Development*, Dover [NY: 1949], p. 27]. 'Dialectic' is a 'logic', or 'pattern of what *follows* from what', more general than the "*formal logic*" of 'propositonal followership'. 'Dialectic' generalizes about how *natural* populations, ensembles, systems, [sub-]totalities, both concrete, physical-'external' «*arithmoi*», and 'internal', human-conceptual «*arithmoi*», change, including especially of how they *change themselves*. 'Dialectic' is the name for the fundamental [and ever self-developing] *modus operandi* of nature, including of human[*ized*] nature. 'Dialectics' is about both '[*allo-*]*flexion*' or '[*allo-*]*flexivity*', the '*bending*' of the '*course of development*' of one '[*ev*]*entity*' by the actions of others, and '*self-re-flexivity*', '*self-re-fluxivity*', '*self-dialogue*', '*self-controversion*', *self-activity*, *self-change* or "*self-kinesis*" ['*self-bending*']. 'Dialectics' is about the subject/verb/object-identical *meta-dynamic* of '*quanto-qualitatively*', '*quanto-ontologically*' [*self-*]*changing*, [*self-*]*developing*, *via-*'*metafinite*'-*singularity* '[*self*]*bifurcating*' '*meta-systems*' or '*process-entities*' ['*eventities*'], manifested in all levels, at all '[meta-]scales', for all 'orders' of 'natural history', including that part of 'natural history' which we call Terran human history, *and*, by hypothesis, *in the history of humanoid species generally*, throughout this cosmos. For Plato, «*Dialektike*», 'dialectical thought-*technology*', embodied in his «*arithmos eidetikos*», names *a higher form of human cognition. It is higher than that of* «*Dianoia*» *or* «*Dianoesis*»; higher than that which Hegel termed «*Verstand*», "The Understanding". "Dialectical thought" names *a higher stage of human cognitive development*, a higher "state" of human [*self-*]*awareness*, a higher form of *human self-identity*, beyond even those associated with the most advanced possible forms of *axiomatic, deductive, mathematical* logic, still «*dianoetic*» and partly sub-rational due to the frequent arbitrariness, authoritariness, and dogmatism of their unjustified axioms and primitives: "...*disputation and debate* may be taken as a *paradigmatic model* for the general process of *reasoning in the pursuit of truth*, thus making the transition from rational *controversy* to rational *inquiry*. There is nothing new about this approach. Already the *Socrates* of Plato's *Theaetetus* conceived of *inquiring thought as a discussion or dialogue that one carries on with oneself*. Charles *Saunders Peirce* stands prominent among those many subsequent philosophers who held that discursive thought is always *dialogical*. But *Hegel*, of course, was the prime exponent of the conception that all *genuine* knowledge must be *developed dialectically*. ...These conclusions point in particular towards *that aspect* of the *dialectic* which lay at the *forefront of Plato's concern*. He insisted upon two fundamental ideas: (1) that a starting point for *rational* argumentation cannot be merely assumed or *postulated*, but *must itself be justified*, and (2) that the *modus operandi* of such a *justification can be dialectical*. Plato accordingly mooted the prospect of *rising above* a *reliance* on *unreasoned first principles*. He introduced a special device he called "*dialectic*" to *overcome* this *dependence* upon *unquestioned axioms*. It is worthwhile to see how he puts *[this]* in his own terms: There remain geometry and those other allied studies which, as we have said, do in some measure apprehend reality; but we observe that they cannot yield anything clearer than a dream-like vision of the real so long as they leave the assumptions they employ *unquestioned* and can *give no account of them. If your premiss is something you do not really know and your conclusion and the intermediate steps are a tissue of things you do not really know, your reasoning may be consistent with itself, but how can it ever amount to knowledge?* ...So...the *method* of *dialectic* is the *only one* which takes this course, *doing away with assumptions.* ...*Dialectic will stand as the coping-stone of the whole structure*; there is *no other study that deserves to be put above it. Plato's writings do not detail in explicit terms the exact nature of this crucial enterprise of dialectic.* Presumably we are to gain our insight into its nature not so much by way of *explanation* as by way of *example* -- the example of Plato's own *practice* in the *dialogues*." [Nicholas Rescher, *Dialectics: A Controversy-Oriented Approach to the Theory of Knowledge*, SUNY Press [Albany, New York: 1977], pp. 46-48, **bold** *italic* *emphasis* *added* by F.E.D.]. The procedures of formal proof, of deductively deriving theorems from axioms and postulates, is the exercise of «*dianoesis*» «*par excellence*». But the process of *discovery, formulation, selection, refinement*, and *optimization of the individual axioms themselves*, and of *systems* of axioms, is beyond the «*dianoetic*» realm. Formal and mathematical logic provide it with no algorithmic guidance. That process belongs to the realm of *dialectics*. Dialectical 'Meta-Axiomatics' «*aufheben*»-conserves the full logical rigor of deductive proof-based «*dianoesis*». But dialectical 'Meta-Axiomatics' also exceeds that «*dianoesis*» in rigor by virtue of its unified recognition of: (i) the *axioms-dependence* or *assumptions-relativity* of all formal proofs, (ii) the *logical 'equi-coherence' of non-standard models* of "first order" axioms-*sub*systems with respect to their *standard models*, (iii) the *independence* or *Gödel-undecidability* of key axioms of "*higher order*" axioms-systems with respect to the rest of the axioms, hence the *logical 'equi-coherence'* of alternative axioms-systems, built on contraries of those key axioms, and especially (iv) '*The Gödelian Dialectic*'; the psycho-historical, «*aufheben*»/evolute-cumulative progression of *de facto* axioms-system within the *social* progression of the human species, i.e., the dialectical process of exploration, comparative evaluation, and rational selection of assumptions [of *premises, postulates, axioms, definitions, primitives*, and *rules of inference*] is not a final, once-for-all, 'finishable', *synchronic* activity. Not all possible alternative and/or *incremental* axioms are known, *or even knowable*, for humanity, at any given moment in human history. This '*meta-axiomatic*' dialectic process is, on the contrary, an ever-renewed, ongoing, and cumulative process, a *diachronic* activity of expansion of our *accessible* axiomatic and '*ideo-ontological*' foundations. It produces *a progressive historical sequence of systems* of logic and mathematics. That progression reflects the emergence of psycho-cultural 'readiness' for each next epoch of *axiomatic* and '*ideo-ontological*' expansion, borne in the interconnexion between: (1) "*technical*" or '*technique-al*', "*technological-ontological*" expansion of the activities/practices of a *generally acceleratedly-expanding* human-societal self-reproduction; of "*human species praxis*", and (2) maturation in the prevailing level of exo-somatically acquired, trans-genomically transmitted cognitive and affective development of the typical "social individual", hence of the global human culture and "meme pool" [or "Phenome"]. The mathematical logic of the '[proto-]«*arithmoi*» *theory*', [proto-]'*totality theory*', "*ensembles theory*", "*manifolds theory*", or "*set-theory*" approach to an axiomatic foundation for all of mathematics created a model, and a kind of metric, for the '*self-internalization*', '*self-re-entry*', '*self-inclusion*', '*self-incorporation*', or '*self-containment*' of sets, i.e., for the becoming "*elements*" of "*sets*" *themselves*; the becoming "elements" of [*idea*-]*objects*, of entities which are already *sets-of-elements*. It is called the theory of *logical types*. A set-representation which "*contains*" only representations of "*logical individuals*", e.g., of '*fundamental objects*' which are *not* themselves sets, might be assigned to '*logical type* **1**'. Thus, if **a** and **b** denote two such "*concrete*" or "*determinations-rich*" 'base-[idea-]objects' [perhaps, at root, idea-representations of physical, sensuous objects], the set denoted {**a, b**} is then of *logical type* **1**, and represents a more '*determinations-reduced*', "*abstract*" [idea-]object, denoting only those determinations, qualities, or "predicates" which **a** & **b** *both* exhibit. A set of *logical type* **2** would then be *a set that includes sets of 'base-objects' among its elements*, such as that denoted by: { a, b, {a}, {b}, {a, b} }. Sets of *logical type* **3** contain at most *sets of sets of* base objects, e.g.: { a, b, {a}, {b}, {a, b}, {{a}}, {{b}}, {{a, b}}, {{a}, {b}}, { {a}, {a, b} }, { {b}, {a, b} } }. Those elements of the latter set denoted by { {a}, {a, b} } and { {b}, {a, b} } are called "*ordered pairs*", also written <a, b> & <b, a>, respectively, because for them, *unlike for sets in general, order of listing matters*: {a, b} = {b, a}, but { {a}, {a, b} } = <a, b> ≠ <b, a> = { {b}, {a, b} }. Herein '=' denotes '*equals by definition*'. Thus, if we take "*natural*" *numbers* to be our 'base [idea-]objects', then sets or "classes" "*of*" or "containing" such numbers would be of *type* **1**, *classes* "*of*" or "containing" *classes* [of such numbers] would be of *type* **2**, and *classes of classes of classes* [of such numbers] would be of *type* **3**, and so on. Kurt Gödel, the contributor of, arguably, the greatest leaps forward in the science of logic since antiquity, described an 'axiomatic dialectic' of mathematics, albeit in "['early-']*Platonic*', '*a-psychological*' and '*a-historical*' terms, hence also in '*a-psycho-historical*' terms, as follows: "It can be shown that *any formal system whatsoever* -- whether it is based on *the theory of types* or not, if only it is free from contradiction -- *must necessarily be deficient in its methods of proof*. Or to be more exact: For any formal system you can construct a proposition -- in fact a proposition *of the arithmetic of integers* -- which is certainly true if the system is *free from contradiction* but *cannot be proved in the given system* [the foregoing summarizes Gödel's "First Incompleteness Theorem" -- F.E.D.]. Now if the system under consideration (call it *S*) is *based on the theory of types*, it turns out that *exactly the next higher type* not contained in *S* is necessary to prove this *arithmetic* proposition, i.e., this proposition *becomes a provable theorem* if we add to the system *S the next higher type and the axioms concerning it*." [Kurt Gödel, "*The Present Situation in the Foundations of Mathematics* (*1933o)", in S. Feferman, et. al., eds., *Kurt Gödel: Collected Works, vol. III; Unpublished Essays and Lectures*, Oxford U. Press, [NY: 1995], p. 46, **bold** *italics* *emphasis* added by F.E.D.].

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Again: "If we imagine that the system Z [a formal, logical, propositional-/predicate-calculus system inclusive of *"Natural" Numbers'* Arithmetic -- F.E.D.] is successively enlarged by the introduction of *variables for __classes of__ numbers*, *classes of __classes__ of numbers*, and so forth, together with the *corresponding comprehension axioms*, we obtain a *sequence* (continuable into the transfinite) *of formal __systems__* that satisfy the assumptions mentioned above, and it turns out that *the consistency* (ω-consistency) *of any of these __systems__ is provable in __all__ subsequent systems*. Also, *the __undecidable propositions__ constructed for the proof of Theorem 1* [Gödel's "First Incompleteness Theorem" -- F.E.D.] *become decidable by the __adjunction__ of __higher types__ and the __corresponding axioms__*; however, *in the __higher__ systems* we *can construct other undecidable propositions* by the *same procedure*. ...To be sure, all the propositions thus constructed are *expressible in* Z (hence are *number-theoretic propositions*); they are, however, *not __decidable in__* Z, but *only in __higher systems__*..." [Kurt Gödel, *On Completeness and Consistency (1931a)*, J. van Heijenoort, ed., *Frege and Gödel: Two Fundamental Texts in Mathematical Logic*, Harvard University Press [Cambridge: 1970], p. 108, *bold italic emphasis* [and square-brackets-enclosed commentary] *added by* F.E.D.]. The cumulative progression, or advancing 'ideo-cumulum', of axiomatic systems which Gödel describes above was viewed *a*historically by him. Gödel, a professed "mathematical Platonist" [in the sense of the *earlier* rather than of the *later* Plato; see below], didn't intend this '*meta-system*' -- this *cumulative diachronic progression* of [axioms-]*systems* -- to serve as a *temporal* or *psycho-historical* model of the stages of human mathematical understanding, as reflective of the stages of the self-development of humanity's collective cognitive powers as a whole; of the *knowledges* to which each such epoch of those powers renders access, and of the *ideologies* [or *pseudo-knowledges*] to which human thinking is susceptible within each such epoch. But *we do* wish to explore its efficacy as such. *Note how, as Gödel narrates above, each successor system «aufheben»-contains its immediate predecessor system, and, indeed, all of its predecessor systems; each higher __logical type__ «aufheben»-contains all predecessor __logical types__*. Can Gödel's theory of this *cumulative*, '*evolute*', *«aufheben»* progression of axioms-systems, which we term '*The Gödelian Dialectic*', or '*The __Godelian__* [Idea-Systems' Ideo-]*__Metadynamic__*', provide at least an *idealized* [i.e., a *distorted*] image of *actual history*, of the actual *psycho-historical process* and *progress* of mathematical aspects of the self-development of a humanity's collective cognitive capabilities, hence of its *knowledges* and *ideologies*? We shall see.

<u>A Note on Notation</u>: We delimit *major __hypotheses__* -- typically textual, and denoted generically, here, by ellipsis dots, '...' -- as follows: ■ ... ■ [*though the majority of the material, so enclosed or not, remains conjectural*], vs. [*proven*] *theorems*, derived deductively from explicit premises, via ⊢ ... ⊣. *Single quote-marks enclose '__self-quotes__' of our __own__ coinages. Double quote-marks enclose __exact quotes__ of others. Triple quote-marks enclose approximate, paraphrased quotes of others. Double 'angle marks', «...», enclose words of languages other than English, whether transliterated or rendered in their native alphabets.*

It turns out that each of Gödel's "undecidable" *propositions of arithmetic* that plague each 'epoch' of this formal axiomatic expansion are propositions each asserting the *__unsolvability__* of a different, specific "*diophantine*" [referencing Diophantus' «*Arithmetica*»; see more on this below] *unsolvable equation*. I.e., each "Gödel formula", which asserts the *self-incompleteness-or-self-inconsistency* of its axioms-system, "deformalizes" to one asserting the *__unsolvability__* of a specific "*diophantine equation*". Per today's definition, such is an equation whose *parameters* [e.g., *coefficients*] and whose *solutions* are restricted to the "natural" numbers. Each equation truly is unsolvable *within* the given axioms-system. However, the proposition that it is so cannot be deductively proven *within* that axioms-system. It can, however, be so proven via the added axioms within the *next* such system, as well as within all subsequent successor-systems. If the "*logical individuals*" or '*arithmetical idea-objects*' "existing" per the "*comprehension axioms*" of a given axiom-system are limited to "natural" numbers, *classes* of "natural" numbers,..., all the way up to *classes of classes of...of* "natural" numbers, e.g., to 'class-objects' up to a given "*logical type*", then the next system will *cumulatively* expand those '"existential"' limits by one step, to include also *classes of classes of __classes__ of __classes__ of*...of "natural" numbers, i.e., 'class-objects' of still higher "*logical type*". Each successive higher class-inclusion of previous 'class-objects' can model [including via *adjunction* of its corresponding "*comprehension axioms*", defining the '*computative behavior*' of these new entities] a *new kind* of arithmetical 'idea-object'; indeed, *a __new__, __higher kind of number__*. Thereby, this *qualitative expansion of the axioms-system*, this adjunction of the additional, "*comprehension axioms*" to the previous axioms, corresponds to a *qualitative* expansion of the '*idea-ontology*', the '*arithmetical ontology*', i.e., the '*__number-ontology__*' of the system.

■ Specifically, *the __diophantine equation__ that was __unsolvable__* as such *within the predecessor __axioms-system__ may itself become __solvable__, albeit in a __non__-diophantine sense, within the next* [*as well as in __all subsequent__ axioms-systems*] in this *cumulative sequence of axioms-systems*, *precisely by means of these next new kinds of numbers, which will __not__ be 'diophantine numbers', i.e., not "natural" numbers.* ■ We can see a *__kindred__ 'unsolvability-to-solvability dialectic'* at work in the following examples. The equation [2 + x = 2 or x = 2 − 2] states a *paradox*: how can the *addition* of a number, x, produce a result, a sum, that is *not bigger than* that 'known' number, here 2, to which that "unknown" number, x, is added? Given the **N** genus of number, addition always means increase, *never no increase*. This equation is *not solvable* within the system of arithmetic of the *cardinal numbers*, **N** = {1, 2, 3, ...}, but *is* solvable, by the '*non-diophantine number*' 0, within the '*ideo-ontologically' expanded system* of the "*whole numbers*", **W** = {0, 1, 2, 3, ...} [*Adjunction of the zero concept may seem trivial to us, yet it entailed a great and protracted conceptual travail for our ancient Mediterranean ancestors, and, with respect to issues surrounding __division by zero__, and the related issues of __singularity__, remains fraught with unresolved problems, "even" among we moderns!*]. The equation [2 + x = 1] states a *paradox*: how can the *addition* of a number, x, produce a result, a sum, that is *less than* that 'known' number, here 2, to which that "unknown" number, x, is added? Within the **W** genus of number, addition always means a change that increases, or, at minimum, that results in no change at all, but *it never means a decrease*. The latter equation thus finds no number among the "*wholes*" to solve/satisfy it, but it does so among the "*integers*" or '"*integral*"' numbers, the expanded numbers-set **Z** = {..., −3, −2, −1, 0, +1, +2, +3, ...}, which is a *qualitatively*, that is, '*__ideo-ontologically__ expanded*', new-*__kinds__-of-numbers-expanded*, meaning or '*meme*-ing'-of-"number"-*expanded*, *semantically-expanded __universe-of-discourse__* of "Number", vis-à-vis the preceding genus, the **W** *__universe-of-discourse__*. The equation is *solved*/"*satisfied*" by the '*non-diophantine number*' −1. Next, the equation [2x = 1] also states a *paradox*: how can the *multiplication* of any number, namely that of the multiplicand, here x, by another, known, number, the multiplier, produce a product which is *less than* that multiplier, here 2? Multiplication, within the **Z** genus of number, always either increases the absolute value of the result vis-à-vis its "factors", leaves it unchanged, or turns it into zero. But it can never turn a 2 into a 1. Such an equation is *not solvable* within the system of arithmetic of the "integers". It is solvable via '*ideo-ontological expansion*' to encompass the *qualitatively different system* of arithmetic of the "**Q**uotient numbers", "*ratio*-numbers", "*ratio*-nal" numbers, or "*fractions*", i.e., by yet a new '*non-diophantine number*', the '*split a-tom*' ['*cut __uncuttable__*'], '*monad*-fragment', or "*fract*ional value" +1/2: **Q** = {...−2/1, ...−3/2...−1/1, ...−1/2... 0/1, ...+1/2...+1/1, ...+3/2...+2/1, ...}. The *__nonlinear__* equation [x² = 2] states a *paradox* too: it requires x to be a kind of number which is '*both __odd__ and __even__ at the same time*' [see the classic «*reductio ad absurdum*» proof of the "*ir*-ratio-nality" of √2]. It is *not solvable* '"*rationally*"', but *is* solvable via 'ideo-ontic' expansion to the "**R**eal" numbers, *two 'non-diophantine numbers*', the "irrational" values −√2 and +√2: **R** = {...−π...−3...−e...−2...−√2...−1...0...+1...+√2...+2...+e...+3...+π...}. Finally, the *__nonlinear__* equation [x² + 1 = 0] states a *paradox* as well: it implies −x = +1/x, requiring a kind of number whose *additive inverse*, −x, equals its *multiplicative inverse*, 1/x or x⁻¹, whereas, among "**R**eal" numbers, −2 ≠ 1/2, −3 ≠ 1/3, −π ≠ 1/π, etc. It is *not solvable* or "satisfiable" within any of the foregoing genera of number, or of arithmetics, up through that of the "**R**eal" numbers. It is '*__non__*-diophantinely' solvable, via expansion to the "**C**omplex" numbers, **C** = {R + R·√−1}, by two '*__non__*-diophantine' numbers, known as the "pure imaginary" numbers, x = +√−1 = 0 + 1·√−1 ■ +i, and x = −i. And more .... *Note how each successor genus or universe of number «aufheben»-contains all of its predecessor universes of number.* Such an «*aufheben*» '*consecuum*' evinces the essence of what we mean by a '*dialectic*'; by a '*dialectical process*', or by a '*meta-dynamical, meta-evolutionary self-progression*'. But how might this potentially infinite progression of '*species*' of number, *required for __equational__ solvability*, map to "*sets of sets of ... of sets*"? One way that sets of higher "*__logical type__*" can model [↔] higher, later *kinds of numbers* is as *ordered pairs* of earlier *kinds of numbers* / earlier *kinds of sets*.

3

We already noted that *ordered pairs* can be modeled via certain kinds of sets. "*Integers*", for example, can be modeled as *ordered pairs* of "*whole numbers*", i.e., as sets of *logical type* 2 if we take the "*whole numbers*" as 'base objects', defined, via their "*comprehension axioms*", as *differences*, viz., as: $\{\{1\}, \{1, 0\}\} = <1, 0> \leftrightarrow 1 - 0 = +1 \neq \{\{0\}, \{1, 0\}\} = <0, 1> \leftrightarrow 0 - 1 = -1$. Rational numbers can then be modeled as *ordered pairs* of *integers*, defined, via their "*comprehension axioms*", as *divisions*, e.g., $<+1, +2> \leftrightarrow (+1) \div (+2) = +1/2 \neq <+2, +1> \leftrightarrow (+2) \div (+1) = +2/1$.

Thus, they may also be translated to *ordered pairs of ordered pairs* of "*whole numbers*", or to 'sets-of-sets *of* sets-of-sets' of "*whole numbers*", that is, to 'sets-of-sets *of* "*whole numbers*" '*squared*', meaning these sets-of-sets *operating upon these very sets-of-sets* themselves, per a '*multiplicand-ingestion*' set-product rule:

$$+1/2 \leftrightarrow <+1, +2> \leftrightarrow \{\{+1\}, \{+1, +2\}\} \leftrightarrow <<1, 0>, <2, 0>> \leftrightarrow \{\{<1, 0>\}, \{<1, 0>, <2, 0>\}\},$$

which translates to $\{\{ \{\{1\}, \{1, 0\}\} \}, \{ \{\{1\}, \{1, 0\}\}, \{\{2\}, \{2, 0\}\} \} \}$, a class-object of *logical type* 4, i.e., of *logical type* 2^2, or "two squared", *w.r.t.* the "whole numbers" taken to be the 'base-objects'. Further on, *ordered pairs* of "**R**eal numbers" may model **C**omplex numbers, **C**, viz.:

$$<1.000..., 2.000...> \leftrightarrow 1 + 2i \neq <2.000..., 1.000...> \leftrightarrow 2 + 1i,$$

such that **C** can be modeled as the two-dimensional space of a special kind of direction-denoting as well as magnitude-denoting "directed line segment," or "vector". And so on. .... Thus the "*rational*" *numbers* may be grasped as "analogues" and as 'meta-fractal *similants*' of the *integers*, and the *integers* as 'meta-fractal *similants*' of the *whole numbers*. Even though they are of *different kind*, differing in *quality*, they may be constructed in and as *different* 'epochs' in a progressive-cumulative, '*self*-iteration' of one and the *same* «*aufheben*» operation of 'self-incorporation', of 'self-subsumption', of '*self*-combination' or of '*self*-combinatorics' of *sets* or of *ordered pairs*. This number systems progression, formed by the *self*-iteration of the '*ordered pairs of*' and '*sets of*' operations, constructs a "logical" or 'idea-object' version of what we term a '*meta-fractal* [*idea-*]*cumulum*', '[meta-]*fractal*' because it constructs a structure which is *self-similar* at successive "scales"; '*meta*[-fractal]' because these "scales" are not purely quantitative, as they are for "mere" fractals, but are 'quanto-*qualitative*', or 'quanto-*ontological*', i.e., such a '*cumulum*' is an '[*ideo-*]*meta*-«*arithmos*»', made up out of multiple '[ideo-]*«arithmoi»*', such that each constituent '[ideo-]*«arithmos»*' consists of *different kinds of* '[ideo-]*«monads»*'; *in this case, different kinds of number*. This may be seen in that the later '*similants*' involve adjunctions of *new* [*idea-*]*ontology, new, higher logical types* of sets; *new kinds* of sets; *new kinds of ordered pairs; new kinds of numbers, qualitatively* different from all of the earlier '*similants*', not just *quantitatively* different therefrom, *because* «*aufheben*»-'*containing*' all of the earlier '*similants*', and thus also 'meta-fractally' '*scale-escalated*' with respect to all of the earlier '*similants*'. We also find, in the history of nature to date, *physical, 'external-objective'* '*meta-fractal*' structures; a '*physio-cumulum*', or '*physio-meta-«arithmos»*', made of multiple '*physio-«arithmoi»*', of different kinds of '*physio-«monads»*': molecules as '*meta*-atoms' made up out of multiple atoms; atoms as '*meta*-'subatomic-"particles" made up out of multiple sub-atomic "particles", etc. Thus, we hold, the 'internal', 'inter-subjective', '*idea-object-ive*', mathematical-progress-driving, *conceptual process* of '*The Gödelian Dialectic*', i.e., '*ideo-onto-dynamasis*' ['modelable', in the language of *dialectical ideography*, as seen in *Supplement A.*, via *generalized self-multiplication*, '*quadraticity*', or '*ideo-onto-dynamis*', to appropriate Diophantus' term], and the 'external', "objective", "natural" process driving the *self-development* of pre-human/extra-human 'physical' nature, or «*physis*», i.e., '*physio-onto-dynamasis*' ['modelable', in the language of dialectical ideography, as we shall see in *Supplement B.*, via '*physio-onto-dynamis*'], share a similar, 'dialectical' or «*aufheben*», '*meta-fractal*' *logic* or *pattern*. [A fuller exploration -- and a dialectical model -- of this '*Gödelian Idea-Meta-Evolution*', as observed in the [psycho-]*history of arithmetics*, is forthcoming in *Part II.* of *Dialectical Ideography, The Meta-Evolution of Arithmetics*]. Of course, all of the above algebraic equations may, today, appear "trivial", having long since been solved by our remote ancestors. But are there still unsolvable equations in our own day? Are there still new kinds of numbers, yet to be discovered? If Gödel is right, that this 'dialectic' of incompleteness /undecidability/unsolvability is [potentially] "continuable into the transfinite", then there *must* be. If so, how far has this 'Gödelian dialectic' progressed, to date, in Terran human history? As mapped into *the history of the collective human psyche* per its '*collective, anthropological/psyche-ological, psycho-historical conceptual readiness-gradient*', how far along into it are we as of today? Does our present stage of this 'Gödelian dialectic' have any scientific relevance? And, if there are, today, still, some equational «*insolubilia*», does their solution -- garnered by moving into the next stage of this 'Gödelian dialectic' -- have any practical value, any *urgent* technological application?

■ *Yes*. Indeed, the very equations which formulate this humanity's most advanced collectively-recognized formulations of its "*laws*" of nature are generally of a type called *nonlinear [partial] differential equations*. They also remain, for the most part -- especially when they are *nonlinear* -- unsolved, typically even a century or more after their first formulation. They are also often declared to be, not just '*so far unsolved*', but '*unsolvable*" in "exact" or "analytical" or "*closed*" "*form*". This phrase means that their solutions apparently cannot be expressed in terms of the "*elementary*" or 'fundamental' "*algebraic*" and 'trans-algebraic', or "*transcendental*" *functions* or operations *currently recognized as such*, as "elementary", even if their solutions *can* be expressed in "*open*" *form*, involving [potentially] "infinite sums", i.e. "infinite *series*" or "infinite *polynomials*"-- ever improvable approximators -- made up out of finite and "closed-form" terms. The "unsolvability" or so-called "non-integrability" of these *nonlinear* differential equations may also mean that the integration/solution of these equations involves *zero-division* "*singularities*" which lead to "function-values of infinite magnitude", so that their solution "diverges" or attains "*infinite*" or "undefined" values corresponding to *finite* values of the time parameter; that the "limit" of their "infinite series" sums, forming their integrals, appears to be without [finite] quantitative limit; appears to be quantitatively "limit*less*" or '*un-limit*-ed'. This "*Nonlinearity Barrier*" of modern mathematical science massively blocks this humanity's capability for further scientific and technological/engineering advance around its entire perimeter with the *un*-known; with its present '*un-knowledge*': "That is the way I explained *non-linearity* to my son. But, why was this so important that it had to be explained at all? The complete answer to this question cannot be given at present, but *some people feel that the answer, if known, would shake the very foundations of mathematics and science*...practically all of classical mathematical physics has evolved from the hypothesis of *linearity*. If it should be necessary to reject this hypothesis because of the refinements of modern experience, then *our linear equations are at best a first and inadequate approximation*. It was Einstein himself who suggested that *the basic equations of physics must be non-linear*, and that *mathematical physics will have to be done over again*. Should this be the case, *the outcome may well be a mathematics totally different from any now known*. The mathematical techniques that might be used to formulate *a unified and general non-linear theory* have *not* been recognized...*we are now at the threshold of the nonlinear barrier.*" [Ladis Kovach, *Life Can Be So Nonlinear*, *American Scientist*, 48:2, June 1960, pp. 220-222, *bold italic emphasis added by* F.E.D.].■

No less than the *founding problem* of modern, mathematical science -- a problem that was also a central focus and motivation of ancient science -- today takes the form of a system of nonlinear integro-differential equations which have, to this day, in both their Newtonian and Einsteinian, General Relativistic versions, remained essentially unsolved [the 1991, slow convergence, "open-form", *singularity-"infinitely"-delaying/evading* Qiu-dong Wang series solution notwithstanding], *because of their nonlinearity*. This founding problem is the fundamental problem of astronomy, the problem of the mutual-determination and *other-objects-mediated-self-determination* of the motions of celestial objects, when more than two such objects are admitted into the mathematical model of the celestial cosmos: "The n-body problem is the name usually given to the problem of the motion of a system of many particles attracting each other according to Newton's law of gravitation. *This is the classical problem of mathematical natural science, the significance of which goes far beyond the limits of its astronomical applications. The n-body problem has been the main topic of celestial mechanics from the time of its inception as a science.* The fundamental dynamical problem for a system of n gravitating bodies is the investigation and pre-determination of the changes in position and velocity that the [bodies] undergo as the time varies. However, this is a complex *non-linear* problem *whose solution has not been possible* under the *present-day status* of *mathematical analysis*." [G. F. Khilmi, *Qualitative Methods in the Many-Body Problem*, Gordon & Breach, 1961, p. v].

Indeed, the models of nature that modern mathematical science has favored are profoundly flawed and misleading in crucial aspects of their 'descriptics' of nature, due to *this specific* inadequacy of the mathematics that Terran humanity has evolved so far: "It is an often-stated truism that *nature is inherently non-linear. Biological systems* particularly *are full of ... non-linearities ...* The reason that we go to the trouble of building *linear* models when we are really interested in *non-linear* systems is that we then acquire the power to evaluate the dynamic performance of the system *analytically...* In fact, we can *analytically* solve for the response of a *linear* system to any conceivable input function, however complicated." [Bernard C. Patten, *System Analysis and Simulation in Ecology,* vol. I, Academic Press [NY: 1971], p. 288]. However, in the *non-linear* domain: "In general, the *analytical study of non-linear differential equations* has been developed only to a very limited extent, owing to the *inherent mathematical difficulties* of the subject. There does not exist, in this field, a suitable technique for attacking *general non-linear* problems as they arise in practice." [John Formby, *An Introduction to the Mathematical Formulation of Self-Organizing Systems,* Van Nostrand [NY: 1965], p. 115]. *General non-linear* integrodifferential equations cannot presently be solved in "closed form", because the functions that would solve them have so far "resisted" discovery and formulation within the extant tradition of Terran mathematics: "*...the assumption of linearity* in *operational processes* underlies most applications of *analysis* to the problems of the natural world...*Nature,* with scant regard for the desires of the mathematician, often seems to delight in formulating her mysteries in terms of *nonlinear systems* of equations...*the theory of functions...has been developed largely around classes of functions in which the linearity property is an essential factor...*most *non-linear* equations *define new functions* whose properties have *not* been *explored* nor for which tables exist..." [Harold T. Davis, *Introduction to Nonlinear Differential and Integral Equations,* Dover [NY: 1962], pp. 1, 7, 467]. In the light shed by the foregoing statements, the oft-decried '"mechanistic"' bias of mathematics, and of modern science in general, is seen in altered perspective. This new perspective is strengthened by the observation that the more 'organitic' and "organismic" qualities of Nature, which classical "mechanism" excludes -- phenomenologies such as those of *non-equilibrium* and [meta-]evolutionary [meta-]dynamics; of holistic, synergetic "whole-more-than-sum-of-parts" organization; of the qualities of self-determination and self-development, and of sudden and qualitative change -- find a native and potent expression in the *non-linear* domain. It thus emerges that science has been mechanistic only to the extent that it has failed to be *scientific* enough -- failed to be *empirical* enough, or true-enough-to-observation/experience. Mathematics has been "mechanistic" and 'linearistic' only to the extent that it has failed to be *mathematical* enough. Modern science and applied mathematics have fallen short of a more adequate description of experiential/empirical truth through neglect of the immanent truth already enshrined within themselves. *Not even mechanics itself is truly* "mechanistic": "*...Mechanics as a whole is non-linear;* the special parts of mechanics which are *linear* may seem *nearer to common sense,* but all this indicates is that *good sense in mechanics is uncommon.* We should not be resentful if materials show character instead of docile obedience...Although *mechanics is essentially non-linear,* it is little exaggeration to say that *for 150 years only linear mechanics and its mathematics were studied.* It became *standard* practice, after deriving the equations for a phenomenon, to replace them at once by a *linear so-called* "approximation". It would be wrong to regard *this mangling* as being in the original tradition of mechanics..." [C. Truesdell, *Recent Advances in Rational Mechanics, Science,* 127: 3301, 04 April 1958, p. 735].

Closed-form-function solutions for our *nonlinear-equation*-expressed "*laws*" of nature would provide ready-calculation of global solutions, for the total domain of initial conditions. A "*computer simulation solution*" or "*numerical solution*" -- the only kind of "solution", if any, presently available for most of these *nonlinear* " *laws*" of nature -- merely "*simulates*" *some* of the implications of the *unsolved* equation, and is limited to a single solution-trajectory or solution-history, from a single initial condition, a single "point" or "starting state", leaving all other starting points *unsolved-for.* Such simulation-"solutions" also suffer severe limitations of computer calculation *time* [computation-speed] and storage capacity [memory *space*], as well as all of the limitations of the computational and "qualitative" [in-]accuracy of "numerical" algorithms, particularly with regard to the detection of "essential" *singularities.*

If "*nonlinearity*" is the root of this mathematical difficulty and "intractability", if "*nonlinearity*" is the *cause* of this present "closed-form *unsolvability*", then what does "*nonlinearity*" signify? In its deepest meaning, *nonlinearity* signifies what Plato called «*autokinesis*» [see below]. Differential-equation "*Nonlinearity*" is the mathematical name for the mathematical, 'equational', pure-quantitative modeling of '*self-motion*', of '*self-change*', of '*self*[-induced] *movement*'; of 'self-induced change-of-state'; of "*self-reflexiveness*" and of 'self-reflexive', "self-referential" action; of 'self-developing process', or 'self-developing *eventity*'! The equations that these presently unformulated function-formulae solve are called "*nonlinear*" because, in them, the unknowns [which, for integro-differential equations, are *function-unknowns,* not single number-values as are the solutions of algebraic equations], the so far *unfathomed solving-functions,* appear with their function-values, or with the values of their derivative-functions, *operating upon themselves,* and/or upon one another. This signifies the dynamical or time-like [indeed, '*chronogenic*'] interaction *and self-interaction* of the underlying actualities that these functions mime. *Linear* integro-differential equations, the kind that have been easily solved by Terran mathematicians for so long, are characterized, in contrast, by function-unknowns which occur singly, independently, without interaction, *operating neither upon self nor upon any other unknown / to-be-solved-for function(s).*

A typical *nonlinear* "ordinary" or "total" differential equations is an ideographical '*state*-ment' that asserts or "*states*", in effect, that the instantaneous *velocity of evolution* of the generic, pure-quantitative *value* of the *state* of the *system* modeled by that equation for *any,* generic time-value, t -- the *state* represented by $x(t)$, thus denoting the *generic state-function-value* of *the dynamical function-unknown to be solved for* -- is proportional to a higher power of that unknown, generic *state*-value itself, denoted $x(t)^n$, $n > 1$, i.e., to a *multiplicative self-application/self-operation/self-flexion*' or 'self-re-flexion'; to a *self-multiplication,* of that *state*-value. Such a *pure-quantitative self-multiplication* signifies either a '*self-magnification*' or '*self-diminution*' of the value(s) of the *state*-variable(s) for every ['non-Boolean'] value of [the *state*-variable-value components of the *state*-"vector" function,] $x(t)$. Such an equation describes a system whose "evolution" is at least partially '*autokinesic*', *self*-driven; *self*-propelling in its *state*-space or '*space of states*' -- an *imagined space* or *conceptually-constructed space* in which every *point* denotes a different possible *state* of that *system.* For example, *nonlinear* differential equation models of predator-prey population/bio-mass dynamics within an ecological system often contain a population-size *self*-limiting Verhulst "*self-interaction* term". This term involves adding in, e.g., a *self*-multiplication of $N_i(t)$, which denotes the *population-count-as-state* of the ith species as a function of time, t, *with a minus sign applied to it, thus providing a [negative] contribution to the* "*instantaneous*" *rate of growth of that species' population-count* -- here defined as the *rate of evolution* or *velocity of evolution* of that species' *state* -- *with respect to time, as the time 'count' advances:* "The *nonlinear correction term* is referred to as a "*self-interaction...term*" [which term we also term '*self*[-re-]*flexive*' or '*self*[-re-]*fluxive*' -- F.E.D.], of the form $N_i(t)^2$ ... where the terms of the form $N_i(t) \cdot N_j(t)$, $i \neq j$, *also quadratically nonlinear,* are referred to as "*mutual interaction terms*" [which terms we also term '[*allo-*]*flexive*'] -- F.E.D.]." [R. Dutt, P. K. Ghosh, *Nonlinear Correction to the Lotka-Volterra Oscillation in a Predator-Prey System, Mathematical Biosciences* 27 (1975), pp. 9-16, *bold italic emphasis added by* F.E.D.].

The equations of Einstein's mathematical model of the "universal gravitation", the equations of his General Theory of Relativity, are *nonlinear* precisely because they must model the *non-a-tom-istic*, *'self-reflexive'*, *'auto-kinesic'*, self-changing *'self-interactivity'* of the cosmos-encompassing gravitic field: "...an *interaction* is *non-linear* if the *total force* exerted by *several bodies* is *not* the sum of the *forces each* would exert if *acting alone*. *Why is the gravitational-inertial interaction non-linear*? The reason is a fundamental one. We saw at the end of the preceding chapter that all forms of energy have mass and so act as a source of gravitation and inertia. This is true, not only of matter and of light, but also of *gravitational potential energy*. We know that this form of energy has a real physical significance; it has to be included in a total energy balance... *This means that when two bodies act together as a source, in addition to their individual masses we must take their mutual gravitational potential energy as a source*. The *total* force is then *not* the *sum* of the *individual* forces... It follows that the *exact interaction* between [*better, among* -- F.E.D.] an *arbitrary number of bodies* is going to have a *complicated form*. Indeed, as we shall see, *it has not been possible to formulate this interaction in an explicit way. In consequence, our previous calculation of the total inertial force due to all the matter in the universe is neither strictly correct nor easily correctable*. We can only hope that our *linear approximation* gives an answer that has the correct order of magnitude... In view of all these difficulties, *how was Einstein able to write down a law general enough to specify all the properties of the nonlinear gravitational-inertial interaction*? The answer is that he wrote down the *local* properties of the interaction, using the *field* point of view. From this the *global* properties of the interaction between distant bodies can be calculated in principle, *although in practice no one has been able to do this exactly even for just two bodies*, except in the limit when one of them has a mass negligible compared with the other... It is instructive to look at this *self-interaction of the gravitational field* from a slightly different point of view...inertial forces act on *gravitational waves* and, if the Principle of Equivalence is correct, so must gravitational forces...This shows *how essential* is the *self-interaction of gravitation*... It is one manifestation of the fact that *gravitation acts on "everything"*.... We then have *a self-interacting gravitational field* satisfying *a non-linear field law*." [D. W. Sciama, *The Physical Foundations of General Relativity*, Doubleday [New York: 1969], pp. 55-62, *bold italic emphasis added by* F.E.D.].

Thus, for the past 300+ years human knowledge and industry have been partially paralyzed and vitiated by a perennial failure to "solve" general nonlinear integro-differential equations, that is, to attain the means by which the vast *potential knowledge* that especially the "*laws* of nature" equations among them encode can be explicitly extracted and practically applied. Key instances of this incapacity include the Newton gravity-equations for more than two mutually-gravitating bodies, the Einstein universal gravity field equations of General Relativity just addressed in the quotation above, the Navier-Stokes equations of electro-neutral liquid/gaseous hydrodynamics, and the "'*electro-magneto-hydrodynamics*'" of the Maxwell-Boltzmann-Vlasov equation for electro-dynamically *non*-neutral, "'*magneto*-hydro-dynamical'" "plasmas", e.g., for superheated, *ionized* gasses -- the very media in which nuclear fusion reactions, self-sustaining over 'mega-macroscopic' spatial and temporal scales, are observed to occur in extra-human nature, e.g., in the central core-regions of stars. The prospect of fusion power epitomizes the vast scientific, industrial-technological, and social benefits of a *Nonlinearity Breakthrough*. A 'closed-form', global solution of the highly-nonlinear Maxwell-Boltzmann-Vlasov plasma equation should enable direct computation of control-parameter-values corresponding to self-sustaining nuclear fusion reaction regimes, while also providing other physical/engineering insights, all leading rapidly to the design and construction of commercially *super*-competitive fusion power reactors, utilizing low-radioactivity or 'no-radioactivity', virtually pollution-less fuel cycles [e.g., the *Hydrogen-Boron* fuel-regime]. Consider the intensely '*auto-kinesic*', nonlinear character of a plasma: "A *plasma* is a gas of charged particles, in which the *potential* energy of a typical particle due to its nearest neighbor is much smaller than its *kinetic* energy. The *plasma state* [also termed *plasma phase* -- F.E.D.] is the fourth state of matter: heating a solid makes a liquid, heating a liquid makes a gas, heating a gas makes a plasma. (Compare the ancient Greeks' earth, water, air, and fire). The word plasma comes from the Greek plásma, meaning "something formed or molded." It was introduced to describe ionized gases by Tonks and Langmuir [in a 1929 paper -- F.E.D.]. More than 99% of the known universe is in the plasma state." [Dwight R. Nicholson, *Introduction to Plasma Theory*, Wiley [NY: 1983], p. 1, *emphasis added* by F.E.D.]. The *motion* of the non-neutral, *electrically-charged* plasma particles just described continually, dynamically generates a changing *magnetic* field -- a magneto-*dynamic field* of forces. The locations and concentrations of these particles' electric charges, changing moment by moment, due to that same *motion*, also continually changes the plasma's *electric field* of forces, sustaining an electro-*dynamic* field. *A plasma thus generates, by the continual motions of its electrically-charged constituents, an overall or collective electro-magneto-dynamic field of forces*. That field of forces, in addition to acting on anything external to the plasma, *also acts on the plasma itself*, also because its constituent particles are electrically-charged, rather than being mostly electrically neutralized, as in typical gas-phase matter. The plasma's field continually changes the motions of its constituent particles, and thus changes the electric/magnetic fields they are generating. Their changing positions/*motions* thus change their collective *field*, which changes their collective *motions*, which again changes their *motion*... . "*Nonlinear self-consistent motions*" are thereby possible, whereby the plasma-internal, self-generated *field* also guides the plasma's particles to *reproduce* their very pattern of *flow* by which they generate that plasma *field* which, in turn, generates that plasma *flow*...,thus fomenting a sustained *self-re-iteration*; a *self-consistent* "state" of motion; a '*consistent-with-self*' ['*consistent-with-continuation-of-self*'] and '*self-reproducing*' motion of the plasma. Indeed, the "asymptotically stable" solutions of the plasma equations, corresponding to actual sustainable flows [to '*spatio-temporal attractors*', as contrasted with "measure zero", virtually unobservable "*transients*"] must typically have this dynamically "*self-consistent*", '*self-reproducing*' character. Along with any additional influences, acting upon it from its outside, from its '*externity*', the plasma's '*internity*' thus *interacts with itself*, '*self-reflexively*' and '*self-refluxively*' driving its own internal motion, hence its '*automorphogenesis*' and '*auto-metamorphosis*' as a '*subject-verb-object-identical eventity*'.

This '*self-reflexive*' nature of '*external*', "*physical*" *processes* is also instantiated and mirrored in the 'human-subjectivity-internal', *mental process* realms of formal logic and mathematical logic. "'[*Self*-]*Reflexiveness*'" is, according to Bertrand Russell, the very heart of the "'insoluble'" set-theoretical and semantical "*paradoxes*" that plague formal, *mathematical logic* and *set-theory*: "In *all* the above *contradictions* (which are merely selections from an indefinite number) there is a *common characteristic* which we may describe as *self-reference* or *reflexiveness*." [Bertrand Russell, Alfred North Whitehead, *Principia Mathematica to *56*, Cambridge University Press [NY: 1970], p. 61, *bold italic emphasis* added by F.E.D.].

What we call the $_N$Q dialectical *ideography*, our '*modern resumption*' of Plato's ancient «*arithmos eidetikos*»; the initial, «*arché*» dialectical '*meta-arithmetic*' which, together with its *dialectical* '*meta-algebra*', and its «*sequelae*», we are exploring, belongs to a domain of "'*Non-Standard Models*'" of the "Natural Numbers". The possibility of such non-standard interpretations of the axioms of "'natural'" arithmetic was "predicted" both by *the Löwenheim-Skolem theorem*, and by the joint application of *the Gödel Completeness and Incompleteness theorems* to the "*first order*" axioms of the Peano "*Standard*" "*natural numbers*" arithmetic: "Most discussions of Gödel's proof...focus on its *quasi-paradoxical* nature. It is illuminating, however, to ignore the proof and ponder the implications of the theorems themselves. It is particularly enlightening to consider together both the *completeness* and *incompleteness* theorems and to clarify the terminology, since the names of the two theorems might wrongly be taken to imply their incompatibility. The confusion arises from the two different senses in which the term "*complete*" is used within logic. In the *semantic* sense, "*complete*" means "capable of proving whatever is *valid*", whereas in the *syntactic* sense, it means "capable of *proving* or *refuting* [i.e., of "*deciding*" -- F.E.D.] *each sentence* of the theory". Gödel's *completeness* theorem states that every (countable) *first-order* theory, whatever its *non-logical* axioms may be, is *complete* in the *former* sense: Its theorems coincide with the statements *true* in *all models* of its axioms. The *incompleteness theorems*, on the other hand, show that if formal number theory is *consistent*, it fails to be *complete* in the *second* sense. The *incompleteness theorems* hold also for *higher-order* formalizations of number theory. If only *first-order* formalizations are considered, *then the completeness theorem applies as well*, and *together they yield not a contradiction, but an interesting conclusion*. Any sentence of arithmetic that is *undecidable* must be *true in some models* of *Peano's axioms* (lest it be *formally refutable* [as it would be were it true in *no* models of the Peano axioms -- F.E.D.]) and *false in others* (lest it be *formally provable* [as it would be were it true in *all* models of the Peano axioms -- F.E.D.]). *In particular, there must be models of first-order Peano arithmetic whose elements do not "behave" the same as the natural numbers*. Such *nonstandard models* were *unforeseen* and *unintended* but they cannot be ignored, for their existence implies that *no first-order axiomatization of number theory can be adequate to the task of deriving as theorems exactly those statements that are true of the* ["standard" -- F.E.D.] *natural numbers*." [John W. Dawson, Jr., *Logical Dilemmas*: *The Life and Work of Kurt Gödel*, A. K. Peters [Wellesley, MA: 1997], pp. 67-68, *bold italic emphasis added*]."

The *Löwenheim-Skolem theorem* has similar implications: "The research begun in 1915 by Leopold Löwenheim (1878-c. 1940), and simplified and completed by Thoralf Skolem (1887-1963) in a series of papers from 1920 to 1933, *disclosed new flaws in the structure of mathematics*. The substance of what is now known as the *Löwenheim-Skolem theory* is this. Suppose one sets up axioms, logical and mathematical, for a branch of mathematics *or for set theory as a foundation for all of mathematics*. The most pertinent example is the set of axioms for the whole numbers. One intends that these axioms should *completely* describe the *positive whole numbers* [i.e., the "**N**atural numbers, **N** -- F.E.D.] and *only* the whole numbers. But, *surprisingly, one discovers that one can find interpretations -- models -- that are drastically different and yet satisfy the axioms*. Thus, whereas the set of whole numbers is countable, or, in Cantor's notation, there are only $\aleph_0$ of them, there are *interpretations* that contain as many elements as the real numbers, and even sets larger in the transfinite sense. The converse phenomenon also occurs. That is, suppose one adopts a system of axioms for *a theory of sets* and one intends that these axioms should permit and indeed characterize non-denumerable *collections of sets*. One can, nevertheless, find a countable (denumerable) *collection of sets* that satisfies the system of axioms and other transfinite *interpretations* quite apart from the one intended. In fact, every consistent set of axioms has a countable *model*. . .In other words, *axiom systems that are designed to characterize a unique class of mathematical objects do not do so*. Whereas *Gödel's incompleteness theorem* tells us that a set of axioms is not adequate to prove all the theorems belonging to the branch of mathematics that the axioms are intended to cover, *the Löwenheim-Skolem theorem tells us that a set of axioms permits many more essentially different* ['*qualitatively different*', '*ideo-ontologically different*', unequal in a *non-quantitative* sense -- F.E.D.] *interpretations than the one intended*. The axioms do not limit the *interpretations* or *models*. Hence *mathematical reality cannot be unambiguously incorporated in axiomatic systems.** *Older texts did "prove" that the basic systems were *categorical*: that is, all the *interpretations* of any basic axiom system are isomorphic -- they are essentially the same but differ in terminology. But the "proofs" were loose in that logical principles were used that are not allowed in Hilbert's metamathematics and the axiomatic bases were not as carefully formulated then as now. *No set of axioms is categorical, despite "proofs" by Hilbert and others*.. . .One reason that *unintended interpretations* are possible is that each axiomatic system contains *undefined terms*. Formerly, it was thought that the axioms "defined" these terms *implicitly*. But the axioms do not suffice. Hence the concept of *undefined terms* must be altered in some as yet unforeseeable way. *The Löwenheim-Skolem theorem is as startling as Gödel's incompleteness theorem*. It is another blow to the axiomatic method which from 1900 even to recent times seemed to be the only sound approach, and is still the one employed by logicists, formalists, and set-theorists." [Morris Kline, *Mathematics: The Loss of Certainty*, Oxford U. Press [NY: 1980], pp. 271-272, *blue bold italic emphasis added by* F.E.D.]. Per our view, then, the real import of Gödel's *completeness theorem*, in the context of his *incompleteness theorems*, is that, as evidenced in the ubiquity of "*non-standard models*", *interpretational and axiomatic 'alternativity'* abounds. That of his *incompleteness theorems* is *'Mathematico-Auto-Dynamasis'*; the *'intrinsity'* of mathematical *'ideo-dynamasis'*, of the *'ideo-«auto-kinesis»'* of that «aufheben» *'consecuum'* which is the "*inexhaustible*" progression of the systems of mathematics; the *immanence* of the conceptual *and [psycho-]historical 'Dialectic of Mathematics'*; the very meaning of our symbol,)H(.

The algebra of the '"*non-standard*"' ${}_N\underline{\Omega}$ initial *dialectical arithmetic* is also describable as a *'contra-Boolean algebra'*. The calculative phenomena of this ${}_N\underline{\Omega}$ *'contra-Boolean algebra'* are quite contrary to those which, in *Boolean algebra*, mirror formal logic. *Boolean algebra* models *'ideo-onto-stasis'*. The ${}_N\underline{\Omega}$ *'contra-Boolean algebra'* models [e.g., the Gödelian] *'ideo-onto-dynamasis'*. This *'contra-Boolean'* arithmetic and algebra issue, as such, from the 'strong contrary' of the Boolean-algebraic axiom which Boole termed "*the fundamental law of thought*" or "*law of duality*". Summarizing, then, the foregoing, we have found that the ${}_N\underline{\Omega}$ *'dialectical ideography'* is an arithmetic of 'Gödelian-Skolemian *meta-Natural Numbers*', i.e., of '*meta-numbers*' which are '*Peanic*', in that they satisfy the first four, "first-order" Peano Postulates for the "Natural" Numbers, despite also exhibiting the '*strongly contra-Boolean*' characteristic in their self-operation and mutual operation -- in their '[self-][inter-]action', '[self-]application', or '[self-][re-]flexion', i.e., in their '[self-][re-]flexive', '[self-]operative', or '*generalized-multiplication operation*' *self-multiplicative* behavior. This initial, initiating *dialectical arithmetic*, models, in diametrical contrast to the "Standard Natural" arithmetic of '*unqualified quantifiers*', the operations of a realm of '*unquantified* and, indeed, *unquantifiable qualifiers*', interpretable to describe trans-Russellian and, indeed, trans-Gödelian '[*onto-*]logical types', or [ontological] *qualities* and '*meta-qualities*' [modelable via '*meta-predicates*', or '*predicates of predicates*'], which beget new, but '*meta*', '[*onto*-]types'; new such [*meta*-]*qualities*, even/ever higher in '*meta*' degree. This self-proliferation of '*onto-predicates*', '*ontological qualifiers*', or '*ontological categories*' may be "interpreted" or "modeled" as resulting from the *quantitatively* growing *population counts/population densities* of the «*arithmoi*» of «*monads*» that the ${}_N\underline{\Omega}$ '*meta-numerals*', by means of the *ontological categories* to which they are assigned, represent, due to the *self-expanding self-reproduction* or *self-accelerating 'auto-catalysis'* of those populations, increasingly 'consequenting' in their thus *self-intensifying* '*self-environment*', '*self-surroundment*', and '*inter-action self-densification*', plus their '*self*-[*inter-*]*action self-densification*', or '*intra-action self-densification*', via the thus '*self-frequentizing*' mutual confrontation of their *individual eventities'/monads*', or, in other words, the *self-deepening* '*«auto-dynamis»*', [or '*self-squaring*'] '*self-confrontation*' of their class/category [i.e., due to their concrete '*meta-«arithmoi» meta-dynamics*', or '*cumulum meta-dynamics*']. This re-discovery of '*dialectical arithmetic*' emerged also, for us, in the context of the most advanced development of Plato's thinking, as embodied in his final dialogues, beginning with *The Parmenides*. In those dialogues, Plato advances beyond his earlier, 'Parmenideanic' eternal stasis of the "Forms", to embrace «*autokinesis*», and the primacy of this "*self-motion*" over "*derived motion*": "The dialogues of the Socratic period provide that view of the world usually associated with Plato. *The period of transition and criticism, and the final synthesis, are little noted*; nor does the transition occur by an abrupt break, but rather by a pointing up of difficulties, and an introduction of new emphases. ...The *Parmenides* can be taken as signaling the change. In this dialogue Socrates is unable to defend his Doctrine of Ideas. The problem of the utter difference between time and eternity sets the problem. As creatures of time it seems that we should have no capacity to know the universal forms, nor can we have, then, any connection with the universal God, or He with us. ...*Where the Republic and Phaedo stressed the unchanging nature of the soul, the emphasis in the Phaedrus is exactly reversed*. In this dialogue, *the soul is the principle of self-motion*, and we are told that *the soul is always in motion*, and *what is always in motion is immortal. The difference now between spirit and matter is not changelessness in contrast with change, but self-motion* [i.e., that which we have termed '*self-re-flexive*' or '*auto-flexive*' '*nonlinearity*', à la Hegel's "*being for itself*", i.e., '*self-'beholding' being* -- F.E.D.], the essence of the soul, in contrast with *derived motion* [our '*merely flexive*' or '*allo-flexive*' "*nonlinearity*" or, in some models, *linearity*, à la Hegel's "*being-in-itself*" or "*being-for-another*", i.e., a kind of being which is 'beheld' by other being, but which itself 'beholds' neither other being nor itself -- F.E.D.]. *The emphasis on self-motion is continued even in the Laws, Plato's final dialogue*." [William L. Riese. *Dictionary Of Religion and Philosophy*. Eastern and Western Thought, Humanities Press, Inc. [NJ: 1980], pp. 442-443, *bold italic emphasis* added by F.E.D.].

The «*insolubilia*» of our epoch include, as we have already encountered in the quote from Bertrand Russell, above, not only the "natural *laws*"/"*laws* of motion"/"*laws* of change'-formulating nonlinear, total and partial integro-differential equations of "mathematics proper", but also the '"*self-referential*"', '*self-reflexive*', '*self-refluxive*', "*impredicative*", '"*nonlinear [quadratic] propositional function*"' paradoxes of set-theory and formal logic, with their '*mentally autokinesic*' set and proposition idea-objects or '*idea-eventities*'. These include the alternately, 'instantaneously' self-ingesting and self-disgorging "*Russell Set*" [of all sets which are *not* members of themselves], the anciently-known, truth-value self-oscillatory, thus "limit-cycle" like, "*pseudomenon*" of Epimenides [modernly reduced to the sentence "This sentence is false."] -- 'limit-cycles' being a principal, "self-oscillatory" state-space solution-trajectory unique to *nonlinear* differential equations, *impossible for linear* differential equations -- and, more substantively, the ever self-/power-set incorporating *Set Of All Sets*, i.e., the set-theoretical, "extensional" definition of the "intension" of the set-concept itself [as arising from an *actually finite* universal set of actually-constructed "logical individuals"]. *Their common characteristic?*: «*autokinesis*». Thus, '*The Nonlinearity Barrier*', as our contemporary, applied-mathematical '*Insolubilia Barrier*', is, in terms of the Russellian formulation [*of, we claim, its roots or reflections in mathematical formal logic and set theory*], none other than the *ideological obstacle* of '*The Reflexiveness Barrier*' -- '*The Self-Reference Barrier*' or '*The Self-Reflexivity Barrier*'. It is also, in terms, especially, of the ultimate formulation of the ancient Orient, '*The Self-Refluxivity Barrier*', that is, '*The Karma Barrier*' -- the barrier of explicit recognition of what that tradition calls '"*The Law of [the Reflux of] Action*"' or "*The Law of Karma*". In terms, especially, of the ultimate [Platonic] formulation of the ancient Occident, it is '*The Autokinesis Barrier*'. It is, in short, none other than '*The Dialectics Barrier*'.

Consider, then, five hypotheses. ■ (1) That contemporary Terran humanity, as per our conjecture above, resides within that 'Gödelian epoch' of the *'psycho-historical'* 'meta-evolution' of mathematics in which *the very equations of «autokinesis»*, which are also the *extant mathematical formulations* of *dialectical process*, though standardly unrecognized as such, namely, the general, especially the current *"laws"*-of-nature-formulating *nonlinear* integro-differential equations, constitute the *«insolubilia»*, the "unsolvable equations", *in some sense "diophantine"* [w.r.t. this, see the work on Hilbert's Tenth Problem]. (2) That these equations belong to the *"deformalization"* of an incompleteness-asserting *'Gödel formula'* for the present epoch of *«de facto»* mathematical axiomatics, i.e., for the current stage of the Gödelian incompleteness/undecidability/unsolvability *dialectic of mathematics*. (3) That this *"deformalization"* is, in effect, a proposition asserting that most nonlinear integro-differential equations are unsolvable, not only in the diophantine sense, but also in terms of the *so far extant non*-diophantine numbers, indeed, in terms of the *entire* current stage of expansion of the number concept, of the conceptual, *'ideo-ontological'* expansion of the implicit axiomatic system of the kinds of number, and of their operatorial, 'arithmetical logic', so far officially admitted into arithmetic and its higher mathematical octaves. (4) That unsolvability-asserting proposition is *true but undecidable, unprovable* within the current *«de facto»* axiomatic system; 'undecidable' from its *«de facto»* axioms, but that this proposition becomes decidable/provable/formally demonstrable within the Gödelian *next* axioms-system of mathematics, via the adjunction of the *next* self-incorporation, or *logical type* level, of sets, and, thereby, of the *next* new kind of number which that next higher *logical type* can model. Lastly, (5) That this new kind, or '[ideo-]ontological category' ['onto'], of number [*in some way*] also supplies the *new kinds of "elementary transcendental functions"* [G. N. Watson] required to solve *generalized total and partial nonlinear integro-differential equations* in an expanded, *new* definition of *'closed-form'*, *'analytical' solution.* ■

If this is so, then how do the *'dialectors'* or *'dialectical meta-vectors'*; the *new kinds of 'meta-numbers'*, including *'Peanic'* but *'contra-Boolean'*, *'dialectical numbers'*, or *'aufheben-operation*-modeling numbers' -- the new species of *'Gödelian/Skolemian' "Non-Standard"*, *'meta-Natural'* Numbers of our *«arché»* *'dialectical arithmetic'* -- fit into this picture? Do they provide *even a prelude to* that *new system of arithmetic* essential to these new kinds of "elementary transcendental" *'nonlinear' solution-functions*, these functions capable of formulating *«autokinesis»*; of describing *'diachronic fractals'*, or *never exactly repeating, but ever-self-similar, 'self*-*powering'*, *'''self*-*squaring'''* [*«[auto*-]*dynamis»*], *self-iterative, and self-accelerating* [or temporally, *'chronogenically' fractal-scaling*, diachronically-*scaling] temporal progressions* [i.e., with *'temporal acceleration'* as their principle of progressively-diminishing-duration *fractal duration-scaling*]; of describing *'self-reflexive action'*; *'auto-kinetic'*, *'self-developing process'*, or *'self-developing eventity'*, and of formulating a full-regalia *theory of 'self-reflexive functions'* [of the operations of *'generalized* [*self-*]*multiplication'* or *'[self-re-*]*flexion'*]? We shall see.

After his Completeness and Incompleteness theorems, the final achievement of Gödel's work, supplemented by that of Paul Cohen circa mid-century last, addressed the "undecidability" of two propositions, *"The Axiom of Choice"*, an axiom of Zermelo-Fraenkel set theory, the system of nine axioms widely considered to constitute the foundation for all of modern mathematics, and *"The Generalized Continuum Hypothesis"*, a candidate additional, tenth axiom for that system, and a generalization of Cantor's *Continuum Hypothesis* regarding the first two 'scales' of "actual infinity" in Cantor's purported progression of *transfinite cardinal quantities*. Gödel's and Cohen's work together demonstrated that either of these propositions, or their contraries, in any combination, are compatible, as axioms, with the remaining eight Zermelo-Fraenkel axioms, i.e., are *"independent"* of those eight Axioms [just as Euclid's *Fifth or Parallels Postulate* is *"independent"* of the other postulates of Euclidean Geometry]. These demonstrations dealt a devastating blow to the absolutist ambitions of logicists, formalists, and 'setists' alike: "Actually, Cantor went much further. He hypothesized that the *order* of infinity of the irrational numbers immediately follows that of the rationals. That is, he believed that there is no order of infinity that is both higher than that of the rational numbers and lower than that of the irrational numbers. This statement became known as the *Continuum Hypothesis*, and the work of Kurt Gödel and Paul Cohen in the twentieth century established that it is impossible to prove this hypothesis within the rest of mathematics. The *Continuum Hypothesis* stands alone (with some equivalent restatements) opposite the rest of mathematics, their respective truths independent of each other. This remains one of the most bizarre truths in the foundations of mathematics." [Amir D. Aczel, *Fermat's Last Theorem: Unlocking the Secret of an Ancient Mathematical Problem*, Four Walls Eight Windows [NY: 1996], p. 139n]. "None of the proposed solutions of the basic problems of the foundations [*of mathematics --* **F.E.D.**] -- the axiomatization of set theory, logicism, intuitionism, or formalism -- achieved the objective of providing a universally acceptable approach to mathematics. In...1951..., Gödel proved that...the *continuum hypothesis*...is consistent with the Zermelo-Fraenkel system of axioms (without *the axiom of choice*). In 1963, Paul J. Cohen...proved that...even if one retained *the axiom of choice* in the Zermelo-Fraenkel system, the *continuum hypothesis* could not be proved. *These results imply that we are free to construct new systems of mathematics in which either or both of the two controversial axioms are denied.* All of the developments since 1930 leave open two major problems: to prove the consistency of unrestricted classical analysis and set theory, and to build mathematics on a strictly intuitionistic basis or to determine the limits of this approach. *The source of the difficulties in both of these problems is infinity as used in infinite sets and infinite processes.* This concept, which created problems even for the Greeks in connection with irrational numbers and which they evaded in the method of exhaustion, has been a subject of contention ever since and prompted Weyl to remark that mathematics is the science of *infinity*." [Morris Kline, *Mathematical Thought from Ancient to Modern Times*, vol. 3, Oxford Univ. Press (NY: 1972), pp. 1208-1209, *bold-face italics* **emphasis** *added* by **F.E.D.**] "The two independence results [*of Gödel and Cohen --* **F.E.D.**] mean that in the Zermelo-Fraenkel system *the axiom of choice* and *the continuum hypothesis* are **undecidable** [*in the Gödelian sense --* **F.E.D.**]...*There are then many mathematics*. There are numerous directions in which set theory (apart from other foundations of mathematics) can go. ...As for the *continuum hypothesis*, here one ventures into the unknown and, whether one affirms or denies it, significant consequences are not known as yet. ...Just as the work on the parallel axiom led to the parting of the ways for geometry, so Cohen's work on these two axioms about sets leads to a manifold parting of the ways for all of mathematics based especially on set theory, though it also affects other foundational approaches. *It opens up several directions that mathematics can take but provides no obvious reason for preferring one over another*." [Morris Kline, *Mathematics: The Loss of Certainty*, Oxford U. Press (NY: 1980), pp. 268-270, *bold-face italics* emphasis added by **F.E.D.**]. "Although these results [*of Gödel and Cohen --* **F.E.D.**] have a formal analogy with geometry, the situation is quite different, since it is possible to set up the different kinds of geometry from a unified standpoint, namely that of general set theory. However, *there is no unified principle for founding the different, mutually-exclusive systems of set theory* [*unproven, dogmatic assertion --* **F.E.D.**]. *According to the present state of affairs, such principles of a mathematical nature do not even seem to exist, because a higher mathematical abstraction than that of set theory is absolutely inconceivable* [*unproven,* ■ *clinically hysterical* ■ *assertion --* **F.E.D.**]. Gödel himself expressed the view that the development of set theory will lead to new axioms, which will allow *the continuum hypothesis* to be disproved." [W. Gellert, H. Küstner, M. Hellwich, H. Kästner, eds., *The VNR Concise Encyclopedia of Mathematics*, Van Nostrand Reinhold [NY: 1977], p. 722]. Joining the **8** remaining Zermelo-Fraenkel Axioms with each consistent alternative to the candidate-tenth, *generalized 'Cantor Axiom'* and/or to *The Axiom of Choice*, may yield a new, 'ideo-ontologically' different, "Non-Standard", *'Contra-Cantorian'* or *'Anti-Point-Atomistic' Mathematics*. Each such *'Neo-Mathematics'* is, logically, *equally as self-consistent as*, yet *qualitatively different from*, existing, "Standard" Mathematics, just as the several *Non-Euclidean Geometries* differ *qualitatively but self-consistently from* the *Euclidean*. Might one of these **3+** possible *Non-Standard axiomatic set theories*, perhaps one that incorporates, as replacement axioms, negations of *both The Axiom of Choice* and *The Generalized Continuum* Hypothesis, provide, if elaborated, '''short-cuts''' to *'The Nonlinearity Breakthrough'*? We shall see.

The *final* Platonic synthesis, centered on the concept of *«autokinesis»*, *failed* to become a sufficient "material force", within or beyond the 'meristemal' developments of Hellenistic civilization pioneered by the ancient Alexandrians. Had it succeeded in so becoming, then perhaps the Occidental "Dark Ages", *ten centuries of pseudo-Christian, theocratic totalitarianism and endless Inquisitorial atrocity*, might have been averted, with accession to the higher system/'meta-attractor' of industrial capitalist civilization attained, *ten centuries earlier*! *Our present 'Dim Ages' civilization is but six centuries out of that ten centuries' "Dark Ages".* It holds the *potential to open upward and outward into a future Age Of Light.* Yet, and precisely for that reason, already the forces of those who fear that Light are gathered to close humanity back down again; to drag us all back into the abyss of a new and *this-time-final* Darkness.

We hold that a *'meta-fractal analogy'* -- a 'quanto-*qualitatively*' *scaled*, diachronically-deployed [*self*-]*similarity* -- obtains between the human-social 'meta-state' of Mediterranean late antiquity, with its 'meristem' at ancient Alexandria, and that of our contemporary 'late modernity' global civilization. Mediterranean late antiquity verged upon 'industrial renaissance', the "take-off" 'meta-state' of an "industrial revolution", before Roman-Imperialized pseudo-Christian genocide plunged that world into a thousand years' abyss of Darkness. The Roman imperium viciously repressed the early Christian movement for its dissent from the prevailing, Pagan, imperial ideology and way of life. That imperium found that early Christian movement increasingly both threatening to its power, and difficult to destroy. It also found *potential* in this movement for the *ideological engineering* of a new, state-crafted, state-perverted false religion, one of far greater *'ideological-efficiency'* than Paganism. The imperium therefore eventually adopted and imposed that perversion, switching from the repression and slaughter of Christians to the repression and slaughter of Pagans -- *especially* the "learned" ones, in whom it also perceived a growing threat to its rule. It may be hard for us, "'with our noses to the grindstone'" of proximate concerns, to foresee the other side of the 'meta-evolutionary leap' upon which our own civilization is lately verging, and given an ideological vantage point, still buried deep within prehistoric times [in Marx's sense]. Further on, we will attempt to 'solve for' some features of that next system of civilization, using the new tools of the $_N\underline{Q}$ *dialectical algebra*. But, for now, perhaps it would be helpful to consider some descriptions of the human-social 'meta-state' of late antiquity from the vantage of *our* side of *its* leap, a leap that was not *completely* aborted, but "merely" delayed, for ~50 generations, by the western Dark Ages:

"The period following the Peloponnesian War was one of political disunity among the Greek states, rendering them easy prey for the now strong kingdom of Macedonia which lay to the north. King Philip of Macedonia was gradually extending his power southward and Demosthenes thundered his unheeded warnings. The Greeks rallied too late for a successful defense and, with the Athenian defeat at Chaeronea in 338 B.C.[E. -- F.*E*.*D*.], Greece became a part of the Macedonian empire. Two years after the fall of the Greek states, ambitious Alexander the Great succeeded his father Philip and set out upon his unparalleled career of conquest which added vast portions of the civilized world to the growing Macedonian domains. Behind him, wherever he led his victorious army, he created, at well-chosen places, a string of new cities. It was in this way, when Alexander entered Egypt, that the city of Alexandria was founded in 332 B.C.[E.]. ...From its inception, Alexandria showed every sign of fulfilling a remarkable future. *In an incredibly short time, largely due to its very fortunate location at a natural intersection of some important trade routes, it grew in wealth, and became the most magnificent and cosmopolitan center of the world.* ..." [Howard Eves, *An Introduction to the History of Mathematics*, 3rd Ed., Holt, Rinehart & Winston [NY: 1969], pp. 112-113, *emphasis added* by F.*E*.*D*.]. "After Alexander the Great died in 323 B.C.[E.], his empire was partitioned among some of his military leaders, resulting in the eventual emergence of three empires, under separate rule, but nevertheless united by the bonds of the Hellenistic civilization that had followed Alexander's conquests. Egypt fell to the lot of Ptolemy. ...He selected Alexandria as his capital and, *to attract learned men to his city, immediately began the erection of the famed University of Alexandria. This was the first institution of its kind. ...Report has it that it was highly endowed and that its attractive and elaborate plan contained lecture rooms, laboratories, gardens, museums, library facilities, and living quarters. The core of the institution was the great library, which for a long time was the largest repository of learned works to be found anywhere in the world, boasting, within forty years of its founding, over 600,000 papyrus rolls. It was about 300 B.C.[E.] that the university opened its doors and Alexandria became, and remained for close to a thousand years, the intellectual metropolis of the Greek race* [and not of the Greek "race" alone, but of the Occidental Afro/Euro/Near-Asian hemisphere of humanity entire! -- F.*E*.*D*.]." [*Ibid.*, p. 113, *emphasis added* by F.*E*.*D*.]. "No other city has been the center of mathematical activity for so long a period as was Alexandria from the days of Euclid (ca. 300 B.C.[E.]) to the time of Hypatia (†A.D. 415 [C.E.]). It was a very cosmopolitan center, and the mathematics that resulted from Alexandrian scholarship was not all of the same type. ..." [Carl Boyer, Uta Merzbach, *A History of Mathematics*, 2nd. Ed., John Wiley & Sons, Inc. [NY: 1991], p. 178, *emphasis added by* F.*E*.*D*.]. "About 290 B.C.[E.] Ptolemy Soter built a center in which scholars could study and teach. This building, dedicated to the *Muse*s, became known as the *Muse*um, and it housed poets, philosophers, philologists, astronomers, geographers, physicians, historians, artists, *and most of the famous mathematicians of the Alexandrian Greek civilization*. Adjacent to the Museum, Ptolemy built a library, not only for the preservation of important documents but *for the use of the general public*. This famous library was said at one time to contain 750,000 volumes, including the personal library of Aristotle and his successor Theophrastus. Books, incidentally, were more readily available in Alexandria than in classical Greece because Egyptian papyrus was at hand. In fact, Alexandria became the center of the book-copying trade of the ancient world. *The Ptolemies also pursued Alexander's plan of encouraging a mixture of peoples, so that Greeks, Persians, Jews, Ethiopians, Arabs, Romans, Indians, and Negroes came unhindered to Alexandria and mingled freely in the city. Aristocrat, citizen, and slave jostled each other and, in fact, the class distinctions of the older Greek civilization broke down. The civilization in Egypt was influenced further by the knowledge brought in by traders and by the special expeditions organized by the scholars to learn more about other parts of the world. Consequently, intellectual horizons were broadened. The long sea voyages of the Alexandrians called for far better knowledge of geography, methods of telling time, and navigational techniques, while commercial competition generated interest in materials, in the efficiency of production, and in improvement of skills. Arts that had been despised in the classical period were taken up with new zest and training schools were established. Pure science continued to be pursued but also applied science.*" [Morris Kline, *Mathematical Thought from Ancient to Modern Times*, vol. I., Oxford U. Press [NY: 1972] pp. 102-103, *emphasis added* by F.*E*.*D*.]

"*The mechanical devices created by the Alexandrians were astonishing even by modern standards*. Pumps to bring up water from wells and cisterns, pulleys, wedges, tackles, *systems of gears*, and a mileage measuring device no different from what may be found in the modern automobile were used commonly. *Steam power was employed to drive a vehicle along the city streets in the annual religious parade*. Water or air heated by fire in secret vessels of temple altars was used to make statues move. ...Water power operated a musical organ and made figures on a fountain move automatically while compressed air was used to operate a gun. New mechanical instruments, including an improved sundial, were invented to refine astronomical measurements." [*Ibid.*, p. 103, *emphasis* added by F.*E*.*D*.]. "Proclus refers to Heron as *mechanicus*, which might mean a mechanical engineer today, and discusses him in connection with *the inventor Ctesibius, his teacher*. Heron was also a good surveyor. ...*The striking fact about Heron's work is his commingling of rigorous mathematics and the approximate procedures and formulas of the Egyptians. On the one hand, he wrote a commentary on Euclid, used the exact results of Archimedes (indeed he refers to him often), and in original works proved a number of new theorems of Euclidean geometry. On the other hand, he was concerned with applied geometry and mechanics and gave all sorts of approximate results without apology. He used Egyptian formulas freely and much of his geometry was also Egyptian in character.* ...His applied works include *Mechanics, The Construction of Catapults, Measurements, The Design of Guns, Pneumatica* (the theory and use of air pressure), and *On The Art of Construction of Automata*. He gives designs for water clocks, measuring instruments, *automatic machines*, weight lifting machines, and war engines." [*Ibid.*, pp. 116-117, *emphasis added* by F.*E*.*D*.]. Consider in this regard also the circa 80 B.C.E., purportedly anthyphairesis-employing complex-gearing-based Orrery-computer known as the *Antikythera Mechanism* [D. H. Fowler, *The Mathematics of Plato's Academy*, Clarendon [NY: 1987], pp. 223, 364].

"*The highest point of Alexandrian Greek algebra is reached with Diophantus*. ... His work towers above that of his contemporaries; *unfortunately, it came too late to be highly influential in his time because a destructive tide was already engulfing the civilization*. Diophantus wrote several books that are lost in their entirety. ...His great work is the *Arithmetica* which, *Diophantus* says, comprises thirteen books. We have six [*surviving in Greek; 4 more were recently found, in Arabic translation, possibly translations of Hypatia's commentaries on books 4 through 7, rather than of Diophantus' originals -- F.E.D.*] ...*One of Diophantus' major steps is the introduction of symbolism* [i.e., of *proto-ideography* -- F.*E*.*D*.] *in algebra.. .The appearance of such symbolism is of course remarkable but the use of powers higher than three is even more extraordinary. The classical Greeks could not and would not consider a product of more than three factors because such a product had no* [then-known -- F.*E*.*D*.] *geometrical significance* [i.e., given the apparently 3-and-no-more/no-less-dimensional space of our world -- F.*E*.*D*.]. *On a purely arithmetical basis, however, such products do have a meaning; and this is precisely the basis Diophantus adopts.*" [*Ibid.*, pp. 138-139, *emphasis* added].

"*The death of Archimedes portended what was to happen to the entire Greek world*. In 216 B.C.[E.] Syracuse allied itself with Carthage in the second Punic war between that city and Rome. The Romans attacked Syracuse in 212 B.C.[E.]. While drawing mathematical figures in the sand, Archimedes was challenged by one of the soldiers who had just taken the city. Story has it that Archimedes was so lost in thought that he did not hear the challenge of the Roman soldier. The soldier thereupon killed him, despite the order of the Roman commander, Marcellus, that Archimedes be unharmed." [*Ibid.*, p. 106, *bold italic text* added by F.*E*.*D*.].

"The fate of Hypatia, an Alexandrian mathematician of note and the daughter of Theon of Alexandria [the redactor of Euclid's *Elements* -- F.E.D.], symbolizes the end of the era. *Because she refused to abandon the Greek religion, Christian fanatics seized her in the streets of Alexandria and tore her to pieces.*" [*Ibid.*, p. 181, *emphasis* added by F.E.D.]. "From the standpoint of the history of mathematics, the rise of Christianity had unfortunate consequences. Though the Christian leaders adopted many Greek and Oriental myths and customs with the intent of making Christianity more acceptable to converts, *they opposed pagan learning and ridiculed mathematics, astronomy, and physical science; Christians were forbidden to contaminate themselves with Greek learning*. Despite cruel persecution by the Romans, Christianity spread and became so powerful that the emperor Constantine (272-337 [C.E.]) was obliged to consign it a privileged position in the Roman Empire. *The Christians were now able to effect even greater destruction of Greek culture. The emperor Theodosius proscribed the pagan religions and, in 392 [C.E.] ordered that the Greek temples be destroyed. Pagans were attacked and murdered throughout the empire. Greek books were burned by the thousands.* In the year that Theodosius banned the pagan religions, the Christians destroyed the temple of Serapis [in Alexandria -- F.E.D.], which still housed the only extensive collection of Greek works. *It is estimated that 300,000 manuscripts were destroyed. Many other works written on parchment were expunged by the Christians so that they could use the parchment for their own writings.*" [*Ibid.*, pp. 180-181, *emphasis* added by F.E.D.]. "*In 529 [C.E.], the Eastern Roman emperor Justinian closed all the Greek schools of philosophy, including Plato's Academy.* ...The final blow to Alexandria was the conquest of Egypt by the upsurging Moslems in ... 640 [C.E.]. *The remaining books were destroyed* on the ground given by Omar, the Arab conqueror: "Either the books contain what is in the Koran, in which case we do not have to read them, or they contain the opposite of what is in the Koran, in which case we must not read them." *And so for six months the baths of Alexandria were heated by burning rolls of parchment.* After the capture of Alexandria by the Mohammedans, the majority of the scholars migrated to Constantinople, which had become the capital of the Eastern Roman Empire. Though *no activity along the lines of Greek thought could flourish in the unfriendly Christian atmosphere of Byzantium*, this flux of scholars and their works to comparative safety *increased the treasury of knowledge that was to reach Europe eight hundred years later. It is perhaps pointless to contemplate what might have been. But one cannot help observe that the Alexandrian Greek civilization ended its active scientific life on the threshold of the modern age. It had the unusual combination of theoretical and practical interests that proved so fertile a thousand years later. Until the last few centuries of its existence, it enjoyed freedom of thought, which is also essential to a flourishing culture. And it tackled and made major advances in several fields that were to become all-important in the Renaissance:* quantitative plane and solid geometry; trigonometry; algebra; calculus; and astronomy. It has often been said that man proposes and God disposes. It is more accurate to say of the Greeks that God proposed them and man disposed of them. *The Greek mathematicians were wiped out. But the fruits of their work did reach Europe...*" [*Ibid.*, Morris Kline, *Mathematical Thought from Ancient to Modern Times*, vol. 1., p. 181, *emphasis added by* F.E.D.].

Analyzing recent trends in ideology, within the overall pattern of recent Terran human 'psycho-history', and correlating their hidden initiators, just discernible at the shadowy edges of events, with the key *'contra-temporal terms'* of the *'psycho-historical equations'*, we conjecture as follows [for we can claim no direct, "insider knowledge" of these matters]:

■ Global Strategic Hypotheses -- Towards A Strategy for Humanity: *A Gloss on Some Recent Chapters of the 'Hidden History' of The Human Species*. Now, *once again*, the further development of our *this-time-global* human civilization -- of widespread prosperity, society-wide education, and *political democracy*; of mathematics, science, and *competitive-capitalism-driven* technological progress, *"the growth of the productive forces"* or of the *'self-productivity'* of humanity -- threatens the power of *today's* imperium: of the iron-fisted 'invisible hand'; of the 'invisible dictatorship' of the oil/finance plutocracy; of the global *'Dictatorship of Petroleum'*. *In particular, the advent of muclear fusion technology alone would wipe out key financial foundations of their rule. In general, fixed capital-value accumulates in increasing ratio to circulating capital-value as the accelerating historical accumulation of capital-value, and the acceleration of capital-value-productivity-increasing technological advances which 'capital-value-profit-ism' incents and incites, proceeds, thereby acceleratedly expanding the cross-section of vulnerability of especially the greatest conglomerations of accumulated fixed-capital-value, which are the monopoly of the capitalist plutocracy -- threatening the asset-value of both their directly-owned fixed capital equipment, and of their banks' massive loans, which financed fixed-capital construction/purchase by others -- to technological or obsolescence de-valuation or value-obliteration, potentially wiping out the economic foundation of the capitalist plutocracy's political power, which power they value above all else.* This is the economic foundation of today's secret, hidden, ruling ideology of *'capitalist anti-capitalism'*. I.e., as a result, that *capitalist* plutocracy has turned *anti-capitalist*; has turned against science and technology, and even against economic growth in so far as they benefit the majority of humanity. The innermost, ruling faction of this petroleum/finance imperium, the faction of the plutocracy that we call, for historical reasons, the 'Rocke-Nazis', has turned ever-more-absolutely against the popular culture of scientific, technological, public education, and middle-class, competitive capitalism. The Rocke-Nazis have concluded that a politically-democratic, competitive-capitalist, increasingly educated, increasingly inventive, increasingly prosperous, and therefore increasingly independent [more difficult to prostitute] humanity is increasingly *plutocratically, timocratically ungovernable*; is ungovernable *by them, despite all of their vast wealth and power*. Nor does this faction hope, any longer, that a *negative-population-growth, negative-economic-growth*, neo-feudal New Dark Age can, alone, even with a thorough *'de-education'* and *'re-peasantization'* of the *surviving masses* under their crypto-aristocratic rule, make humanity again governable by them *for long*. The 1990s global *"technology-boom"*, its [*former*-]Third-World *'industrialization boom'*, and, especially, its *global 'democracy boom'* after the sweeping, swift, and amazingly non-violent fall of some of the most vicious and violent totalitarian dictatorships the world has ever seen, the Stalinist dictatorships of Russia/Eastern Europe, terrified them to their craven core. *Widespread prosperity, education, political democracy; widespread popular knowledge of mathematics and science, competitive-capitalism-driven technological progress, and global cultural renaissance will lead to* -- among other things which are blessings for humanity, and anathema to the Rocke-Nazis -- the emergence of ever more new billionaires; *new potential rivals* to the Rocke-Nazis; *new* Steve Jobses, new Ross Perots, new Bill Gateses, new George Soroses, who may not choose to join the Rocke-Nazi 'Country[ies]-Club', or to play by the Rocke-Nazis' rules. They felt that they had to engineer risky "asset-pricing bubbles", through their usual 'reverse money-laundering' techniques, to bring these potential rivals down -- the Japanese economy, the Asian "Tigers", the California/Silicon Valley high-tech industry, the internet "dotcoms", etc. [To understand the current 'humanocidal culminant', it must first be understood, especially in 'psycho-historical' terms, how and why power is an absolute addiction for the Rocke-Nazis, the only thing that, bottom-line, really matters to them; how no amount of murder is, to them, too high a price to pay to retain it. *They would, can -- and do! -- murder their own mothers if mother gets in the way of power.* The sadism-inducing tenor of their character-formation is also key]. *Capitalist anti-capitalism* has lately converged, in their deliberations, with a neo-/crypto-Malthusian, neo-/crypto-Social-Darwinist *human anti-humanism*. They have concluded that the human genome itself, with the proneness to 'exo-genetic' learning that it engenders, the capacity for innovation -- and for revolt -- that it bestows, has got to go [*except, of course, for them, with their technologically-extended life-spans*]. This ruling faction is therefore rapidly readying its *'meta-fractally analogous'* pseudo-solution; its 'humanocidal' *Final Dark Age*; its genomically-engineered '"*Final Solution to the Humanity Problem*"' [for which its [initially] servant-dictator Hitler's *"Final Solution to the Jewish Problem"*, and its [initially] servant-dictator Stalin's gulags, were but partial and local *dress rehearsals*]. They are preparing a genetically-engineered, successor designer disease pandemic to their mere "population control" AIDS virus, and arranging for a global pandemic that will, quite quickly, once they unleash it, wipe out the genomic human race globally. *Only the Rocke-Nazis will have the antidote.* And we, their present human slaves, will be replaced by the race of genomically-engineered, congenitally-servile, pandemic-immune, chimaeric slave drones, '"chromosomically incapable"' of deep learning, of technological innovation, or of revolt, that their secret laboratories are now so frantically fabricating. Ruling classes have always had a "love-hate relationship" with their slave-classes, have always hated the resistance of their slaves to their continual rape of their slaves lives; hated their slaves' ever-present threat of revolt, and slaughtered as many of their slaves as they could afford to lose when revolts did erupt. *But those rulers also abjectly depended upon those slaves for the work and the services which sustained those rulers' "lavish" lives.* The Rocke-Nazis now believe that they can put an end to all of this once and for all; that human [bio-]technology has reached, at last, a level such that they can finally afford to exterminate virtually all of their present human "slaves"; the vast majority of the human race. The Rocke-Nazis are *'the humanocidal culminant'*, the ultimate canalization of the whole history of human tyranny. But, perhaps, the very idea of engineering a sub-humanoid species that can work but not learn, serve but not innovate, and survive, being victimized and violated daily, and yet not revolt, is a contradiction in terms. Perhaps the *'partial humanocide'* which the Rocke-Nazis intend can only actually be, if "successful", a *'total genomocide'*: *'human-species-suicide'*. And, perhaps, the desperate, life-despairing *'annihilism'* of the pseudo-Islamicist "suicide bombers" is but another sign of this *'humanocidal'* contra-zeitgeist.

Former German military intelligence operative Hitler, initially assigned to spy on the "National Socialist" party, was later assigned, with massive financing, to take over that party and the German nation, and to steer Germany into war with Russia. The progenitors of the Rocke-Nazi faction in the City of London and in New York feared the threat to their global dominance that a German-Russian alliance, combining German science and industry with Russian science and labor-/natural-resources, would pose. But Hitler soon perceived his potential to replace his masters with himself, made a pact with Stalin [to postpone their showdown 'til later], and turned on his [former] masters to the West. Those erstwhile masters had eventually to endure great costs to themselves, e.g., to ally with Stalin, and to institute the somewhat pro-labor "New Deal" reforms in the U. S., to enlist their middle/working classes in the armed overthrow of their former henchman Hitler, who now threatened the nascent Rocke-Nazi's survival. The lesser *"servant-dictators"* spawned worldwide by the Rocke-Nazi imperium so ubiquitously ever since also tend, like Hitler before them, quite *regularly*, indeed, *"lawfully"*, to transform themselves into *'Franken-dictators'*. Need we mention Ngo din Diem, the Shah of Iran, Marcos, Noriega, Idi Amin, Milosevich, Saddam Hussein, etc., *ad nauseam*. They tend to turn on their Rocke-Nazi masters like Frankenstein's monster, seeking to become the masters of their [former] masters; seeking to make their masters 'former', by seizing the imperium for themselves. The Rocke-Nazis apparatus must therefore suddenly reverse gears, and rush to forcibly remove them, often at great ideological, political, and economic cost to the Rocke-Nazis. That is one of their greatest weaknesses. After World War II, it was only the horrific parasitism of the CIA-installed, and CIA-sponsored and -underwritten servant-dictatorships across the globe [with their *CIA-trained, CIA-funded, and CIA-armed secret police*, and their CIA-trained *rape/torture/death-squad government terrorists*, who, on CIA orders, massacred several generations of pro-democracy nationalists throughout the Third World], that made *'pseudo-socialism'*, i.e., *Stalinist proto-state-capitalism*, so-called "Communism", which at least promised a little industrialization in return for its brand of totalitarian viciousness, look *marginally* more attractive. The U.S. government/CIA foreign policy of enforcing "non-Communist" police-state dictatorships throughout the Third World thus served as the primary recruiting force for this "Communism", keeping its moldering corpse seemingly alive for so long, far beyond its "natural" life-span, thus keeping vast corporate welfare payments to the "defense" industry, and to the Rocke-Nazi banks which financed the deficit spending supporting that corporate welfare system, alive as well. But recently, the Rocke-Nazis were stricken with horror by the *largely non-violent* overthrow of the Stalinist dictatorships at their core, in Russia and Eastern Europe. They -- aided and abetted by their University of Chicago hired liars, their "shock treatment" social-torturers -- engineered, and continue to engineer a horrific revenge and punishment upon the Russian people for their democratic aspirations, subjecting them to Weimar-Germany-like conditions in an effort to discredit democracy, and in the hopes of turning them into neo-Nazis. *But the Rocke-Nazis know only too well that they have to be exceedingly careful, and not move too quickly, as they move toward their ultra-horrific and ultra-criminal goal.* Were a misstep on their part to awaken the people too early from their divided-and-conquered, Balkanized mentalities and foci -- from their ideological slumber -- then the Rocke-Nazis would face the same kind of nonviolent, overwhelmingly popular overthrow to which their Stalinist brethren in Russia and Eastern Europe recently succumbed. The stakes would be so much higher, and the popular motivation for that overthrow so vastly the greater -- the interdiction of 'humanocide' -- than even in the case of that overthrow of the utter viciousness of Stalinist 'pseudo-socialism'. Before they can get their '"*Final Solution*"' in place, they will prepare the way for it by economically -- hence politically -- crushing the global middle class, collapsing majority U.S. living standards to Third World levels. They are gearing up for the massive middle class repression that this will require. In the United States, the heartland of democracy, the last vestige of the New Deal "social safety net", the Social Security system, is being targeted for destruction, along with the remnants of the private pension system. The police state rule requisite to repressing the public reaction to the crushing of middle class living standards is nearing readiness, via the Rocke-Nazis' USA "PATRIOT" Act [whose true name is "The USA TRAITOR Act"], and via their new, KGB-clone "Department of Homeland Security" and domestic/foreign "Intelligence Czar", plus their recent FCC-foisted monopolization of the mass media, and the federally-imposed nationwide installation of *unauditable, hackable electronic voting machines*. They reason that, if they can crush what remains of democracy at the center, they can quickly mop-up its motley mementos everywhere else soon thereafter. The "PATRIOT" Act's unconstitutional "legalization" of spying by the new 'U. S. secret police' on church meetings and other public meetings of U. S. citizens; of secret police surveillance of U. S. citizen's reading choices at libraries and bookstores, with prosecution of librarians and bookstore owners who reveal that spying; of secret searches of citizens homes, without notification; of declaring as "terrorists" citizens who merely assemble peaceably to petition their government for redress of grievances, plus the claim that President Bush has the right to violate, at whim, the FISA law, U.S. anti-torture laws, and any other laws, by "executive order" decree, and to declare any U. S. citizen an "enemy combatant", thus to strip that citizen of all civil liberties, to incarcerate that citizen indefinitely, without due process of law, without any access to judicial review, to torture that citizen if the President so decides, and to execute that citizen upon conviction by a "kangaroo court" of military officers, proceeding in secret, without even the right of an attorney for the defense, has already publicly proclaimed President Bush to be an absolute dictator, with little public opposition. The training and inculcation of U. S. citizen soldiers -- volunteer, professional and national guard -- by U. S. "intelligence", to the Warrant-less invasion of Iraqi homes, and the lawless, trial-less incarceration, torture, and execution of Iraqi citizens, will soon come home to roost. The video tapes documenting the worst of the crimes against human rights committed at Abu Graib, and throughout Iraq and Afghanistan, and in other nations as well, under the auspices and the orders of U. S. "intelligence", have not been shared with the American people by "their" government. We were shown only the humiliations. The videos of the tortures, the rapes, and the murders of Iraqi citizens have been withheld from us. Soon it will be American citizens, stateside -- any who dare to disagree with the gathering Bush dictatorship -- whose homes will be invaded in the wee hours; who will be incarcerated without warrant, without due process of law; tortured, raped, and murdered by Bush's 'New Gestapo' -- if the American people fail to awaken from their denial, and to put a stop to Bush's plutocratic-theocratic, totalitarian destruction of their nation, and of the rest of the world.

The American people face an horrific 'karmic reflux': If they continue to allow their Rocke-Nazi-prostituted, Rocke-Nazi-perverted government to visit servant-dictator rapacious tyrannies upon their fellow human beings in the Third World and, indeed, worldwide, then they will reap what they have sown; they will reap a like rapacious tyranny in their own lives, in their own homes, in the USA. They will so reap because the predictably desperate, suicidal, terrorist violence of the reaction *to those tyrannies* by those fellow human beings -- by those remaining Third World citizens who are left alive after the pro-democracy nationalists have been massacred *by those tyrannies* -- including their counter-attacks upon the U. S., will be used, by the Rocke-Nazi-captured U.S. government, as an excuse to complete the repeal of the U. S. Constitution and Bill Of Rights already underway, and to institute a fundamentalist, terrorist, totalitarian, *pseudo-Christian* theocratic police-state in the U.S., as a 'karmic' mirror-image of the fundamentalist, terrorist, totalitarian, *pseudo-Islamic* theocratic police-states that the Rocke-Nazis have already engineered and provoked in the Third World. Along the way to their '"*Final Solution*"', the Rocke-Nazis will turn all of Terran human society, everywhere, into Beirut, into Lebanon, into Palestine; into Afghanistan, into Iraq -- into *One Big Concentration Camp*, globally. The Rocke-Nazis will try to turn the whole world into Pol Pot Cambodia, into Sarajevo, into Bosnia, into Chechnya, into Somalia, into Haiti, into East Timor, into Columbia, into Argentina, into Ruwanda, into Myanmar, into Darfur. All these have been but their dress rehearsals. They are masters of mass manipulation, masters at dividing and conquering, at profiling the American people mass-psychologically for the weaknesses that they can exploit; masters at the [cf. Bamford] "Operation Northwoods"-style fabrication of "events", by which they can fool us into..., e.g., *going to war over which end of the egg we open* [cf. Swift]. *Political* checks and balances against governmental abuse of *political* power, such as those built into the U. S. Constitution, *fail* once the unchecked *economic* power of the plutocracy, via their "lobbyists", etc., burgeons to the point where it can *prostitute* the executive, legislative, and judicial branches of government, *buying them out lock, stock, and barrel*! If the people of the United States lean toward the "New Republican Party" [more aptly termed the '*Rape-Public-an*' Party, for its policy of the rampant rape and pillage -- *privatization*, crony-confiscation, and other "primitive accumulation" -- against all public assets, and, on the other side, of the foisting *socialization* of private crony-corporate costs upon the taxpayers of the working/middle class], then the Rocke-Nazis will try to destroy the U. S. middle class, and its remnant democratic institutions, via a new round of "primitive accumulation" at the expense of that middle class -- via the looting of the U. S. taxpayers' Treasury, and of corporate private pension-plans; via all of the corporate-welfare-proliferating, hyper-rich hyper-re-enriching/middle-class impoverishing policies that we have seen ever since the Bush *«coup d'état»*. They will destroy public education with their '"*All Children Left Behind*"' inculcation of just one exam -- aimed at enforcing ignorance of all else -- and with their *anti-scientific, pseudo-Christian* "Creation Science/Intelligent Design" suppression of even what little still remains of science education in the public schools.

The Rocke-Nazis will continue to pervert, into a mass recruiting tool for the pseudo-Christian ideology that they are concocting, so as to drastically deepen our already-egregious ideological enslavement, the healthy reaction against the rampant growth of social atomization, social alienation, anomie, and demoralization, under the ever-intensifying substitution of the cash nexus for all other forms of human involvement and connexion, in this *society of estrangement, of universal alienation, universal selling, universal prostitution*. The Rocke-Nazis are ever trying to twist this humane reaction into yet further fodder for their *New Dark Ages pseudo-Christianity*; for a *fundamentalist, theocratic-totalitarian dictatorship*, with its *'New Inquisition'*, mirror-opposing the maniacal *pseudo-Islamic fundamentalism* that they have also covertly created. After the "Soviet Union" dissolved, they desperately needed a new "national security threat", to "justify" the re-escalation of "Defense" spending corporate welfare, of Federal deficits and public debt, *with the vast taxpayer-borne burden of the debt-service payments they generate* [more corporate welfare to the giant Rocke-Nazi banks, which "loan" the U. S. government the money to finance the deficit], and to help "justify" their *«de facto» repeal of the U. S. Constitution and Bill Of Rights*. Of course, any *'Rape-Public-an'*, oil-executive-staffed regime worthy of the name "will look the other way" on anti-price-fixing law enforcement when its buddies in the Rocke-Nazi oil companies raise oil prices, due to "oil shortages" from "greater *demand*", *of course*, despite the end of the Iraq oil embargo, and the return of the huge Iraqi oil *supply* to the world market! So the Bush *public tax cuts* for the rich are seconded by his *'private tax' hikes* for the rest of America, via the oil companies' "*taxation without representation*". It's so much easier now than ever before, today, for the Rocke-Nazis to rule, and to race toward their *'Final Solution'*, via the ideological infrastructure they have lately fabricated, and now operate, via their *'Rape-Public-an'*, mostly unwitting, and, to the Rocke-Nazis, "untermenschen" agents; the 'drooling greedies'; the "Christian", *money-worshipping, Mammon-idolizing, monetary-status-obsessed* "New Republicans", than it was before, trying to foist their *'Meta-Nazi'*, "*People are Pollution*" neo-pseudo-religion of *'Earth-ism'* via the Democratic Party. After all, the Rocke-Nazis' ancient, *Roman-imperial progenitors succeeded in bringing off a Dark Ages once before, using an earlier version of pseudo-Christianity* [one *also* diametrically opposed to the actual teachings of Jesus of Nazareth, in theory and, even more massively more so, in practice]. The "Old", true Republicans, and traditional conservatives in general, heeding the wisdom of the U. S. Founding Fathers, and 'Founding Mothers', about how human beings cannot be trusted with unchecked power; about how '"*power corrupts, and absolute power corrupts absolutely*"', worried about, and fought against, excessive, unbalanced concentrations of power, in the state, and in private, mega-corporate behemoths as well. Not so, the "new" *Rape-Public*-ans! The *Rape-Public*-ans are all for *'Corporate Stalinism'*; *'Private* and *Privatized Stalinism'*; the global, *public dictatorship* of the *private bureaucracies* which rule those "inter-national", "multi-national", "trans-national" -- indeed *'meta-national'* -- formations which are, after all, *global command economies internally*, even if they [pretend to] "compete" against one other, in so-called "free markets", externally. Should the people of the United States, in revulsion, reject the Bush *Rape-Public*-ans, and lean back toward the "Democratic" Party, the Rocke-Nazis will simply switch ideological gears, and endeavor to collapse U. S. living standards to Third World levels, destroying the U. S. middle class, and its remnant democratic institutions, via "Carbon Taxes" and other "zero [i.e., *negative*] economic growth", "zero [i.e., *negative*] population growth" policies. They will then endeavor to destroy public education via a recrudescence of their anti-science, anti-technology, neo-Luddite pseudo-religion of "*Earth-ism*"'. They will aim to pervert the healthy popular reaction against capitalism's rampant, accelerating production of pollution, etc., *externalities*, and its rapacious destruction of the natural basis of human society, into a "back to nature" social atavism; a "*People are Pollution*", neo-Nazi, pro-Dark Ages neo-/crypto-feudalism, justifying global genocide on pseudo-"ecological" grounds. *Different ideological means, same ends*. Some commentators have noted [including Julian Simon, who met with an untimely demise] that these "*Small is Beautiful*", anti-population, and pro-poverty movements *are bankrolled by the biggest of the big*, i.e., by the Rocke-Nazi-run foundations and corporations. The people of the United States, in cooperation with the rest of the people of this world, must put a stop to the Rocke-Nazis' *"Final Solution"*, or the Rocke-Nazis will surely put a stop to all of us -- to our futures, to our children's futures, and to our children's children's futures. If the Terran human species cares enough for and about itself, then it surely can thwart the Rocke-Nazis' plan, creating, in the same process, a *this-time-global* renaissance of humanity. Those who do *not* care enough are, defenselessly, headed down the drain of history, along with the Rocke-Nazis. For, should the Rocke-Nazis "*succeed*", then planet Earth will have *failed* its *'meta-Darwinian Planetary Selection Test'*. Then, before much longer, this whole planet will perish in a final Ice Age that only such a global renaissance, a renascent leap forward in human cognition, in science, in technology, and in civilization entire, could have averted! What Terran humanity now faces, in its face-off with the Rocke-Nazis, is a global, planet-wide test of its *moral* fitness to survive. *It is dangerous to assume that the Bush 'Meta-Nazi' regime will relinquish power at the end of Bush's term. An incident may be manufactured, à la Hitler's burning of the Reichstag, and "Operation Northwoods"* [J. Bamford, *Body of Secrets*, Anchor [NY: 2001], pp. 80-91], *which the regime will use to "justify" suspension of elections, of habeas corpus, of the posse comitatus law, and of the U. S. Constitution and Bill Of Rights generally, with imposition of martial law, occupation of key U. S. cities by federal troops and private corporate mercenary forces, trial of U.S. citizens by military tribunal, and concentration camp "internment" of "enemy civilians". It should be obvious, by now, to all who are not in hysterical denial, that this regime, and the sinister forces behind it, are operating on a strict schedule, a 'timetable to totalitarianism'. The secret executive orders are already in place. Only if Bush becomes so unpopular so rapidly as to threaten the Rock-Nazis with exposure and total de-legitimation will they scuttle him, as they did, on a earlier, slower totalitarian track, with Nixon.* ∎

We plan to mail the *Briefings* from <u>Part I.</u> of *Dialectical Ideography* to this website, under separate cover [see below], as circumstances allow. These mailings are part of our implementation of *'The Seldonian Imperative'* -- the ethical imperative to act presently so as *to avert*, if possible, the collective agony of foreseeable future human-societal social-reproductive catastrophes, and the wars, and/or the genocides, and the "dark ages" which follow close upon them, or, if it is not possible/too late to completely avert said catastrophes, to act so as *to reduce both their severity and their duration*. These distributions also advance *'The Seldon Project'*, to develop, and to make more broadly accessible, for Terran humanity, as its "*Moment Of Truth*" and "*Hour Of Destiny*" approaches, the new *«organon»* of *'dialectical ideography'*: a modern, cumulatively-higher, helical re-emergence of Plato's *«arithmoi eidetikoi»*, as discovered by Dr. Seldon. They form part of our efforts to help this humanity actualize its *«eu-catastrophic»* potential for a *world-wide renaissance* of *material, emotional, intellectual*, and *spiritual prosperity*, founded, in part, upon the *humanity-wide diffusion of this new «organon»* of *'nonlinear logic'*, and, thus, upon all of the *'psyche-ological', conceptual, mathematical, scientific, technological, and social evolutionary/social 'meta-evolutionary' accompaniments* of that *advanced cognitive level*. These include the advent of *'subatomic power'*, starting with *the harnessing of Hydrogen, protonic fusion power*, the greatest productive force ever to get "on the agenda" for socio-technological mastery by Terran humanity *so far*.

Dialogically yours,

Hermes de Nemores
for **Foundation** Encyclopedia **Dialectica**,
F.E.D.-mobile

<u>Enclosed herewith</u> --
<u>Package –1</u>:   *Dialectical Ideography*,   *Introductory letter*; **Supplement A**;

<u>Forthcoming</u> --
<u>Package ±0</u>:   *Dialectical Ideography*,   *Introductory letter*; **Supplement B**;
<u>Package +1</u>:   *Dialectical Ideography*,   **Part I. c.**, *Meta-Briefing: Briefing on Briefings*;
<u>Package +2</u>:   *Dialectical Ideography*,   **Part I. c.**, *Briefing on* **Q**;
<u>Package +3</u>:   *Dialectical Ideography*,   **Part I. c.**, *Briefing on* **U**;
<u>Package +4</u>:   *Dialectical Ideography*,   **Part I. c.**, *Briefing on* $_{\bullet}μ$ *or* α.