## $\{ \underline{\times}^2 \notin \underline{\times} \}$ :

# Dialectical Ideography

## A Contribution to the Immanent Critique of Arithmetic

## **Prescripts**

## Motive

Presented by

Foundation Encyclopedia Dialectica



11.09.07.4901 Version:

07 September 2009 C.E. / B.U.E. Last Updated: First Drafts Distributed:

25 November 1999 C.E. / B.U.E.

Dialectical Ideography

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Dialectical ideography as set forth herein is interpreted variously as:

(1) a calculus of 'quanto-qualitative change', encompassing an explicit, ideographical arithmetic for the dimensional unit[ie]s, or metrical «monads», of classical "dimensional analysis", and, thereby, 'semantifying' the "meaningless" singularities [finite-time, zero-division-generated "infinite" values] of especially the "unsolvable" [in part, because of those very singularities] nonlinear integrodifferential equations and their solution-functions, through their metrical 're-qualification' using those new, explicit 'metrical qualifiers' of this 'dimensional arithmetic', concretizing and operationalizing Plato's «arithmoi Monadikoi», and Diophantus' h:

(2) an alternative, onto-logical, 'contra-Boolean algebra', undergirded by a 'contra-Boolean arithmetic';

(3) an ideographic, 'onto-dynamical' "symbolic logic" for the state-space/control-parameter-space 'meta-dynamics' of 'meta-finite', 'conversionsingularity self-bifurcation', for a diachronic 'self-progression' of dynamical systems, i.e., for a 'meta-dynamical meta-system';

(4) a mathematics capable of modeling the history of mathematical ideas as well as a [psycho-]historical algebra and a [psycho-historical]arithmetic for modeling the 'meta-evolution' of the sciences generally; an ideography for the [psycho-]history of ideas; an ideography of the 'meta-dynamical' logic of conceptual self-innovation and self-development; a 'philosophical algebra' or trans-Leibnizian «characteristica universalis»; an arithmetic and algebra of innovative conception or of the creative conceptual process;

(5) a rules-system for an ideographical language of the *qualitative self-escalation* of 'meta-monad-ic' and 'super-system-ic' 'onto-logical types' levels of self-transcending [meta-]systems;

(6) a generic algorithm for the 'meta' operation regress; for a trans-Hegelian, 'autopoiesic' version of the «aufheben» operation; and for a '''dynamical''', 'temporalized', diachronic, 'meta-evolutionary' version of the Russellian/Gödelian logical types hierarchy;

(7) a model for a 'meta-fractal', non-Cantorian theory of totalities, of 'meta-finite' arithmetics, and of the "foundations" of mathematics;

(8) an arithmetic, algebra, geometry, and analysis built on certain "non-standard natural numbers", i.e., on the 'Gödelian meta-natural meta-number units', a space of "evolute hypernumbers", 'of 2nd degree', 'each one made up out of a homogeneous multiplicity' of "standard", '1st degree' natural number units, instantiating those "non-standard models of first order Peano arithmetic" whose 'constructability' is implied by the first-order conjunction of Gödel's completeness and incompleteness theorems, as by the Löwenheim-Skolem theorem, constructing thereby an 'ontologically dynamical', 'de-Parmenideanized' actualization of Plato's "arithmetic of dialectics", his «arithmoi eidetikoi».

Not just the ideographies, but the entire work of **The Foundation**, is *"symbolic"*. This essay, in addition to that of ideogramic, pictogramic, and phonogramic symbolization, draws also upon the power of neo-mythological, allegorical, and mythopoeic -- that is, of *"psycho-historical"* -- symbolization to aid in the conveyance of its most urgent messages. The *'Possibility-Space'* of the 'ideo-ontological meta-state' of contemporary Terran humanity is captured, descriptively, we hold, in the following *"psycho-historical equation"*, wherein  $\underline{\mathbf{R}}$  connotes the 'ideo-ontological category' of <u>Philosophies</u>, <u>S</u> the 'ideo-ontological category' of <u>Sciences</u>, and wherein  $\underline{\Psi}$  connotes the 'ideo-ontological theories', i.e., the 'meta-state' predicted for 'ideo-ontological epoch'  $\tau = 3$ :

## $\langle \hat{\mathfrak{q}}_{R} \rangle^{2^{3}} = \langle \underline{R} \rangle^{8} = \underline{R} \oplus \underline{P} \oplus \hat{\mathfrak{q}}_{PR} \oplus \underline{S} \oplus \hat{\mathfrak{q}}_{SR} \oplus \hat{\mathfrak{q}}_{SP} \oplus \underline{\Psi}.$

Dialectics should inculcate humility. "Perfection" is not a final 'meta-state' that can be finally manifested, but an open-ended, 'uncompleteable', asymptotic process, moving from greater to lesser imperfection. We realize that conceptual 'homeomorphic defect' is inescapable for cognizing beings such as ourselves. Even at best, we must always be partly wrong. Even at best, one cannot be finally, completely, and wholly right. One's mental constructs cannot ever be the truth, the whole truth, and nothing but the truth. But one may be right enough for one's time, for one's moment, for one's role, and for one's part; right enough to help one's contemporaries to live through, and beyond, one's time, and thus, potentially, to enjoy the privilege, the pain notwithstanding, of a vital ['life-ful'] and willing participation in the succeeding epoch of imperfection.

Dialectical Ideography

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- Briefing on the  $\mathbb{E}_7 \subset \mathbb{E}_{MQN} = \mathbb{E}_{MU} = \mathbb{E}_{[(mu)]}$  arithmetic for 'ontically and metrically qualified quantifiers' [for 'quanto-qualitative', or 'qualo-quantitative', state-variables/control-parameters],  $\sqsubset \left(\mathbb{N}\right)^{2^3}$ ;
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#### Notes On Notations

- · Single quote-marks enclose 'self-quotes' of our own coinages.
- Double quote-marks enclose exact quotes of others.
- Triple quote-marks enclose approximate, paraphrased, or re-interpreted word-coinages / full-phrase quotes, of others.
- · Double 'angle marks', « ... », enclose non-English words, transliterated or rendered in their own alphabets.

We will occasionally embed, in the context of English 'phonogramic text', the ideograms  $\partial$ ,  $\underline{\partial}$ , or  $\underline{\partial}$ , juxtaposed as an ideogramic prefix-symbol to a phonogramic word-symbol, signifying a [finite] *quantitative* part, a [finite] *qualitative* part, or a [finite] '*quanto-qualitative*' part, or '*qualo-quantitative* part', respectively, of the meaning of the word so modified, e.g., ' $\partial$ population',  $\underline{\partial}$ «monad»,  $\underline{\partial}$ 'meta-space', and wherein, as contextualized by their operands, the '''operator''' symbols  $\partial$ ,  $\underline{\partial}$ , or  $\underline{\partial}$ , may be read-off as '''partial'''.

Three inter-related, parallel repertoires of '*dialectical ideograms*' are used, herein, throughout, to formulate the expressions of the  $\underline{Q}$  '*dialectical ideography*'. The definitions of each of the ideograms merely listed below will be given, in the sequel, in the context of their use, as their uses arise in the course of the discourse:

(1) an *«arithmos»* of *'rectilinearly-styled'* ideograms, addressing, simultaneously, and indifferently, both the context of (2) and that of (3), as given below -

## {ਙ, ≿, →, ◘, ≓, -, ∎, ⊠, ⊡, ⊡, [, ]}

-- for the generic / minimally-interpreted variant of the Q 'dialectical ideography';

(2) an «arithmos» of "curvaceous", or curvilinearly-styled' ideograms -

### $\{\widehat{\texttt{Q}}, \widecheck{\texttt{X}}, \rightarrow, \textcircled{\textbf{0}}, \textcircled{\textbf{-}}, \textcircled{\textbf{-}}, \textcircled{\textbf{0}}, \textbf{0}, \textbf{0},$

-- for that 'dialectical ideography' as interpreted for ''systematic dialectic'' as well as for the 'ideo-meta-systems' «species» of 'meta-system-atic dialectic', that is, for "pure" idea-systems which are <u>not</u> referred to '''external-to-mind''', sensuous / historical objects / processes, and;

(3) an «arithmos» of 'dia-gon-al', or 'angularly-styled' ideograms, namely, the symbols-set -

### $\{\hat{\mathbf{x}}_{j},\boldsymbol{x},\rightarrow,\boldsymbol{a}_{j}, \textbf{p}, \neg \boldsymbol{a}_{j}, \boldsymbol{\phi}_{j}, \boldsymbol{\diamond}_{j}, \boldsymbol{\diamond}_{$

-- for that 'dialectical ideography' as interpreted for ''historical dialectic''', as well as for the 'physio-meta-systems' «species» of 'meta-system-atic dialectic', that is, for idea-systems which <u>are</u> referred to '''external-to-mind''', sensuous / historical objects / processes, and as well as;

(4) an *«arithmos»* of 'hybrid' or 'mixed-style' signs to denote ''assignments''', or ''interpretations''', mapping from the *«monads»*, or from the 'multi-*«arithmos» «monad»*-ic cumula', of any of these *«arithmoi»* to those of any other –

#### $\{ \vdash \ni, \leftarrow \exists, \leftarrow \neg, \leftarrow \neg\};$

(5) a new inequality sign,  $\frac{1}{2}$ , as the ideogramic symbol for the relation of <u>non</u>-quantitative inequality, i.e., for the relation of qualitative inequality, as part of the *«arithmos»* of basic relations --  $\{>, =, <, \frac{1}{2}\}$  - that convey the F.<u>E</u>.<u>D</u>. *'tetrachotomy principle'* which resides at the root of dialectical arithmetic;

(6) the symbol  $\underline{H}$ , arising from the 'life-script dream' of our founding member, Karl Seldon, which signifies, at any given historical moment of human time, the then-ultimate horizon of the 'diachronic meta-system' of mathematical axiomatic systems, and their 'cumulum', per our ''psycho-historical'' interpretation of '*The Gödelian Dialectic*' of the self-incompleteness-generated self-progression of the *«aufheben»* '' conservative extensions'' of such systems.

#### PRESCRIPTS

#### Motive

"... don't we know that all of this is but a prelude to the song itself, ... the song itself that dialectic sings?"<sup>1</sup>

#### Plato, Republic, 531c-532a

#### Objective.

On Earth, the human race -- the race to achieve humanity before accumulating 'contraventory' consequences foreclose forever on the very possibility of that achievement -- is now our own, desperate race against time!

Upon the outcome of this, our race, depends the future of all life on Earth, and more.

Most human beings alive today do not know this explicitly, but only implicitly, subconsciously.

A chance still remains for humanity to awaken itself, to rally its forces, and to acquit itself in that trial of itself to which it now summons itself.

Humankind is the only immanent hope for the regeneration of Earth's biosphere, of its capacity for further existence. Realized humanity can avert the otherwise inevitable abortion of this planet, *if it will*. It can tame the self-destructive tendencies inherent in Earth's '*co-biosis*', its "mutual way of living", its total 'bio-geo-«*physis*»', and, it can do so, first, by taming its own self-destructiveness.

The process of "natural selection", at this locus, now converges to a '<u>meta</u>-Darwinian' planetary selection test, a test of the fitness for further '[<u>meta</u>-]evolution' of the planet entire, of the total life-system of the Earth, led by humankind – and humankind not as "genome" alone, but as 'phenome' as well.

This is a test, not of technological "fitness" only, but of "*the ethical fitness to survive*" of 'planetized humanity', whose *concerted* and '*omni-symbiotic*' action will be required to save itself and its world.

Earth's blind-running fitness for bio-social [meta-]evolution, and beyond, is temporary and self-terminating.

Unless this planet evolves an ethical/technological species able to act *intentionally* to extend that fitness, then this "'living planet" will fail of its test and die.

See the other planets that share Earth's sun: corpses, corpses -- every one!

Soon, either Earth must join them in death, or [re]turn them to life.

James Gleick, in his **1987** book <u>Chaos: Making a New Science</u>, called the attention of Terran humanity to the fundamental cognitive self-enfetterment still paralyzing Terran humanity's ethical/technological progress, **The Nonlinearity Barrier**. He also described the enormous undertow of this biosphere's doom attractor, which humanity must overcome, or to which it and its biosphere must soon succumb. He described the potential planetary destiny that we of the Foundation know as **The Great White Death**:

"Climatologists who use global computer models to simulate the long-term [and highly nonlinear -- F.<u>E.D.</u>] behavior of the earth's atmosphere and oceans have known for several years that their models allow at least one dramatically different equilibrium. During the entire geological past, this alternative climate has never existed, but it could be an equally valid solution to the system of equations governing [NB: "system of equations" is here, and no doubt unconsciously, posited 'reifically' and fetishistically as a 'pseudo-subject'/pseudo-agent'/pseudo-actor'/pseudo-cause', or 'pseudo-controller', of physical-world behavior -- F.<u>E.D.</u>] the earth. It is what climatologists call the White Earth climate: an earth whose continents are covered by snow and whose oceans are covered by ice. A glaciated earth would reflect seventy percent of the incoming solar radiation and so would stay extremely cold... Computer models have such a strong tendency to fall into the White Earth equilibrium that climatologists find themselves wondering why it has never come about..."<sup>2</sup>.

Whether or not it has happened before on Earth, could it be about to come about [again]? Climatologist H. Lamb noted, in **1982**: "...The cooling of the general run of European summers since 1953...has had another consequence which marks out the change of climatic tendency since the middle of the century...on Baffin Island in northeast Canada, in the central part of which 70 percent of the highland region seems to have been covered by 'permanent' ice and snow between two hundred and four hundred years ago and where this had been reduced to 2 percent by 1960, the 'permanent' snow beds have been increasing again since and incipient new glaciers have been found."<sup>3</sup>

Geophysicist R. G. Johnson noted, in the July **8**, **1997** edition of *EOS*, the Transactions of the American Geophysical Union: "When the last ice age began 120,000 years ago...the insolation at all latitudes was nearly the same as today...That today's climate may be close to the threshold for new glaciation may indeed be the case. Large plateau areas of Baffin Island are now covered with semi-permanent snow fields that expanded during the historic Little Ice Age 150-350 years ago when cool summers and extremely severe winters were frequent in northern Europe...Canadian glacial nucleation areas are now perilously close to the threshold for new ice sheet growth, as indicated by the historic expansion of snow fields on Baffin Island...Initiation of new ice sheet growth is of great concern because the strong positive feedback of enhanced albedo and heavier cloud cover... might lock in the ice age growth mode despite CO<sub>2</sub> warming."<sup>4</sup>

Viscoplastic circumferential ["horizontal"] transmission of radial ["vertical"] *shear* stress, rising locally at the edges of increasing loads of far-Northern land ice -- on Baffin Island and elsewhere -- may also hold clues to the causation of the marked recent resurgence in seismic and volcanic activity at the lower-Northern and equatorial latitudes, as exemplified by the Mt. St. Helens eruption, *et sequelae*, possibly including sub-oceanic lava flows that may amplify "El Niño" phenomena. H. H. Lamb: "There have been some studies...which seem to indicate greatly enhanced volcanic output during various main stages of the last major ice age...it is possible that changes of stress on the Earth's crust, when enormous masses of water from the oceans were converted to ice on land, produced waves of volcanic activity...there may well have been a reaction -- a [F.E.D.: "*positive*"] 'feedback effect' -- of the dust veils in the atmosphere leading to sharper cooling of the climate at the Earth's surface."<sup>5</sup>

The parade of prodigious Pleistocene glaciations, whose miles-deep *Juggernauts of Ice* shaved bald vast stretches of Earth's biosphere, never truly ended. This parade merely paused, again, some **10,000++** years ago. This parade has paused repeatedly, every **~100,000** years, since the Pleistocene began, some two million years ago, for about **10,000** years each time. The most recent of these **~10,000** year pauses opened the present interglacial. This interglacial has been humanity's window of opportunity for the development of ethical and technological civilization, and for noospheric evolution and 'meta-evolution', as well as for the partial self-regeneration of Earth's biosphere from the 'eco-suicidal' ravages of these reiterated *Ages Of Ice*.

If Earth's humanity allows the current interglacial to end; allows the Ice Ages to resume, that window will close -- this time, forever. Earth will become a *Planet Of Ice*, the final cadaver in a solar system of planetary cadavers.

Earth has entered the closing period of its current interglacial, an interglacial already hyper-extended -- and extenuated -- relative to all of the previous Pleistocene pauses, due to some so far unintentional but *ecologically beneficial* consequences of human socio-technological evolution.

<u>Hypothesis A</u>. The "Law" Of The Tendency Of Ecological Primary Productivity To Decline? The burgeoning oceanic and continental «physis» of Earth's "ascendant-phase photosynthetic biosphere" removed vast masses of carbon dioxide from Earth's once predominantly "carbonic" air. Much of this carbonic matter accumulated under water, in vast fresh water tropical swamps and bogs as well as in marine sediments, and, later, deep inside Earth's continental crusts and ocean-bottom strata, as anaerobically decaying animal, plant, and protiste corpses. Those corpses transformed into the peat and coal, and, at least to some extent, also into the petroleum, natural gas, etc., that later became the fossil fuels of human industry. Climatic cooling ensued from this massive CO<sub>2</sub> depletion, as well as from the self-depletion of Thorium, etc. [of some of the last, heaviest, most unstable products of stellar/atomic evolution, the spontaneously radioactively self-decaying elements within Earth's lithosphere], as from other self-induced, blind-running, cumulative secular processes.

Earth's self-cooling at length self-bifurcated its climate. Earth became vulnerable, in a new way, to aperiodic, and tendentially 'self-perpetualizing', global glaciations.

This new species of glaciations was triggered, in part, by the low-points of insolation of the various [Milankovitch] irregularities in Earth's orbital path with respect to its sun. These low points had hitherto oscillated Earth's CO<sub>2</sub>-saturated atmosphere between temperature regimes of "warm" and "slightly less warm". But biospheric CO<sub>2</sub> depletion at length allowed a threshold of "cooling" sufficient to trigger the manifestation of self-accelerating land ice accumulation to be crossed. Gigantic glacial *Jaws Of White*, poised repeatedly, from the start of the Pleistocene onward, on the verge of closing irrevocably over the waning equatorial enclave of Earth's once-global rainforest.

This maw of massive biomass massacre, this self-expanding, self-accelerating, icy *Wedge of White*, was the self-reflexive action, the self-caused mirror reflux, of that great *Mantle of Green*, the self-expanding photosynthetic biosphere, which earlier engulfed the planet's oceanic and continental surfaces.

Some might entitle this hypothesis "'*The "Law" Of The Tendency Of The Rate Of Photosynthesis To Fall*" as a consequence of the tendency of that rate to accelerate to high levels early on, leading to massive anaerobic, anoxic decay of dead biomass, and, thus, to progressive, cumulative depletion of atmospheric CO<sub>2</sub> as a consequence, resulting in a '*self-braking*' and '*self-breaking*' of the global acceleration of 'phyto-synthesis', and thus of most global formation, and accumulation, of biomass, '[meta-]phytic' and '[meta-]zoic' alike.

Per this hypothesis, the Terran biosphere is thus *a self-bifurcating <u>meta</u>-system*, that is, a self-developing diachronic <u>sequence</u>, or 'macro-ecological <u>succession</u>', of qualitatively distinct, ontologically-expanding biospheres; of 'qualo-ontologically' distinct dynamical system<u>s</u>. This <u>meta</u>-system is a '<u>meta</u>-continuity', bridging the "singular", catastrophic, qualitative abysses of 'meta-finite' <u>dis</u>continuity that separate each biospheric predecessor system from its successor system. E.g., the "Chemosynthetic" / prokaryotic archaea / bacterial-Biosphere branched itself off into/emerged the eukaryotic, '*Phyto*synthetic'/*Photo*synthetic Biosphere.

Each successor biosphere connects to its next by a 'meta-continuous' discontinuity; by a 'meta-finite' "singularity"; by a '<u>self</u>-bifurcation' bridge; by a "meta-system transition" [cf. Turchin<sup>6</sup>]. The "<u>self</u>-activity" of the present macro-ecosystem, the Photosynthetic planetary biosphere itself, as a whole -- <u>not</u> the <u>separate</u> activity of any <u>external</u> controller -- shifted its own atmospheric CO<sub>2</sub> concentration control parameter-value across a critical, bifurcation threshold. This 'self-parameter' 'self-shift' induced a "phase transition" not only in the state trajectory of that system, but in its state-space/control-space, or 'meta-space', itself, a qualitative, 'onto/metrical' change in the state-variable/control-parameter dimensionality and metrical/dimensional content of that 'meta-space', to describe a *qualitative*, 'ontological' change in its dynamics, i.e., in its "laws" of motion.

This "change of laws", this emergence of new, successor dynamical "laws", was caused, *mediately*, by that system itself, by the very behavior of that system which accorded with the predecessor dynamical "laws". This ""<u>self</u>-causation" was mediated through or transmitted via the biosphere's climatic environment. The resulting "phase transition" in climate moved the biosphere from its former 'global rainforest' regime to one of hemispheric latitudinal multiple-banding. These "'bands'" are, in equator-to-poles order: 'equatorial jungle /- desert / temperate deciduous forest/tundra/standing glacier' -- with its signature oscillatory regime of *long* Ice Ages followed by *short* interglacials, such as has characterized Pleistocene/Recent times ever since.

This previous 'self-induced transition' has itself lately begun to 'self-transition', to 'self-bifurcate', once again.

*In*advertently, *un*intentionally, the global emergence of human agricultural, then industrial, practices -- including the partial conversion of forests into cultivated fields, and the combustion of peat, coal, and, later, [other] fossil fuels -- partially replenished atmospheric CO<sub>2</sub>, diverting the would-be next '*Big* Ice Age' into the short-lived "*Little* Ice Age", postponing the close of this interglacial, and the return of global glaciation, until now. By burning fossil fuels, Terran humanity has, in part, merely restored to Earth's atmosphere some of the CO<sub>2</sub> that

was depleted from it – unconsciously, of course -- by pre-human nature, due to some of the consequences of accelerated natural photosynthesis during the preceding geological eras.

But such unconscious consequences of human action no longer suffice to avert what the Milankovitch Effect, and the accumulated consequences of pre-human ecological '[meta-]evolution', all now impend: *resumption of Ice Age 'eco-suicide*'.

The greatest ecological hazard to Earth's biosphere stems not from humanity, but from this planet's, and its solar system's, pre-human and extra-human 'endolithic', lithospheric / hydrospheric / atmospheric / biospheric internal dynamics themselves, as well as from *the exolithic residuum*, the leftovers of solar/planetary-systemic formation itself. Climatogenic actions of Terran humanity have – inadvertently – ameliorated Earth's 'endolithic' climatic threat so far, by returning to the atmosphere a small part of the CO<sub>2</sub> that was depleted in the "karmic" action of the pre-human photosynthetic biosphere *back upon itself*, with all of the massive self-devastating and self-denuding self-consequences for that biosphere that we have noted above.

The CO<sub>2</sub> that human industry has added [back] to the atmosphere is, for this biosphere, **not a "pollutant**" as some are wont to say, in total defiance of everything that our science of ecology has revealed. It is **a vital nutrient** required to sustain green plants -- this biosphere's photosynthetic "primary producers" -- upon whose productivity virtually all Terran biological life depends. This CO<sub>2</sub> is a basic atmospheric and oceanic biospheric resource that has been depleted, and that has been in **dire scarcity** as a result, relative to the concentrations needed to fulfill the potential "primary productivity" of those "primary producers". And, this dire scarcity is a consequence of the activity of the biosphere itself, lodged long before the emergence of humankind. In the context of today's Terran biosphere, **carbon dioxide is a primary resource in short supply**. As a consequence, the primary productivity of this 'self-balding' biosphere has been in severe "depression" ever since the beginning of the Pleistocene at least -- due to this **shortage** of CO<sub>2</sub>. Increase in ambient atmospheric carbon dioxide levels is one of the keys to this biosphere's regeneration. Not just a few species, but *all* species, are endangered due to this CO<sub>2</sub> **shortage**.

Not just a little bit of bio-diversity, here or there, but virtually *all* Terran bio-diversity -- any surface bio-diversity whatsoever -- is at risk. All of this is at risk due to the **shortage** of CO<sub>2</sub>, as well as to all of the other trends of depletion-conversion-accumulation, metered and controlled by the control parameters of this biosphere's next 'self-bifurcation', which result from the many **extra-human**-nature-induced -- <u>not</u> human-nature-induced -- trends that converge to a final "Snowball Earth" "Age Of Ice", and to a biocidal, sterilized planetary surface -- unless Terran humanity mobilizes and intervenes technologically.

<u>Hypothesis B</u>. The Greater versus the Lessor Threat. Temporary climatic "over-warming" could possibly become a short-term issue. Catastrophic Ice Age cooling is by far the deadlier long-term threat.

While it might take centuries before mile-deep ice could again engulf the Northern Hemisphere, *temperate zone agriculture would be brought to its knees* by less than a decade of *successive* winters like those of the Little Ice Age, or like those of much more recent record-setting cold seasons -- viz. 2008-9, 2000-1, 1993-4, 1990-1, 1989-90, 1988-9, 1987-8, 1984-5, 1983-4, 1981-2, 1977-8, & 1976-7 - with global famine *resulting*.

**Do not be decoyed!** Drought and desertification, *dry*-heat "heat waves" over *dry* land, are not the sign of "Global Warming", but of its opposite! The signal of net over-warming is the very opposite of drought – pervasive moistness; the return of rainforest-like raininess; of comprehensive 're-moisturization', the incipient 're-tropicalization' in the Northern temperate zone; a succession of wet, rainy, humid, iceless summers *and* winters. Despite *local* exceptions due to the nonlinear complexity of Earth's 'climato-dynamic system', rising wetness, not drought, is the *global* companion of general warming.

Drought and desertification are, «*au contraire*», and perennially so, the preludes to Ice; symptoms of the secular cooling trend of ocean surface waters, which, because rate of water evaporation rises with water surface temperature, entails reduced evaporation; hence reduced precipitation; *translating into drying; hence "heat waves"*, *over land*.

Self-denudation, 'the balding of the biosphere', is almost as much a feature of the prelude and '<u>fore</u>math' of each Ice Age, due to drought and desertification wrought by general oceanic surface cooling and consequent reduced H<sub>2</sub>O evaporation, as it is of the main course and <u>after</u>math of each Ice Age, due to 'the Razor of Ice'.

<u>Hypothesis C</u>. The Principle of The Planetary Selection Test. If the emergent sentient and 'self-sentient' species of a planetary biosphere is either (1) eliminated, by external and/or internal action, or (2) deranged, acting in a self destructive manner either directly upon itself, or indirectly, through destructive commissions and omissions with respect to the rest of the planetary eco-system, or both, then the entire planetary-surface biosphere perishes, due to that eco-system's own internal, blind-running, cumulative 'self-abortive' tendencies, due to the commissions of its human[oid] species, or due to both. Such an eco-system fails to graduate to the stage of planetary expanded self-reproduction [or of multi-planetary ecosphere expansion via bio-regeneration of nearby biotically-deceased planetary surfaces]. In sum, if a human species emergent within a given planetary biosphere fails to achieve the ethical and technological fitness to survive, then the entire planetary development aborts, delivering-up a stillborn planet.

The humanity to which Earth's biosphere has given rise is the only hope to overcome this as well as other mortal hazards, mostly 'self-hazards' to which the blind-running biosphere *exposes itself*. The fruition of this hope demands from humankind more than the unintentional amelioration of global cooling by partial CO<sub>2</sub> replenishment, or other unconscious ecological contributions. The era of "accidental" advantages, of unnoticed beneficial by-products of humanity's gestation, is about over. *Terran '[meta-]evolution'*, if to be sustained, must become deliberate and self-responsible. The only available deliberative agency from within the ecosphere of Earth is Earth's human species. Terran humanity has, *unconsciously*, saved the biosphere *from the biosphere itself* so far. Humanity needs now to *consciously* save [*the rest of*] this '*noö-biosphere*', if thereby also to save itself [as part], and, thus, to save the whole 'noö-biosphere' from the whole of the 'noö-biosphere' itself.

The Earth is not a final stable home in space, nor an eternal mothering womb, which Terran humanity can forever relax back upon, or lapse back into, or husband best by doing as little as possible to "disturb" its "perfect balance", its *static* "equilibrium". *There is no such* static equilibrium for Earth's biosphere.

One hears a lot these days about "permanence" and "sustainability". But, in this pure-noun-less, noun/verb cosmos made of nothing but [*self-*]*conversion processes -- nothing but depletion/accumulation processes* -- nothing in nature is "permanent" or "sustainable". The Terran biosphere as presently constituted, from long before the appearance of Terra's proto-human[oid] species, is not "sustainable" much longer, is 'self-doomed', unless Terran humanity intervenes technologically. The Earth is a *self-*dynamizing and ultimately ecologically *self-de*-stabilizing, *dis*-equilibrium system whose biosocial fitness will *derail itself* if Terran humanity fails to play its part by successfully taking the helm. Terra is Terran humanity's *window in time*, a *window of opportunity*, to '*meta-evolve*' and *transcend*, or to perish.

'Terra-<u>Re</u>-forming' -- the production of an enduring **post-glacial** epoch on Earth by Terran humanity -- requires this humanity's theoretical and practical technological mastery of the **highly nonlinear**, **non-equilibrium** behaviors of matter-energy *in general*, which are the matter-energy **norm**, including those of the non-neutral, electro-magneto-self-active **plasma phase** of matter – as well as of those behaviors of planet Earth itself, *in particular*, as a [sub-]**whole** [as a '[meta-]dynamical', **dialectical sub-**"**hof**" of the «**kosmos**» as the "**hof**"].

This mastery begins with the harnessing of plasma power in the form of nuclear fusion energy.

Hypothesis D. The Fusion Barrier and The Nonlinearity Barrier. Nuclear fusion technology can provide power resources sufficiently-low in economic-cost, and sufficiently high in *energy-density*, to enable humanity to bifurcate the Terran atmosphere/biosphere/lithosphere away from its otherwise-terminal Ice Age attractor.

The advanced fuel-cycles of fusion machines designed to advantageously utilize 'closed-form knowledge' of the nonlinear dynamics of the 'self-confining', 'self-fusioning' meta-states of plasmas can provide fusion reactions which yield only "beta particles", that is, only streams of electrons, thus yielding 'non-radioactivating forms' of high-energy-density nuclear fusion energy.

This new energy source can then both (1) render readily 'optimizable' the heretofore unintended evolution of atmospheric  $CO_2$  concentration, by obviating the burning of fossil fuels as the main available means of energizing Terran human social reproduction, and (2) afford Terran humanity better means to accomplish the crucial socio-ecological benefit that this unintended evolution of  $CO_2$  has so far, unconsciously, accomplished - the averting of a return to Ice Age 'eco-<u>sui</u>cide' on Earth.

The latter new energy source would also avert the eventual catastrophic social-reproductive collapse that will otherwise attend the ultimate depletion of fossil fuels in the long-run, and, in the short run, the human-social self-reproductive collapse ["global economic depression"] that will result from the draconian cost-prohibition of industrial use of fossil fuels for which the "global warming" lobby is pressing, on behalf of their ulterior agenda, along with the global and poly-genocidal 're-Nazi-fication' which that collapse would engender, their real goal.

Recent recession from the precipice of thermonuclear war is a hopeful sign of the ethical potential of humanity to survive the 'planetary selection self-test' that is now looming. However, the plutocracy-engineered steep global decline of nuclear physics, in the United States of America, the Republic of Russia, and elsewhere, is also ominous<sup>8</sup>, given the urgency of the plasma technology breakthrough if this potential is to be actualized.

The most advanced extant conceptual and linguistic expressions of the "laws", or "habits"<sup>10</sup>, of Nature, as presently known to Terran humanity, take the form -- *almost* without exception<sup>7</sup> -- of *nonlinear* partial integrodifferential equations. The "general" and "closed-form", "analytical" solution of these equations has eluded Terran human science, and has been evaded by that science, so far, ever since their first formulation on Earth [some -333 years prior to the first issuance of drafts of this text, in late November of **1999**].

The unknowns to be solved for in these so far unsolved equations are not single numbers, as in the more familiar algebraic equations. They are entire *functions*. These so far unfathomed functions must encode rich repositories of presently inaccessible knowledge. *Within the limits of their 'homeomorphic defect'*, these functions reconstruct the past histories of the '[meta-]states' of every portion of physical space constituted or "occupied" by the physical bodies of the natural '[meta-]systems' that their equations [partially] describe. These *missing functions* -- these formulae that remain unformulated by Terran humanity to date – would also predict the probable futures of those '[meta-]states', for all possible initial conditions expressible within their scope.

The equations that these function-formulae solve are called "*nonlinear*" because, in them, the unknowns, the *unfathomed functions*, appear with their values, or their derivatives, *operating upon themselves*, and/or *upon one another*. This signifies the dynamical or time-like interaction *and <u>self</u>-interaction* of the underlying actualities that these mathematical metaphors mime.

Linear integro-differential equations -- easily solved by Terran mathematicians for so long -- are characterized, in contrast, by function-unknowns which occur singly, without interaction, operating neither upon self nor upon other unknown / to-be-solved-for functions, nor upon any order of the derivatives of same.

Such linearizations are also massively omissive in their «*mimesis*» of the actual phenomena of nature, producing predictions which err egregiously both quantitatively and qualitatively. For the past ~333 years, human knowledge and industry have been partially paralyzed by perennial failure to "solve" general nonlinear equations, that is, by perennial failure to attain the means by which the vast *knowledge*-potential that these

equations encode can be explicitly extracted and practically applied. Key instances of this incapacity include the Newton gravity-equations for more than two gravitating bodies, the Einstein universal gravity field equations of General Relativity, the Navier-Stokes equations of electro-neutral liquid/gaseous hydrodynamics, and the Maxwell-Boltzmann-Vlasov equation for electro-dynamically *non*-neutral, '*magneto*-hydro-dynamical' *plasmas*.

This is **The Nonlinearity Barrier**. It blocks the progress of theoretical knowledge and of engineering praxis around this humanity's entire horizon with "the unknown" – the horizon with humanity's own present unknowing and yet-to-be-known.

Our key objective herein is to call your attention to certain ideas that might aid you in breaching this Barrier.

We hope thereby to help encourage a new mood on the part of key contributors to the scientific culture of contemporary Terran civilization, a mood which courageously and confidently targets **The Nonlinearity Breakthrough** as its central next objective. This **Breakthrough** means 'closed-form' solution of general nonlinear total and partial integro-differential equations, through a radical 'ideo-onto-logical' expansion and deepening of the realm of known, "non-elementary" transcendental <u>functions</u>, i.e., of "non-standard" <u>numbers</u>, with all of the burgeoning conceptual advances -- and all of the new, 'praxical', engineering opportunities -- that this will unveil.

Our fundamental claim, in this regard, can be stated quite simply, although misleadingly, until some unfamiliar dimensions of the meanings of the words that follow, directly next, are systematically set forth in the sequel: Equations involving '<u>self-reflexive</u> terms' – i.e., "<u>nonlinear</u>" terms – require "'<u>self-reflexive</u> functions" for their "'closed-form" solution.

The above means also "<u>self-reflexive functions</u>" of variables valued in <u>'meta-numbers</u>', new kinds of numbers, from a new mathematical 'ideo-onto-logy', whose self-"multiplication" can model the «aufheben», cumulative 'ontological incrementation', the 'ontological expansion', the 'ontological dynamicity', in short, what we call the 'onto-dynamasis', characteristic of the <u>'meta-dynamical meta-evolutions'</u> – of the "<u>revolutions</u>" - of the "<u>revolutions</u>" - that we observe in natural history, including in 'human-nature-al' history, i.e., in human-social history, and not excluding that of the progressive, cumulative comprehension and creation of new mathematical, mental, objects: "conservative extension" of "'mathemic", 'human-nature-al', "<u>psycho</u>-historical", systems.

Another objective is to exemplify, in a rich conceptual context, the '*dialectical operations*' mode, and stage, of human adult cognitive development, and to "capture" its operatorial essence in a rule-based ideographic language-system -- an arithmetic -- of the simplest kind that we have been able to fashion:  $\mathbf{NQ}$ .

Indeed, one of the central objectives of <u>Dialectical Ideography</u> is to make explicit a rules-system -- inescapably 'homeomorphically defectious' though it must be -- for the praxis of dialectical thinking/modeling, to such an extent that this mode of praxis will 'become heritable'. By 'becoming heritable' we mean that dialectical reason rises from being the isolated, episodic attainment, mainly by rediscovery and reinvention-from-scratch, of those rarest of human geniuses -- of intellectual / scientific / philosophical / spiritual heroes such as Heraclitus, Zeno, Socrates, Plato, Leibniz, Hegel, Marx, Boole, Chardin, Gödel, Bohm, etc. -- to being a teachable / learnable / diffusible, cumulatively-advancing, socio-culturally *expandedly-reproducible, and cumulating species-asset* and *skill-of-consciousness*. We mean that it thereby enter the *"Phenome"*, or *Memenome*, of Terran humanity, as a *crucial* "acquired characteristic", a continually-renewed, 'exo-somatic', 'extra-chromosomic' intergenerational inheritance.

We do not attribute to ourselves the genius of the dialectical adepts named above. However, as their mere students, we have endeavored to locate, mapped into their texts, the patterns of their thought, and the patterns of their visions as to the patterns of the workings of the world. And, we have attempted to encode and codify those patterns into the 'meta-arithmetical', 'meta-algorithmic' rules-systems of *the Dialectical Ideographies*.

The technical foundation of our immanent critique of "Natural" arithmetic grew out of the discovery that there is a 'Contra-Boolean' arithmetic of 'onto-logic' which arises from a hitherto unnoticed, 'strong' contrary of Boole's *"fundamental law of* [formal-logical] *thought*", when that *"law"* is taken as an *axiom* of Boolean logical arithmetic. The resulting *"non-standard" arithmetic of* [onto-]logic, and of 'onto-dynamasis', also turned out to be, equally, a concrete instantiation of a *"non-standard model" of "Natural Numbers" arithmetic.* The 'constructability' of such *"non-standard natural numbers"* had been known, *however "non-constructively"*, ever since the advent of the Löwenheim-Skolem theorem, and, later, of the Gödel completeness and incompleteness theorems grasped in their conjunction, i.e., analyzed in terms of their joint implications for the first four, "first-order" Peano axioms for the "Natural Numbers".

These **non**-standard "Natural" / logical numbers satisfy those axioms no less than do the **standard** "Natural Numbers", even though those axioms were intentioned to characterize the standard "Naturals" *alone*.

Moreover, these ""non-standard numbers", when their rules-system is 'enacted' in the mind of a human subject, are seen also to display a marked, *multi-characteristic homeomorphism* to key characteristics of the categorial-progression thought-praxis, and presentation-praxis, of *systematic dialectic*, as well as to key characteristics of the 'onto-dynamical', 'meta-finite', and 'meta-monadic' 'singularity-dynamics' of the dialectical processes of external / objective nature; of natural-*historic[al] dialectic* – i.e., of the recorded pre-human / extra-human natural agents / 'proto-subjects', or 'subject-verb-object eventities', all variously instantiating a 'meta-fractal', generalized «*aufheben*» process of *determinate*, *immanent*, 'self-meta-monadizing', and ontologically cumulative / expansive auto-"negation" as 'auto-transformation'.

This new *dialectical arithmetic* was found to function like a '*dynamized' version* of what *is* recorded, about the sketchily-recorded «*arithmoi eidetikoi*» of Plato; his <u>*dialectical*</u> '*arithmetic of* «*eide*» or «*ιδεας*»'; his «*arithmoi*» of «*asumbletoi*» ['unaddable'] idea-*numbers*; of multi-leveled "'taxonomized *assemblages* of unique, qualitatively-different «*ιδεα*»-<u>*units*</u>, «*ιδεα*-<u>*monads*</u>», or «*eide*-<u>*μονας*</u>»''. This – new -- "'arithmetic''';, this -- dialectical – "'ideography''', was thus seen to develop the neglected sides of *both the 'intra-duality' of logic* and of *the 'intra-duality' of "Natural" arithmetic*.

Furthermore, it was found to do so in the form of a *"meta-arithmetic"* whose *'meta-<u>number</u>'* idea-objects, and whose corresponding *'meta-<u>numeral</u>'* symbols, *'meta-«monad»-ically' «aufheben»-incorporated / negated* existing, standard arithmetics, their number concepts, and their numerals.

And, this initial, «*arché*» 'meta-arithmetic' issues forth, *from out of itself*, when a human subject subjectively, mentally 'enacts' its 'rules-system', a systematic succession of increasingly complex, increasingly "concrete", ever-more descriptively-rich / descriptively-capable categories of "meta-arithmetic"; *ideographic languages* for '*quanto-qualitative*' modeling of the empirical phenomenologies of nature, including of human[ized-]nature.

This progression of 'meta-arithmetics' at first approaches, then surpasses the descriptive potential of the models – of the systems of "ordinary" integro-differential equations -- of Standard Dynamical Systems Theory.

Moreover, the «*arché*» 'meta-arithmetic' itself can be used to model the dialectic of its own, self-issuing progression of 'meta-arithmetics'. And that progression arrives, early along its way, at a '*meta-finite*' resolution of the zero-division "*singularity*" problem that bedevils *especially the <u>nonlinear</u> varieties* of these *equations-system-models*. New, 'qualified' versions of these equations resolve their "*infinity residuals*" [*infinitely-wrong predictions*], at their moments of singularity, into meaningful, semantically/empirically correct, ['*meta*']*finite* predicted values at these '*meta-evolutionary*' / "'revolutionary", '*self*-revolutionizing' moments, of '*auto-onto-dynamasis*', of state-space-/control-space-expanding, "laws-of-motion"-changing, new-dimensions-erecting, new state-space / control-space axes-sprouting, <u>quanto-qualitative mutation</u> and "<u>meta-system transition</u>".

The primary purpose of this section is to make motives manifest. Our motives for making this book publicly available at this time. Motives that might recommend themselves to you to consider the content of this book, and to act upon it; to critique, to correct, to apply, to modify, to further develop its concepts in your own work.

We also hold that the alarm being sounded regarding "global warming" is a decoy. A second purpose of this introductory section is to urge your inquiry -- if you have not so inquired already -- into what motives might move a certain subset, and 'subse<u>c</u>t', of your fellow species-mates to deploy such a decoy.

Vast and urgent discoveries attend that inquiry<sup>8</sup>.

#### Desiderata.

A number of lines of development converged in the discovery and design of the dialectical ideographic languages, and rules-systems, of  $\underline{Q}$ ,  $\underline{U}$ ,  $\mu$ ,  $_{\alpha}\mu$ ,  $_{\beta}\mu$ ,  $_{\nu}\mu$ , and beyond. Several of these might have been, even singly, sufficient to guide the entire discovery, though they were not so in our cases. These 'ideo-genealogies' also disclose the desiderata of our quest. We denote by Q -- singly underscored Q -- the "set" or "space" of the "pure", non-additive, 'unquantifiable', unit-interval-confined 'ontological gualifiers', or of the 'purely-gualitative meta-numbers', grounding the dialectical ideography set forth herein [note that  $\mathbf{Q} \neq \mathbf{Q}$ , the latter denoting the "space" of the "Rational Numbers"; indeed, Q 2 2 Q]. We denote by Q -- doubly underscored Q; Q underscored again -- the total syntactico-semantic 'rules-system' of that ideography. Likewise, U denotes the space of 'quantifiable ontic qualifiers' or of 'ontologically qualified quantifiers' for the 'full-multiplicity', 'quanto-qualitative' ontological universe-of-discourse, the 'multi-population meta-distribution arithmetic', and U denotes its 'rulessystem', while µ denotes the space of 'quantifiable metrical and ontological qualifiers' or of 'metrically and ontically qualified quantifiers' for a 'quanto-qualitative metrico-ontological arithmetic', and u denotes its 'rulessystem'; similarly for successor arithmetics. One goal of our quest herein is to construct, in volume III., a Qbased ideographic or "mathematical" model of the emergence of Q itself, from N, the "first order" 'rulessystem' of the "Natural Numbers", alone, as «arché» 'ideo-ontology' for all arithmetics. Pursuant thereto, it may be helpful to set forth, by 'retro-intro-spection', or by 'memoric reconstruction', the inner conceptual path that we have trod, a summary of the factual historical material of our own ideative genealogy, or discoveryhistory, with respect to Q. This is, at least in part -- in that part known to us -- the data, the 'psycho-historical material' with which such a model should contend, and for which it should account. Some of these thoughtlineages are summarized below, in terms of the key features we desire for the theory that we seek. The continuing quest which led, among other developments, to this treatise, aims at an ideographic, algorithmic, 'quanto-qualitative' computational language consistent with the following hypotheses, or 'working convictions':

a. The Dialectics / Nonlinearity / Self-Reflexivity Link. Working Conviction: There awaits worldwide [@re-]discovery a dialectical logic that will be: (i.) a valued supplementary « organon», likely, among other benefits, to: (ii.) hold keys to The Nonlinearity Breakthrough, and which will be found to be: (iii.) one kind of contrary, or negation, of the statical/Parmenidean and anti-genealogical presuppositions of classical formal and "ideographic" ["symbolic"] logic and set-theory / totality-theory. The latter conjecture led us to the study of contraries of Boole's "fundamental law of thought", which he stated as x<sup>2</sup> = x. Those contraries include, with X denoting a pure-qualitative, 'contra-Boolean', ontological-category-variable --

 $\bigotimes = \bigotimes^{1}$ , is *neither* greater than, *nor* equal to, *nor* less than  $\bigotimes = \bigotimes^{1}$ , but, on the contrary, differs from  $\bigotimes$  <u>non-quantitatively</u>, i.e., <u>qualitatively</u>. Its 'overscore', '^', says  $\bigotimes$  is a "'unit", vs. a "'units-aggregate".

b. The Integro-Differential Equation Nonlinearity / Set-Theoretical Paradoxes Link: Dialectics as the "'Logos'' / 'Logy' / "'Logic'' of "'Self-Reflexive''' / 'Self-Reflexive' Functions. Working Conviction: Our long sought after *dialectical logic* is a 'logic of self-reflexiveness', a logic of 'self-reflexive action', of 'self-activity', or of 'self-change', deeply related to both integrodifferential equation *nonlinearity*, & .: *singularity*, and to the *standard "reflexivity" paradoxes*, i.e., to the 'truth-value-self-oscillatory', "self-contradictory" propositions of formal logic and set-theory, as well as to '*non-standard paradoxes*' such as that of the 'Set Of All Sets', and that of the 'Set Of All Objects'. It is a logic of '*auto-iterative multi-ontic cumula*', of '<u>∂ self-recursive processes</u>', of the '*homeo*-iterative', or '*self*-iterative', form:

$$\underline{\mathbf{E}}_{\mathbf{x}_{\tau}} = \underbrace{\mathbf{x}_{\tau+\Delta\tau}}_{\mathbf{x}} = \underbrace{\mathbf{x}_{\tau}}_{\mathbf{x}} \underbrace{\mathbf{0}}_{\mathbf{x}_{\tau}} \underbrace{\mathbf{0}}_{\mathbf{x}_{\tau}} = \underbrace{\mathbf{x}_{\tau}}_{\mathbf{x}_{\tau}}^{2} \underbrace{\mathbf{0}}_{\mathbf{x}_{\tau}} = \underbrace{\mathbf{x}_{\tau}}_{\mathbf{0}}^{2^{\tau}} - \text{ such that } \underbrace{\mathbf{x}_{\tau}}_{\mathbf{x}_{\tau}} \text{ denotes a purely qualitative,}$$

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ontological categories 'cumulum' [underscore, ' $_{,}$ ', signing 'contra-Booleanity', defined further on] vs. that of standard, fixed-point, '*allo*-iterations', or '*hetero*-iterations' -- Ex<sub>x</sub> = X<sub>x+Ax</sub> = Fx<sub>x</sub> or x<sub>x</sub> = F<sup>x</sup><sub>x0</sub>, where F  $\frac{3}{2}$  x<sub>x</sub>.

- c. Self-Action Yields 'Quanto-Qualitative', 'Quanto-Ontological', 'Meta-Finite', 'Meta-Fractal' Growth. Working Conviction: Internal "self-reflection" in human thought-processes, and external, causal, physical 'self-reflexion' of natural systems generally, is typically 'onto-productive'; is productive not only of quantitative change, but of ontic, ontological, qualitative change as well. By 'self-reflexion' we mean 'self-reflexive action', 'self-reflux' or "feedback"; 'back-feed', 'back-flow', or "blow-back"; 'return flow of the action of and by self from self back to self'; the 'self-developing' "self-interaction", "self-action", or "self-activity" of self-induced 'quanto-qualitative change', or 'quanto-ontological' change. The most basic form of dialectical opposition, thesis / 'contra-thesis' and «physis» / 'contra-«physis» ' alike, is that "between", or, better, "within", a single ['sentence-ial'] "subject", or "agent", and itself as its own ['sentence-ial'] ""object". We model this as action from state-space, to and through control-space, back to state-space, which "singularly" and topologically transforms the entire, unitary state/control meta-space. We hold that such "self activity" is typically 'expandedly self reproductive'. I.e., it may yield an ontic, 'quanto-qualitative' "surplus", "gain", or 'meta-fractal, meta-gnomonic increment'. 'Other-interaction', interaction with other 'selves', other 'subjects' or 'agents' of natural history, other contributors to time; other portions of the 'non-self' or 'other-than-self', may do so also. Such "gain" is typically not only a quantitative increment within the same ontological qualit(y)(ies) that prevailed before interaction. Such gain typically also includes a qualitative, ontological increment; qualitative gain, "innovation", "novelty", "surprise"; an ontological and topological "unprecedentedness". Such "self-action" produces "elevation"; "change of direction", 'gain / change of [ontic and/or metrical] dimension(s)', ""transcendence"", or "gualitative change" typically via «aufheben» 'other-subsumption' & 'self-subsumption'; via processes of 'meta-monad-ization'.
- d. Self-Operation of "'Operators'' as Ideographic Representation of 'Onto[logy]-Genic' and 'Onto[logy]-Generative' "'Self-Refl\_exion'' / 'Self-Refl\_uxion'. Working Conviction: Such "'self-refl\_exion'' and 'self-refl\_uxion' can be fruitfully represented in "symbols", i.e., in symbols of the kind called "ideograms", thus "ideographically" or "mathematically", via 'generalized self-multiplications', seen as 'self-operation(s)', i.e., via <u>self</u>-application of operations in the form of operators; via sequential 'self-product[-ion]s' of 'meta-number' or 'meta-scalar' [un]knowns; in sum, via continual 'self-escalations' of a recurrently "2nd degree", or "quadratic", nonlinearity. Connected conviction: such representations hold some of the keys to the "closed-form" solution of the still-unsolved nonlinear "total" and "partial" integro-differential equations, through expanding the humanly-recognized and humanly-recognizable realm of the so-called "elementary transcendental functions" [cf. G. N. Watson<sup>9</sup>] to include, especially, more of the "<u>nonlinear</u>", i.e., more of the non-commutative / non-distributive -- or 'non-homogeneous / non-superposable' – 'meta-numbers', "functions", "operations", or "transformations".
- e. The Parmenidean Roots of The Nonlinearity Barrier. Working Conviction: The statical ontology -- the longstanding and implicit Parmenidean presumptions of prevailing Terran academic and scientific sub-cultures -- is one of the keys to the reaction against the conceptual phenomena of these "[self-]reflexive" or "self-referential" paradoxes, as to the deeply connected apparent "unsolvability" of general nonlinear equations. Those "paradoxes", or truth-value-self-changing, truth-value-self-toggling, "truth-value-self-oscillating' "propositional functions", or "sentential functions", inhere in, and can be formally derived within the "intuitive", unguarded axiomatics of, these formal systems. Those paradoxes imply a <u>self</u>-refutation, a «reductio ad absurdum» <u>self</u>-denial, of these formal systems' own tacit denial of the possibility of <u>self-changingness</u> among their formal, logical and set-theoretical conceptual objects. The paradoxes constitute a <u>self</u>-denial of these systems' own Parmenidean presumptions, of their implicit 'Parmenidean Postulate', denying the very possibility of the phenomenon of self-change, both as internal, mental, logical, conceptual phenomenon, and as 'external', 'exo-mental' phenomenon. Per this 'Parmenidean Postulate', mathematical-object / mental-object existence implies mental object stasis; mental-object motionlessness.

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Foundation Encyclopedia Dialectica

The attempt to consistently and formally construct a mental model of the early-Platonic doctrine of an overlying realm of "pure", statical, timeless, motionless, immutable, 'linear-equilibrium-like', fixed-point-like idea-objects fails, and -- even formal-logically -- must fail. It fails even by its own, immanent standards of formal, deductive logic and proof. Via the paradoxes, this unstated assumption of Parmenidean 'static-icity' deduces to its own negation, via a "reductio ad absurdum" derivation of the paradoxes as counter-examples, negating its assertion that all mathematical idea-objects must be 'mentally motionless'.

This logical non-excludability -- short of massively counter-intuitive contraption, such as that of Bertrand Russell's "ramified types hierarchy" / "Axiom of Reducibility" -- of 'setic' forms of inherently self-dynamical "reflexivity", or 'essence-ial' self-changingness, was first formally faced in forms of those semantically rather empty, gainlessly oscillatory formal paradoxes. But "reflexivity" also manifests in the semantically more fruitful forms of the Gödel Incompleteness Theorems, plus of other, seminal, and "gainfully", cumulatively self-changing conceptual objects, some of which we will explore in the sequel. Both the apparently "statical" Gödel Incompleteness Theorems, if we ignore their 'Gödelian Dialectic', and the latter, intrinsically 'self-dynamical', 'self-cumulative' conceptual objects, find one of their possible alternative 'meta-numeralic' correspondences in Q, as we shall see in the sequel. The most central and essential exemplars of the latter for this immanent critique are "The Set Of All Sets", & "The Set Of All Objects". One of the early inspirations of this effort, herein termed the 'Heraclitean-Hegelian-Chardinian «Aufheben» Evolute Product of Sets', and its close relative, 'The Power-Set «Aufheben» Evolute Product of Sets', made sense of the otherwise "paradoxical" "Set Of All Sets", which should be the founding object of [extensional] set-theory, as the set-theoretical definition of the very concept of "Set" itself. The latter product rule 'semantifies' "'The Set Of All Sets" as a self-changing, cumulatively self-developing, "eternally-progressing", self-superseding, self-regenerating mental 'eventity'; a conceptual 'cumulum'; a never-repeating 'meta-process'; an ideational "process-object". The former product rule, applied iteratively / recursively to the "empty set" [i.e., to a set with explicitly "no" initial content], builds-up the Whole Numbers, denoted W, after the von Neumann / Zermelo / Fraenkel manner.

These Set Products are also *non-distributive*, *non-commutative*, and *non-associative* over "set addition" ["union"]. "Non-superposition",  $N(x + y) \neq N(x) + N(y)$ , thus analogous to *non-distributivity* in the context of "arithmetic", and "non-homogeneity",  $cN(x) \neq N(cx)$ , thus analogous to *non-commutativity* in the context of "arithmetic", define an "operator", N, as a Nonlinear one. These clues, among others, led to our working conviction that the 'meta-arithmetic' / 'meta-algebra' / 'meta-analysis' of *The Nonlinearity Breakthrough* must be, in general, *non-commutative* and *non-distributive* at least, if not *non-associative* as well; must involve a generally "nonlinear arithmetic" and "nonlinear algebra". The whole realm of such *non-commutative*, *non-distributive algebras* is virtually unexplored in the modern mathematics mainstream. Most variants of Q explored herein exhibit *non-commutative*, *non-distributive*, and, as well, *non-associative* 'multiplication' among their 'meta-scalars'. They are thoroughly non-linear, 'operatorial meta-arithmetics'. Indeed, their ideographical expressions of "'The "Aufheben" Principle'" all imply the

non-commutativity, & non-distributivity, & non-associativity of their «aufheben» -miming product-rules.

f. Goal: A Non-Reductionist Ideography of the 'Quanto-Qualitative Self-Dynamics' of Natural [Including 'Human-Natur[e-]al'] 'Meta-Systems'. Working Conviction: The [meta-]evolution of our cosmos exhibits an historical sequence of cumulative qualitative, or ontological, changes, not just of quantitative changes, that may be aptly represented as such ideographically, in our mathematical models of that history, for greater empirical, experiential accuracy and for greater explanatory power. Our actual cosmological ontology is a self-expanding one, one that thus may be modeled via a self-expanding ontological 'possibility-space', undergirding the 'actuality-space', or 'population-space', of observed frequencies / populations / proportions / "probabilities", or densities of individual [ev]entities. In Q & U as interpreted herein, later-emerging 'ontos' [short for 'onto-logical categories'] are not seen to "reduce" to the earlier-emergent 'ontos' which constituted the later. Rather, later-emergent, "meta-stable" 'ontic «arithmoi»' are seen to be spontaneously 'constructed' from the [self-]action(s) of earlier-emergent ones.

g. The 'Evolute', 'Cumulative' [«Aufheben»], and 'Irrepeatable' Character of 'The Energy-Time / Space-Matter Cumulum'. Working Conviction: 'Meta-evolutionary change' is crucially 'evolute', i.e., 'cumulative', rather than merely 'convolute', i.e., 'predecessor-erasive'. Our application of the term 'evolute' and the term 'convolute' herein appropriates their usage in descriptions of the spiral outer shells of some typical tide-pool "meta-biota". In a "convolute" spiral shell, succeeding whorls hide preceding whorls from view. However, in an "evolute" spiral shell, preceding and succeeding whorls remain 'co-visible' through all stages of growth.

The 'evoluteness' of evolution in this sense thus means that successful *prior* self-reflexive, *non-hybrid*, or 'self-hybrid' <u>product[ion]s</u>, as well as hybrid / cross <u>product[ion]s</u>, are typically conserved and carried forward along with their newly-emerged, qualitatively different products. "Old" ontology is most often not entirely 'erased' or 'extincted' / extinguished by its "new" offspring, but generally continues to be extant, albeit partly in "adjusted" form(s), adjusted via interaction with the "new", and continues to appear beside that "new", as well as appearing as the 'self-internalized', "self-in-folded" foundation of that "new". Indeed, such "old" typically remains manifest in even *greater* "mass" and/or "volume" than does that "new". For instance, citing "pre-biological" stages of the 'meta-evolution' of the ontology of this cosmos, 'Atomic ontomass', populations of atoms, i.e., of matter / energy *not organized beyond the atomic form and level of organization of matter / energy*, e.g., not yet in the *molecular* sense, continues to exist, even though molecules have long-since emerged in this cosmos. 'Molecular onto-mass', populations of molecules, i.e., of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the molecular form and level of organization of matter / energy, e.g., not yet in the prokaryotic <u>cellular</u> sense, continues to exist, even though prokaryotic cells have long-since emerged in the cosmos, at least on -- and in[side]! -- planet Terra.

Citing the human, 'meta-social meta-evolution' of forms of exchange, and of "exchange-value", the emergence of money as medium of exchange did not initially, or even to this day, entirely extinguish the existence of the praxis of commodity barter; even less so did it eradicate the sea of commodities from which money – originally as *money-commodity*, or "numéraire" – initially emerged. The emergence of the "money-relation" did, however, transform the context and thus the nature of the commodity as a form of exchange-value, in the process of forging the relationship of that older 'ontological category', or 'onto', of exchange-value to this newly-emergent 'onto' of exchange-value, in the ontology of the [sub-]universe of exchange-value. Likewise, the emergence of mercantile capital -- of its profit-aiming circulation path, inverted with respect to that of the consumption-aiming circuit of the money-mediated circulation of commodities -- does not extinguish the existence of either the 'onto' of commodities or the 'onto' of money. It does transform their relationships to each other in the process of its formation of their relationships to itself. By dint of this modeling of the space-time-mass-energy "continuum", or "medium", of the cosmos as an *'evolute, multi-ontic cumulum*, we come to recognize that *'cumulum*' also as an *'irrepeatable'* progression. Strict *re*-petition of 'meta-states' is impossible. Second "'petition''' must arise in a context *no longer "pristine"*, *already altered*, by the consequences, the *'cumulum increment*', of *first ''petition'''*.

h. Retention and 'Semantification' of "'Hybrid'", "'Cross-Product'" Terms. Working Conviction: Previously-emerged, evolutely-conserved <u>onto</u>logical categorie<u>s</u>, or 'ontos', continually undergo 'multi-mutual', or 'poly-mutual', readjustment, with respect to newly-emerged ontological categories, or 'ontos', via the 'poly-interactions' <u>among</u> them, not just "between" them. Such adjustment processes can usefully be captured ideographically by retention of 'hybrid' or "cross" product terms in the 'possibilityspace' and 'actuality-space' models, with the "assignment" and "interpretation" of those adjustment processes to and via these hybrid terms. Such hybrid or "cross product" terms are the very kinds of terms so typically dropped, or identified with zero, e.g., in the "scalar product" of vector 'meta-numbers', as well as in many other operations of 'linearist' mathematics. However, in most of our natural-historical dialectical models, such hybrid terms are the markers of dialectical synthesis – of either <u>partial</u>, "half-way-house" 'uni-«physes»', or of <u>full</u> 'uni-«physes»', for the epoch at hand [«physis» = Greek for 'phys-ical' Nature ]. 'Hybrid' terms -- the terms in { nQ, } models [for <u>universes of discourse</u> u, for taxonomy level n, and for

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'meta-*evolutionary' epoch counters*, or '*self-bifurcation index' values*, or *self-singularity counters*,  $\tau \in W$ , of range  $0 \le \tau \le \tau_{\Omega}$ ], generically denoted  $\underset{k}{\overset{n}{\circ}}_{k}$ , such that k is *not* of the form  $2^{\tau}$  -- can be interpreted, for

some universes of discourse, as the mutual adjustments of the preceding and succeeding "purebred", non-hybrid, or 'self-hybrid' terms – the terms of the form  $\hat{\mathfrak{G}}_{2^r}$ . These hybrid terms may also be interpreted,

for some 'partition principles' for their universes of discourse, and for the ontologies they involve, as describing populations of *independent* hybrid [ev]entities, or of distinct material substrates, qualities, or organizations; of "mixed meta-states" of matter-energy, often housing *convers*[e-]*ions* of one 'onto' into its supplementary other.

Most of our dialectical models interpret their 'self-hybrid' terms as representing the irruption of new ontology, of new «<u>arithmoi</u>» [new assemblages of qualitative units], and of their new «<u>monads</u>» [qualitative units], via '[self-]meta-«<u>monad</u>»-izations' of their predecessor «<u>monads</u>»; new 'contra-thesis', or 'contra-«*physis*»', emergences from the previous 'contra-thesis'/'contra-«*physis*»' terms, or from the previous 'uni-thesis' / 'uni-«*physis*»' terms. The 'hybrid', or "'half-breed'", "complex unity" terms invoke an arena of empirical modeling where Terran science has tended to wax squeamish.

As a small-scale "psycho-historical" experiment, observe your own emotional and other cognitive reactions to your connotations and associations for the words which describe mixes of materials, especially those belonging to multiple levels of organization of matter-energy, that include *some* of the *candidate* "*interpretands*" for the hybrid  ${n \atop u} {\mathfrak{Q}}_{k}$  in  $\{ {n \atop u} {\mathfrak{Q}}_{r} \}$ , such that  $k \neq 2^{\tau}$ , for  $\tau$  in  $\{ 0, 1, 2, 3, \ldots \} \equiv W$ :

heterogeneity; humus, dirt, detritus; debris; deposits; dross; dregs; adulterates; *alluvia*; *effluvia*; *entropies*; exfoliations; *effluent*; sediment; scrap; shards; *spume*; *scum*; soil; *slime*; *slop*; *slush*; *sludge*; *slag*; swill; *moraine*; *"mixed-up"*; *mess*; *mire*; *mush*; *mud*; *muck*; *mongrelize*; guck, gruck, gushy; gunk; junk; jumbles; jetsam; goo; goop; glop; grit; grime; garbage; ooze; crud; crap; crumbs; crumble; corruption; corrosion; coagulum; fragments; froth; foam; filth; flotsam; offal; litter; loam, trash; rummage; rubbage; rubbish; rubble; ruins; remains; recrement; residue; wreckage;....

No doubt there is, in part, a sound, Darwinian, genomic basis to the aversions that the word-symbols above, let alone their palpable referents, evoke. No doubt some of our reflex bodily and emotional recoil and even literal nausea in reaction to such actualities is part of an adaptive defense, via avoidance, against the pathogenic microorganisms that abound in many of the contexts connoted by the words listed above, part of the 'hybrid' adjustment of organisms co-constituent of the multicellular, metazoan 'onto' to the massive if invisible presence of potentially pathogenic organisms of the earlier-emerged, prokaryotic and eukaryotic "unicellular" 'ontos'. But the 'psycho-archaeology' of Terran civilization reveals something more, something excessive, something extra-genomic; something memetic in this recoil, visible at least as early as the ancient Greeks: a tendency to seek refuge in "pure" ideas and "perfect, immutable" idealizations. It 'extremifies' in the Nazi oxymoron of "pure blood", in Nazi fears of "mongrelization of the races"; in the Nazi's complete denial of heterosis, of "hybrid vigor". It manifests again in the epithets of modern science, e.g., in the naming "noble" of those elements which do not interact / combine [chemically]. Many of the hybrid 'cumula' we commonly encounter are 'catabolic cumula'. The dusts ever-accumulating on the floors of our houses, that need to be vacuumed away for the sake of the health of their human occupants, are, in part, 'cumula' of elemental atomic mineral powders, of molecular debris, of prokaryotic bacterial spores, of eukaryotic molds and pollens, and of human skin-scales. A 'trans-nounic', 'eventity' view of the living human body sees it as a veritable walking fountain of skin flakes, exfoliating feasts for dust-mites. But what of the 'anabolic cumula' in our cosmos - arising again and again -- starting even before those interstellar pre-atomic, atomic, and molecular nebular condensations, the nurseries of new stars and even, perhaps, of new stellar-planetary systems?

Are there not 'hybrid multi-ontic cumula' whose existence «qua» activity is crucial in catalyzing all the 'meta-evolutionary', 'onto-generative' self-bifurcations? 'The Taboo Of The Hybrid' -- viz., the conceptual Dialectical Ideography Volume I. 14 Prescripts Foundation Encyclopedia Dialectica suppression and mathematical omission of these hybrid actualities, together with the grammaticallyinculcated 'ideo-pathology' of '*nounism*', the semi-conscious belief that the objects we name using our nouns are as 'Parmenideanicly' actionless as the "part of speech" to which their names belong -- weaken science. They block insight. *Ontologically hybrid formations*, even those of the "catabolic" kind, let alone those of the 'anabolic" kind -- from the bio-molecular *lipofuscins* that clog our cells, accelerating our bodily aging, to the *plaques* that clog our arteries, impending our premature deaths, to the 'geo-biological' and 'meta-social' *hybrid cumulates* we noted above, to the asteroidal, cometary, meteoric *exolithic residuum* of *solar-planetary poiesis*, which threaten to extinguish the progress of our planet -- are ignored at our peril.

i. Goal: An Ideography of the «Aufheben» Operation. We seek 'meta-arithmetics', 'meta-algebras', 'meta-geometries' and a 'meta-analysis', in a sense distinct from the Hilbertian one, for "'trans-Hegelian'" versions of a *quanto-qualitative* «aufheben», or "'sublation'", operation. This operation is central to Hegel's [unnecessarily restricted and still largely Parmenidean] version of dialectical logic.

We seek arithmetics of "operations «qua» numbers" & "numbers «qua» operations"; 'meta-arithmetics' of 'meta-operators' which "simultaneously" (a.) annul, (b.) conserve, and (c.) elevate their operands. Such 'meta-arithmetics' should codify an explicitly 'autopoiesic' [self-making], self-reflexive version of the «aufheben» operation. They thus reveal a conception of this operation which, as expressed herein via ideographic, "mathematical" symbols, models a mode of action that is primarily an 'essence-ial' self-operation of a dialectical [ev]entity upon itself, a 'self-critique' or self- / essence-induced 'immanent critique'; a "being-for-itself" 'self-re-flexion' and 'self-re-fluxion'. This is in contrast to a '[de-]flexion', a "being-in-itself" process -- an action upon that dialectical 'eventity', or Subject / Agent, by other Agencies, by other Subjects / Actors, by other [ev]entities, conceived as external / alien to its self / essence. The "elevation" moment of this «aufheben» operation is conceived as one of 'onto-generative', i.e., of 'qualitative' change. That moment thus supplies wherewithal for the description of a universe which is not just in a physical, spatial sense in acceleratory self-expansion, but which is also in a 'contental', 'typological', taxonomical, hence 'descriptional' -- in short, ontological -- acceleratory self-expansion: a universe which is constantly adding new "things" to itself, but not just more "things" of the same [onto-]type (quantitative self-expansion), but "things" unprecedented in kind; new 'onto-mass' of new 'onto-type' ['kinds', or 'qualitative', self-expansion]; thus describing an 'onto-dynamical' universe.

j. The 'Pseudo-Agents' "Pure Quantity", "Time", "Natural Law", and "Chance". Working Conviction: A 'conceptual-therapeutic' need exists for concerted application of a 'neo-Feuerbachian' version of the Feuerbachian 'righting', 'de-capsizing', or 'inversion of the inversion' operation with respect to current usages and "figures of speech", both phonogramic and mathematical-ideogramic, involving the concepts of "Time", "Law Of Nature", and "Chance". A 'neo-Feuerbachian' critique of "'deified''', reified, hypostatized, and subject / object inverted linguistic expressions regarding abstract "Time" and "Natural Law", as well as regarding abstract "Quantity", already resides at the very heart of this inquiry.

Prevailing 'ideo-graphical' notations for dynamical ["time-varying"] variables -- e.g., **S**((**x**, **y**, **z**), **t**) and **X**(**t**) - present "time", denoted **t**, as **ultimate** <u>independent variable</u>, as if abstract "Time" were the final "cause" of all such <u>dependent variable</u>, function-value "<u>effects</u>". This semi-consciously inculcates a concept that –

#### "Time changes all things".

But that assertion places the real actors, the real agents, the real subjects, in the object position, and the real object(s) or result(s) of action in the subject-position of the sentence, hence of the [mis-]conception. It formulates, thereby, an "inverted" proposition, 'standing [the true description] on its head', or "bottom-up" in an "upside-down", or subject / object-reversed, formulation. It reifies the abstraction, "Time"; ascribes to "Time" a false causative status; falsely ascribing "Time" as "Subject" or "Agent" of change, as "Actor", thus constructing, mentally, an empirically-fallacious, ""being-for-itself" 'pseudo-subject', or false subject, while also ascribing the actual actor(s) or agent(s), the true subject(s), "all things", as mere objects of "Time",

as if "Time" were an *external* cause of their changing natures, thus subliminally making them out to be *'pseudo*-objects', ascribing to them a *false "'being-in-itself*"', or *"'being-*[only]-*for-*[an]other(s)"', passivity.

Feuerbach's medicine for such mentality maladies was to reverse such reversals. Let us too do so by performing a syntactical [and semantical] "180 degree rotation" on the sentence-string "*Time changes all things*". After re-righting the resulting upside-down letters, permuting the sub-strings "*things*" and "*all*", and dropping the suffixed "s" from the sub-string "changes", this yields the symbol-string –

#### 'All things change time'.

-- or, leaving the order of "things" and "all" unaltered --

#### 'Things all change time'.

Such raw 'rection' or "'righting" of a more familiar, superficially more acceptable "capsized" [in-]version, may ring strange to you upon your first encountering of it.

But, at length, for us, the results ring true, and have opened onto key insights that pervade this work, that help heal the *subliminal ideo-pathologies* of reifying, hypostatizing, 'apotheosizing', subject/object-inverting, *pseudo-subject-concocting* thought-habits, and that co-found **a new time paradigm**, one which we hope will help you to breach **The Nonlinearity Barrier** of modern Terran-human cognition.

Likewise, when we encounter [over-]turns of scientific phrases such as -

"The Schroedinger Equation governs the behavior of micro-physical objects.",

or

"The laws of natural selection govern the evolution of the species."",

or

"There may be general laws **governing** such nonequilibrium self-construction processes in biospheres and the universe as a whole."

-- we 'turn them over' in mind, [de-]invert them, into -

'The behavior of micro-physical objects governs the Schroedinger Equation [if it is to be an apt model].'

or

'The behavior of micro-physical objects governs the "Laws" of Quantum Mechanics [if they are apt].';

'The observed patterns of the evolution of the species govern the "laws" of natural selection'., etc.

For "Natural Selection" is not a real and God-like super-Subject that "Sits in Judgment" over the species; that accepts some species for continuance, and rejects others. "Natural Selection" is simply a fancy and misleading *name* for some of the consequences of sustained *differential rates of self-reproduction* of co-evolving and *'inter-evolving'* populations of "eventities".

Neither abstract "Time" nor natural "Law" is the "energizing principle", the 'motor', of universal self-movement, nor of cosmological 'meta-evolution'.

Science consists in a 'meta-social' *community of comprehension* of experientially, experimentally faithful, apt, fittingly reconstructive, and predictive operational *descriptions* of empirically-given phenomenologies. *Dialectical Ideography*Volume I. 16 Prescripts
Foundation Encyclopedia Dialectica The "laws" in science are empirically-disciplined formulae, in phono-picto-ideo-graphic language(s), whose formulation by human subjects is – or should be – "governed by" the actualities they seek to homeomorphically, if forever imperfectly, re-present. Such "laws" are not entities operating in the external, 'exo-mental' world as physical agents, subjects, empirical actors in their own right, who "govern" those actualities, or who manipulate the actual actors in any way, with the partial exception of the 'self-sciences' of human 'meta-society', wherein observor and observed [partially] coincide. Such habits of writing, of speech, and of thinking may be an unexamined residue, and a stylistic, 'psycho-historical hangover', or 'overhang', of the ancient Socratic-Platonic, <u>∂</u>Parmenidean theory of the "Forms".

We have therefore chosen to practice a *praxis* of thought designed to re-condition all of our conscious, semi-conscious, and pre-conscious thought-habits by pursuing an account of *actual* time as constituted of and by concrete action, by the *other-action* and by the *self-action* of *concrete sub-totalities*; by *'ev-ent-ities*'; by the actual subject-<u>verb</u>-objects of, and the actual, physical causes of, the existence of "Time"; the very opposite of being "Time's" *mere* "objects" or "effects". We thus search for alternative formulations of the dynamical and 'meta-dynamical' "Laws" of nature in which *the time variable emerges as ultimate* <u>dependent variable</u>, as if the ultimate <u>effect</u>, rather than as the ultimate <u>independent variable</u>, as if the ultimate <u>cause</u>, of cosmological self-development, or of '«kosmo-autopoiesis»'.

#### Thence arises a key concept herein, that of "quanto-qualitative" 'temporal acceleration'.

We therefore also pursue an account of "The Laws Of Nature" in terms of 'meta-gnomonic', 'spatiotemporal meta-fractals', "'quanto-qualitatively'" different but self-similar patterns, or "habits" [Peirce10], of action, evincing the 'self-refluxive self-constraint' of the self-burgeoning processes and populations of [ev]entities ever-pouring forth from universal self-production. We thus also seek for alternative conceptions and verbal expressions regarding such "Laws", which do not connote that they "govern" the actions of concrete actors, but conceive them as linguistic portrayals of the self-created patterns of change expressed by, and expressing, the '[meta]dynamical essences' of, those real actors. Such patterns of evolution, and of 'meta-evolution', conceived as concrete operations embodied in 'externity', may thus themselves change, even change themselves, in the sense of the 'metafinite singularity self-bifurcation' process: in their turn, 'meta-evolve', and even 'self-meta-evolve'! Reflecting back upon some of the deeper historical, cultural, civilizational roots of the 'cumulum' of conceptions upon which Modern Science has drawn in framing its conceptions of "Time" and of "Natural Law", we should say that Abstract "Time" is not the creator-god of all change, nor is a static, changeless God the decreeing source of immutable, changeless, Parmenidean "Natural Law"; is not One Who created the Creation, and legislated, or decreed, that "Law" in the process, once-and-for-all. Nor should the "Tetragrammaton" of the Judeo-Christian texts, the famous "I AM [that] I AM", the "JHVH", be interpreted, mythopoeically, as the ultimate assertion of Parmenidean changelessness. On the contrary, it can be grasped as a consummate, classic expression of 'Non-Linear, Self-Reflexive Divinity':

 $\underline{AM} \rightarrow \underline{AM} & \langle \underline{AM} \rangle = \underline{AM} \otimes \underline{AM} = \underline{AM}^2 = \underline{AM} \oplus \underline{AM}^2 = \underline{AM} \oplus \underline{AM}; \ \underline{jH[vH]} = \underline{jH}^2 = \underline{jH} \oplus \underline{\beta}\underline{jH} \neq \underline{jH};$  $\underline{Being}_{\tau} \rightarrow \underline{Being}_{\tau} & \langle \underline{Being}_{\tau} \rangle = \underline{Being}_{\tau}^2 = \underline{aBeing}_{\tau} = \underline{Being}_{\tau} \oplus \underline{ABeing}_{\tau} = \underline{Being}_{\tau+1} \neq \underline{Being}_{\tau};$ 

-- or, better -

Becoming,  $\rightarrow$  Becoming, <sup>2</sup> =  $r^{4}$ Becoming, = Becoming,  $\bigoplus$  ABecoming, =

**Becoming**<sub>+1</sub> Becoming<sub>+1</sub> Becoming<sub>+</sub>, with 'F<sup>d</sup>' signing the operation of dialectical [«aufheben»] <u>self</u>-negation.

The "*Tetragrammaton*" is better read as describing a '*[self-]continuing Creation*' -- the *ongoing* Cosmo-*Genesis* / Chrono-*Genesis* of an ontologically ever growing, *eternally-progressing* Deific Being in '*Self-Advancing Self-Development*', including the ever-new generation, and transcendence, of ever-new "Laws" / Patterns of becoming. k. The Concept of 'Meta-Finite', 'Conversion-Singularity Self-Bifurcation'. Working Conviction: The paradigm of unitary control-parameter-space / state-space 'self-bifurcation' provides an appropriate conceptual and mathematical-linguistic tool-kit for describing, in both 'past-reconstructive' and 'future-preconstructive' modes, the 'generics' of outwardly diverse physical mechanisms of the combined, "being-in-itself", 'flexive' development, and "being-for-itself" 'self-reflexive', 'self-refluxive' self-development, of populations of "eventities". This paradigm encompasses, not only the "quanto-qualitative" phenomena of pre-human and extra-human nature, but also the "quanto-qualitative" self-transformations of human societal formations; the revolutions, "sudden evolutions", sudden depopulations, and also the "renaissances" which are ontologically generative at the level of human social ontologies, as well as the aperiodic "revolutions" in human idea-systems, including the historically-observable, "psycho-historical" 'meta-evolutions' of mathematics. That is, this paradigm also applies to human society, to that sub-realm of natural history which is '[proto-]human[oid], meta-social nature' «qua» "'eventity"; to its partially other-1 "environment"-generated, partially self-generated, self-engendered history. 'Self-bifurcation' involves actual 'singularities'; finitary, but 'metafinite' and "catastrophic" behavioral "relative discontinuities". These are often seen as marking the outermost temporal boundaries of the existences / identities of systems, "breaks" such that via self-transformations so deep that the preceding 'system-identity' may be perceived and conceived as being lost / ended, and a new, successor 'system-identity' as being born in their wake, despite the signal [self-]evidence of 'meta-continuity'.

Thus, for example, Platon's work, and the work intended by him for the Platonic Academy -- an institution of the Ancient world which lasted for over **900** years, from about **385** B.C.E to **529** C.E., when it was forcibly shuttered by the edict of the "Christian" dictator, Justinian – may be grasped as a 'meta-continuation' of the work of the original "'Pythagorean Order'", which endured for about a century, from circa **530** B.C.E to circa **430** B.C.E., when their initial '*ratio*-nal' world-view was shattered by such revelations of their research as the "incommensurability" – the '<u>ir</u>-*ratio*-nality' – of the diagonal to the side of a unit square. And, we of the Foundation hold – without any intent of arrogance – that the work of the Foundation may be seen as, in turn, a 'meta-continuation' of the intended work of the Platonians, after their initial world-view, of the "Forms", was, in its turn, shattered, and the "*autokinesis*" world-view began to emerge, even in the final 'dialogue-ic' writings of Platon himself.

The model occurrence of <u>self</u>-bifurcation arises when the value of a system control-parameter shifts across its bifurcation-inducing, critical value threshold, but driven not just by some external, environmental, <u>non</u>-self mechanism, but by the internal, <u>self</u>-changes described by the state-space trajectory of that system itself. Such 'metafinite singularity' arises, in one of the two major «**species**» of this «**genos**», via <u>u</u>-'requalified', or 'onto-metrically qualified', dynamical "evolution equations", at that **t** value for which a denominator-resident 'conversion-function', involving a *self*-bifurcation parameter-value, indicates complete conversion / depletion of the 'material negentropy' that had 'fueled' the evolutionary epoch thus ending, within the 'driver loci' of that evolution, by means of a --

$$((0) \cdot \langle \underline{\tilde{\mu}}_{\underline{\Sigma} u | \underline{\tilde{u}}} \rangle ) \cdot \langle \underline{\tilde{\mu}}_{k} \rangle = \mu_{0}$$

-- denominator. The 'meta-system' concept bridges the "catastrophic" identity-loss boundaries cited above; sees predecessor and successor "systems" as united within a single, deeper, or higher, 'meta-continuing', 'meta-system meta-identity'. E.g., successive generations of stellar "births", and stellar novae-"deaths", 'meta-continue' as the [especially planetary-nebular] self-development of the 'meta-system' of the galactic interstellar medium. The 'atmo- / litho-synthetic', chemosynthetic, photosynthetic, and 'industrio-synthetic' epochs of the biosphere 'meta-continue' as the 'meta-system' of Earth's bio-noöspheric 'meta-evolution'. The ancient / 'chattelist', the medieval / feod-based, and the modern / capital-based epochs of Western history 'meta-continue' as the 'meta-system' of Terran Occidental 'meta-social meta-evolution'. This 'meta-system' level of theory and of ideographical, mathematical modeling is neglected in contemporary science, even in that science's most "nonlinear, dynamical" mental, conceptual and mathematical models, which all tend to model 'systems', but not their 'meta-systems', and also not their "meta-system transitions"

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[see Turchin<sup>6</sup>]. This 'meta-system' level of identity, locus of 'meta-space'; and of the unified, state-space /control-parameter-space 'meta-dynamics' of 'metafinite, conversion-singularity self-bifurcation', constitutes that level of natural phenomenology which the ""meta" -logic, -arithmetic, -algebra, -dynamical geometry, and -analysis of the F.<u>E.D</u>. Dialectical Ideographies targets for representational capture.

I. The Concept of 'Self-<u>Duality</u>' or '<u>D</u>i-act-icity'. Working Conviction: The primary formations of every to-us-known epoch of the 'meta-evolution' of this cosmos are globally characterized by *inherent*, *ineluctable, self-induced instabilities*. We mean that, apart from external "accidents", which may terminate the existences of such formations <u>pre</u>maturely, their own immanent, '*essence*-ial', 'self-<u>nature</u>-al', thus "necessary", *internal* self-maturation *self*-terminates them '<u>maturely</u>'. We mean that, *precisely because of what they are* [and therefore of *how* they are and of what they <u>do</u>, *including especially 'because of what they <u>do to themselves</u>], and <i>not only because of what other "things" may or may not do to them*; "things" cannot stay the same; that this 'self-instability' is the most radical, fundamental source of change, and, thereby, even of "Time" itself [≡ 'chronopoiesis]. The incompatibility of each 'meta-state' of each such 'system-self' with the continuation of that very 'meta-state', that is, its inherent '<u>self-incompatibility</u>', is the 'dialectical self-force' that drives change, the "energizing principle" behind the '-\_\_' 'arrow-ideogram' in the 'universal characteristic' process-expression, and the very "'substance''' of concrete "time" itself ---

## $\underbrace{\Delta_{\tau}}_{\tau} \xrightarrow{\rightarrow} \underbrace{\Delta_{\tau+\Delta\tau}}_{\tau+\Delta\tau} = \underbrace{\Delta_{\tau}}_{\tau} \underbrace{[\Delta_{\tau}]}_{\tau} = \underbrace{-}_{\tau} \underbrace{[\Delta_{\tau}]}_{\tau} = \underbrace{\Delta_{\tau}}_{\tau}^{2}$

-- with 'X' as generic 'ontic qualifier cumulum' variable, and with  $\tau$  denoting the 'self-bifurcation index' or *metafinite singularity countor'* for the universe of discourse spanned by  $\{X_r\}$ . For example, the continued present existence of a Hydrogen-fusioning star is inconsistent / incompatible with its later continued existence as such, beyond the critical values of its core Hydrogen-density and Helium-density 'self-bifurcation' control parameters. This is because such a star's very "existence" as a 'Hydrogenfusioning' star IS the continuous depletion of its core Hydrogen and the continuous accumulation of its core Helium, via the nucleosynthetic continual convers[e]ion of the former into the latter, to the eventual degree where core Hydrogen-fusion "burning" sputters out, and the accelerated, "catastrophic" self-gravitational implosion / contraction-collapse of the star resumes [until the resulting degree of stellar core compression rises enough to ignite Helium-fusion, in a phenomenon known as the "Helium flash"".]. A 'dialectical [meta-Jsystem' is 'diactic', or 'dually self-active'. The self-same self-generated acts which change its state, the kind of change depicted by its continual change of position in its state-space, i.e., which creates its "state-space trajectory", also shift its key control parameter value(s). This shift typically occurs in a gradual, mounting, progressive, cumulative, and acceleratory way, until those parameters are thereby driven to their critical threshold values, representing a complete conversion of the negentropybase whose conversion has driven system state-evolution for the entire epoch now therefore closing. The resulting, denominator-resident zero value of the function representing the net remaining available store of that base resource, in the 'driver-loci' of system evolution, models a threshold-crossing which induces a 'via-singularity self-bifurcation', a 'metafinite', 'onto-gualitative change' in the very topology, in the axial, dimensional, *metrical* content, of the state-space and of its flow-field. This 'complete conversion self-bifurcation' thus involves changes in the very dimensionality, and in the state-variable and control-parameter metrics, of the appropriate post-bifurcation state-space / [self-]control-parameter-space, i.e., in the unified, 'state-control meta-space' of 'meta-states'. The 'quanto-qualitative', or 'qualoquantitative', 'meta-flow' of the self-expansion / progression of 'state / control meta-spaces', describing the 'meta-evolution' of the 'meta-system', is, in toto, a geometrical depiction of the 'meta-dynamic' [meta-"law" of motion] of this 'meta-system'.

Such bifurcation is thus **self**-induced **mediately**, as opposed to being *externally*-induced **im**mediately or instantaneously. It is represented, in the state-space / control-space metaphor, as a *cumulative* effect of the successive state-spaces' motions of the 'meta-system' upon its 'paths' in its successive control-parameterspaces. We thus term such a bifurcation a 'self-bifurcation'. Such 'self-bifurcation' is typically associated with a change of ontology, reflected in the irruption of the new metrics of the new state-variables' and control parameters' axes, i.e., normally, with a net expansion in ontology, and with a problem-self-induced change in the specification of the problem and its model. "Withering-away" of metrics / axes / dimensions, as well as interchange of axes between "state-space" and "control-space" sub-spaces, may also manifest.

We memorialize this 'diacticity' via a phonetic formula which is rather a mnemonical more than a truly etymological one --

#### Individuality entails 'indivi-duality'

- meaning <u>'indivi-sible</u>' [inner, endo-, '<u>intra</u>'-]duality', as opposed to 'divi-duality', meaning 'divi-sible', external, 'inter-duality', or '<u>exo</u>-duality'.

We identify this *generic* <u>in</u>ternal *tension*, or <u>'in</u>-*tension*', as one "'between" the subject-aspect / moment versus the object-aspect / moment of each [ev]entity. It manifests ideographically as the <u>syntactical</u> 'self-duality', self-confrontation, self-interaction, or 'self-double-ness' of the "nonlinear term" X<sub>x</sub> in --

## $\overset{1}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{2}{\to} \overset{2}{\mathsf{Z}_{\tau}} = \overset{2}{\mathsf{Z}_{\tau}} \llbracket \overset{1}{\mathsf{Z}_{\tau}} \rrbracket = \overset{2}{\mathsf{Z}_{\tau}} \llbracket \overset{1}{\mathsf{Z}_{\tau}} \amalg = \overset{2}{\mathsf{Z}_{\tau}} \amalg \overset{2}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{1}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}_{\tau}} \xrightarrow{1} \overset{2}{\mathsf{Z}_{\tau}} \overset{2}{\mathsf{Z}$

The ' $\underline{X}_{\tau}$ [ $\underline{X}_{\tau}$ ]' component of  $\underline{X}_{\tau}$ [ $\underline{X}_{\tau}$ ] denotes the 'for-itself', "operator'", 'movor', and 'pattern-of-movement in [meta-]number-space' -- in toto, the <u>subject</u>-aspect -- of  $\underline{X}_{\tau}^2$ . The ' $\underline{X}_{\tau}$ ]' component of  $\underline{X}_{\tau}$ [ $\underline{X}_{\tau}$ ] denotes the 'in-itself', 'stopping-point previously attained in [meta-]number-space', in short, the <u>object</u>-aspect, of  $\underline{X}_{\tau}^2 = \underline{X}_{\tau}$ [ $\underline{X}_{\tau}$ ]. The full expression,  $\underline{X}_{\tau}$ [ $\underline{X}_{\tau}$ ], denotes that which constitutes the self-transformative <u>core</u> of the entire "'self-dual'", self-evolving, 'self-iterative' [ev]entity, as modeled by { $\underline{X}_{\tau+\Delta\tau} = \underline{X}_{0}^{2^{\tau}}$ }, as a whole.

#### Timing.

A tradition of thought, developing from the deeps of Earth's antiquity; appearing, with variations, in both the oriental and the occidental hemispheres of human habitation and self-cultivation, and with varying degrees of staticist, 'Parmenidean' impairment, has come down to us under the name "dialectics".

We find it potentially serviceable for the requisite breakthrough in human-social 'meta-evolution'.

Sober consideration of the potential of this «organon» was blocked, planetwide, for most of the 20th century.

Blocked, because, early in that century, Terran humanity cleaved against itself in a new way.

A "First World", the portion of that humanity *first* self-transitioned to the industrial capital-based *'meta-attractor'* of human *'meta-evolution'*, engendered, and entered into protracted conflict with, a "Second World". The latter comprised some portions of this humanity who recoiled against their social cannibalization by [*what their recoil constituted as*] the "First World". This "Second World" then reactively / transiently unfolded as an 'intra-dual', *quasi-autarkic* vs. [proto]-state-monopolized / nationalized-capital-competing-in-world-market 'meta-state' of state-bureaucratic-nationalist politico-economic [mal-]praxis.

Locked for the last **80** years in this internecine global battle, humanity could not clear-sightedly address the nature and utility of dialectical thought.

One partial fruition of dialectics, the post- and contra-Hegelian school of Karl Marx and Frederick Engels, was central to the ideology of this conflict.

We use the term "ideology" here advisedly, and, indeed, 'Marxian-ly'.

The ruling plutocracies of both combatant parties only pretended to embrace, or to denounce, dialectics.

What the Second Party upheld, and what the First Party rejected, was not the actual dialectical tradition.

Two competing, deeply corrupt [with *crucial* individual exceptions], supra-national, extra-constitutional, *oil | financial | espionage | secret-police | mafia | arms-cartel | drug-cartel | slavery-cartel | capital-asset-"bubble"-engineering |* 'designer-Depression' deploying *| 'designer-disease'-propagating* plutocracies, two factions of a global 'dictatorship of petroleum', seized power, the Second Party more overtly; the First Party, more covertly; but each equally committed to the suppression of universal humanity, of global human social individuality, of human individual sovereignty, of global human prosperity, and of political-economic democracy.

The "dialectical thought" about which they "'ideologized" was but a diverting camouflage for their competing but antagonistically-cooperative social parasitisms; a counterfeit within a facade.

It was the waxing democratic spirit of the people of the Earth, East and West, North and South, that brought this paralyzing impasse to a pause. Earth's people know the value of what they have gained [even if some of their present rulers do not know, or do not want them to know]. They will not trade the degree of democracy -- and of freedom of creative enterprise -- that they have attained, at such great price, for something less. And why should they? What they have gained is the achievement of the generations -- generations of labor, discovery, building; of hardship, struggle, sacrifice, and tragic death.

It has cost them the lives of countless heroines and heroes to make it this far.

At the same time, they know that all that they have gained is in growing jeopardy.

They know that the only way to sustain what they and their foremothers and forefathers have built, is to build, with it, something better.

They will work for, and hold out for, something better than the fate of "population reduction" that the ruling plutocracy seeks to impose upon them -- for themselves, for their children, and for their children's children...something more, not less democratic; with greater justice, and greater opportunity -- not less -- for all.

**Not** for the **<u>unchecked power</u>** of <u>bureaucratic dictatorship</u>, of <u>government monopoly</u>, whether in Hitler's version, or in Stalin's; nor the faceless, all-devouring "welfare state" [which winds up in 'state welfare'; "welfare" for the public bureaucracy and its plutocratic private patrons, while ever less and less goes to the truly needy];

<u>Not</u> for the attempted <u>re-impositions of dark ages</u> "fundamentalist" theocracies, whether pseudo-Christian, pseudo-Islamic, or pseudo-Hindu, etc., with all of their endless bloody inquisitions;

**Not** for the guilt-feeding, **anti-science**, anti-"technology", **pro-superstition**, pro-dark-ages, "people are **pollution**", Neo-Malthusian / Ur-Nazi negative economic growth, negative population growth, <u>humanocidal</u> neo-pseudo-religion of '<u>Earthism</u>'. This '<u>Earthism</u>' is an ideology manufactured-to-order by the ruling plutocracy of the First Party. They created it by perverting a global grass-roots anti-pollution movement, via massive funding of the ideological perversions by that plutocracy's tax-exempt foundations, etc., and by the incessant propagation of 'Hitlerian / Goebbelsian' "Big Lies" by the plutocracy-controlled mass media.

All of the latter are but co-optations by, and covers for, a single strategy: "globalization", or "new world order", as global destruction / 're-Third-world-ization' of middle classes and democracies; as 'multinational-corporation internal-command-economy **Private Stalinism**<sup>+</sup>, supranational dictatorship of the petroleum/finance plutocracy, bought, in the society of universal prostitution, by the wholesale buying of governments -- legislature, executive, and judiciary; lock, stock, and barrel – all of it disguised as "free trade" and as "free market, laissez-faire capitalism", with re-monopolization sold as "deregulation", and global 'multi-genocide' ["population reduction"] sold as "ecology".

Note the mounting tide of plutocracy-faction-sponsored, openly *genocidal* neo-Nazi *experiments* and *dress rehearsals*, found[er]ed upon literally "sub-human" – less than human – ethnic distinctions and exclusivities.

That better future: the people of Earth are *reading*, and are taking heed of, what they have *written -- in their* own blood -- in this century, now passing, and in centuries past, about what it is <u>not</u>.

But what is it?

We hold that the time for a true and this time global consideration of the «organon» of dialectics has begun.

Sophya St. Germain

#

Karl Seldon

#### Foundation Encyclopedia Dialectica

Stars' End, New York, 07 September 2009 C.E. / B.U.E.

#### Endnotes: Prescripts

[Note: All bold italics emphasis, and bold italics underscore emphasis, below, has been added by F.E.D.]

#### Motive

- Ernest G. McClain, <u>The Pythagorean Plato: Prelude to the Song Itself</u>, [York Beach, MN: Samuel Weiser, Inc., **1984**], frontispiece [except, "performs" changed to "sings" by F.<u>E.D.</u>].
- 2. James Gleick, Chaos: Making A New Science, [New York: Viking Penguin, Inc., 1987], p. 170.

The concluding lines of the classic paper on the quantitative verification of the Milankovitch Effect read as follows: "... the long-term trend over the next several thousand years is toward extensive Northern Hemisphere glaciation."

J. D. Hays, et. al., "Variations in the Earth's Orbit: Pacemaker of the Ice Ages", Science, <u>194</u>: 4270, 10 December 1967, p. 1131.

Four years after the "Pacemaker" paper, one of the co-authors introduced a simple *nonlinear* model to reconstruct climatic response to the oscillatory Milankovitch orbital forcing, then used it to forecast future climate, with the following results: "Ignoring anthropogenic effects and other possible sources of variation acting at frequencies higher than one cycle per 19,000 years, this model predicts that *the cooling trend that began some 6,000 years ago will continue for the next 23,000 years.*"

J. Imbrie and J. Z. Imbrie, "Modeling the Climatic Response to Orbital Variations", *Science*, **207**, **9** February **1980**, p. **943**.

Russian climatologist M. I. Budyko comments as follows: "... the process of decreasing the amount of CO<sub>2</sub> in the atmosphere started in the Cretaceous period and accelerated at the end of the Tertiary period. The probable reason for the decreasing CO2 mass is the attenuation of volcanic activities, possibly caused by the exhaustion of the reserves of radioactive elements that produce heating of the lithosphere. From the available approximate estimates it follows that, if this process continues for about a million years [a period short from the viewpoint of the earth's history] one of two ecological catastrophes will occur: the complete glaciation of the earth or the disappearance of autotrophic plants ... It is assumed that in the Pleistocene the earth's biosphere was not far from destruction in the epochs of greatest development of the Quaternary glaciations, which advanced close to the critical latitude [the limit beyond which ice loses its stability and shifts toward the equator as in a self-propelled process]... Assuming the possibility of the disappearance of the biosphere in the not very distant future, one should return to the question of how the biosphere could be maintained for such a long period in the past . . . It is believed that the maintenance on the earth of a mean temperature within the narrow zone necessary for life for billions of years seems to be a random event, the probability of which is very low ... The first result of the global impact produced by man on the biosphere that is connected with restoring the ancient  $CO_2$ -rich atmosphere is an inadvertent consequence of economic activities. This change in the composition of the atmosphere has increased the stability of the biosphere and decreased the possibility of its complete or partial destruction by glaciations ... It is essential for understanding the present changes in the state of the biosphere that, with an increase in atmospheric CO<sub>2</sub> concentration, the atmosphere returns to the composition typical of the Tertiary period, when climatic conditions were far warmer and plant productivity was higher than at present. Since the atmosphere lost  $CO_2$  for the last hundred million years, directly threatening the existence of the biosphere due to a decrease in the productivity of autotrophic plants and the possible complete glaciation of the earth, the present anthropogenic impact on the biosphere seems to be a favorable factor that eliminates the indicated threat."

"However, it must be mentioned that although many aspects of global warming could be favorable to mankind [a rise in the productivity of autotrophic plants, better usage of land in cold climates, etc.], a number of difficulties can also inevitably arise. The major difficulty lies in the necessity of adjusting, in a relatively short time, many branches of the economy to the conditions of a rapidly changing climate and other aspects of natural conditions."

M. I. Budyko, The Earth's Climate: Past and Future, [NY: Academic Press, 1982], pp. 281, 285-287.

In 2005, Dr. Jennifer Hoffman, Dr. Tina Tin, and science writer George Ochoa, published a book entitled <u>Climate:</u> <u>The Force that Shapes Our World and the Future of Life on Earth</u>. Dr. Tin is a climate scientist affiliated with the World Wildlife Fund. Dr. Hoffman is a marine biologist and World Wildlife Fund consultant. Both are subject to the reprisals, including cut-offs of all funding, that have been visited upon many other scientists who have dissented from the "party line" on "Global Warming" — reprisals carried out, in part, the plutocracy-funded and controlled "environmental movement", by the plutocracy-controlled National Sciences Foundation, etc. Thus, even the mildly-worded critique that they have registered, below, against the "Global Warming" dogma, represents an act of considerable, and admirable, courage:

"From about 1450 to 1850, Earth passed through what is called the Little Ice Age (Some scientists place the start date as early as 1300 and the end date as late as 1890).

During this period of renewed cold, alpine glaciers advanced in virtually all the world's mountain areas, and the Arctic islands' ice caps grew larger.

Winters became colder and summers cooler, though the effect on winters was generally greater ....

Worldwide, the climate change damaged many ecosystems.

Floods, plague, and famine devastated Europe.

Crops failed, especially in northern regions.

The Baltic Sea froze. England's Thames river developed ice several inches thick. *In higher latitudes, great storms increasingly roiled the skies*. A storm that hit southern England on December 7-8, 1703, blew down a lighthouse, wrecked houses, tossed ships onto land, and killed 8,000 people....

Drought and flood often besieged the same areas.

... The causes of the Little Ice Age are not well understood ....

In general, since the Little Ice Age, climate has been growing warmer. Temperatures reached a high in the 1940s, became cooler until the mid-1960s, and since have been rising again, setting records for warmth in the 1990s.

Despite this trend of global warming, some researchers believe that the Little Ice Age may not be over, but that it is being counteracted by rising carbon dioxide levels generated since the Industrial Revolution.

It is possible that atmospheric circulation patterns characteristic of the Little Ice Age may still be in place."

George Ochoa, Jennifer Hoffman, and Tina Tin; <u>Climate: The Force Which Shapes Our World and the Future of</u> <u>Life on Earth</u>; Rodale International Ltd. (London, U.K.: 2005); pages 77-80.

Consider the sheer *radicality* of the theory described variously by Budyko, and by Hoffman, Tin, and Ochoa, above, in relation to the "Global Warming" party-line parroted exclusively by the corporatist media. This theory holds that —

The Earth entered a phase of global cooling and re-glaciation circa ~1300 C. E. [possibly marking the end of the already over-extended, >10,000 interglacial, and the resumption of the next, ~100,000 year+ round of the ['continuing-Pleistocene'] Ice Age, as indicated by the Milankovitch drivers, which paced all of the previous Pleistocene Ice Age rounds, and all three of which now point towards renewed glaciation];

 This global cooling and re-glaciation, devastating to the biosphere, has been held in check by the return of CO<sub>2</sub> to the CO<sub>2</sub>-depleted atmosphere, a return achieved by the fossil fuel burning during the Industrial Revolution, and increasingly ever since.

Thus, humanity has — however inadvertently, so far, per these hypotheses — SAVED THE BIOSPHERE from the massive biomass massacre of that CO<sub>2</sub>-depletion-enabled, Milankovitch-cycles-driven re-glaciation.

The CO<sub>2</sub> depletion of the atmosphere was produced, in major part, by the accelerated photosynthetic biomass productivity "booms", and the anaerobic dead-biomass decay, of the Carboniferous, of the Cretaceous, etc. — the very bio-geological processes that formed the fossil fuels in the first place.

That CO<sub>2</sub> depletion lowered the atmospheric temperature sufficiently, by the Pleistocene, to where the Milankovitch drivers, instead of oscillating atmospheric temperature from warm to a little less warm, as they did throughout most of Earth's history, oscillated atmospheric temperature from warm to cold-enough to initiate glaciation, and thus to support sufficient standing-ice-reflection of solar light [potential heat] back into space, to launch the self-amplifying, self-accelerating "positive feedback" cooling trend that generated the Ice Ages.

Most readers have probably never heard of this theory before, though it is well known to scientists like Budyko, Tin, Hoffman, and many others. The corporatist media holds this, along with other taboo topics, such as fusion power as solution to the so-called "energy crisis", under deep cover, and almost never mentions these topics, and, even then, when it does, rarely, mention them, usually only in contexts of ridicule. If you would like to know more about what the plutocracy-controlled media has been hiding from you in these regards, just click on the links provided below.

A more detailed consideration of a theory of the kind alluded to above — elaborated more some **30** years ago, and updated recently — is available via the following link: <u>Crises by Nature: How Humanity Saved the Biosphere</u>, http://www.adventures-in-dialectics.org/Adventures-In-Dialectics/Crises-by-Nature/Crises-by-Nature.htm.

This theory of 'climato-dynamics' is grounded in a model of the historical dialectic of nature, and in an immanent critique of the "atomism", "reductionism", "mechanism", and "linearist-equilibriumism" of the plutocracy's version of science.

A Canadian e-newspaper series documented the dissents of a large number of world-class climatologists and other scientists, in a series of brief but hard-hitting, *one-and-one-half page articles*. Links to a selection of **14** of those articles are provided below.

Overall Series links, with sub-links to all (approximately) 35 articles

http://www.canada.com/nationalpost/financialpost/story.html?id=4432a41c-7c52-4b74-934e-f0dac3b2bcb8

Links to 14 of the ~35 individual articles --

a. Dr. George Kukla: Forget Warming - Beware the New Ice Age

http://www.canada.com/nationalpost/financialpost/comment/story.html?id=bdc24964-7f82-4f7a-863c-f0ff43010278

b. Dr. Syun-Ichi Akasofu: The Little Ice Age is Still with Us

http://www.canada.com/nationalpost/news/story.html?id=94b7d021-c5da-4e82-b37f-53d338709fb1

c. Dr. Christopher Landsea: The Hurricane Expert Who Stood up to UN Junk Science

http://www.canada.com/nationalpost/story.html?id=ae9b984d-4a1c-45c0-af24-031a1380121a&k=0

d. Dr. Richard S. J. Tol: Warming is Real - and has Benefits

http://www.canada.com/nationalpost/story.html?id=1d78fc67-3784-4542-a07c-e7eeec46d1fc&k=0

e. Dr. Carl Wunsch: Unsettled Science

http://www.canada.com/nationalpost/environment/story.html?id=7e23a550-9cc4-4697-b730-b2d094f1628a

f. Dr. Richard Lindzen: The Original Denier - into the Cold

http://www.canada.com/nationalpost/story.html?id=63ab844f-8c55-4059-9ad8-89de085af353&k=0

g. Prof. Paul Reiter: Bitten by the IPCC

http://www.canada.com/nationalpost/news/story.html?id=0ea8dc23-ad1a-440f-a8dd-1e3ff42df34f

h. NASA Chief Michael Griffin: NASA Chief Silenced

http://www.canada.com/nationalpost/financialpost/comment/story.html?id=2271ac23-6895-4789-9da0-6b28968b8d15

i. Dr. William Nordhaus: Discounting Logic

http://www.canada.com/nationalpost/news/story.html?id=7bd269b6-b2e7-44d2-85e0-e7749714ba34

j. Lawrence Solomon: End the Chill

http://www.canada.com/nationalpost/news/archives/story.html?id=216ca730-10f0-4614-9692-fc37d99cbac3

k. Dr. Duncan Wingham: Polar Scientists on Thin Ice

http://www.canada.com/nationalpost/story.html?id=b228f4b0-a869-4f85-ba08-902b95c45dcf&k=0

I. Lawrence Solomon: They Call this a Consensus?

http://www.canada.com/nationalpost/financialpost/comment/story.html?id=c47c1209-233b-412c-b6d1-5c755457a8af

m. Dr. Roger Revelle: Even Gore's Guru Disagreed

http://www.canada.com/nationalpost/news/story.html?id=58e0c50c-1631-46ca-8719-778c0973526e

#### n. Dr. Edward Wegman: Statistics Needed

http://www.canada.com/nationalpost/story.html?id=22003a0d-37cc-4399-8bcc-39cd20bed2f6&k=0

Additionally, over **100** prominent scientists have recently registered, and documented, their dissent from the "Global Warming" "party line", via a U. S. Government Congressional Committee's e-Records site, accessible via the following link: Over **100** Prominent Scientists Warn UN Against 'Futile' Climate Control Efforts

http://epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord\_id=d4b5fd23-802a-23ad-4565-3dce4095c360&Issue\_id

Later, more than 700 scientists from around the world documented their dissent regarding Global Warming claims --

http://epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord\_id=2674e64f-802a-23ad-490b-bd9faf4dcdb7

The award-winning, science-based Geocraft website "Plant Fossils of West Virginia" includes following rejoinder to the 'Gore-ists', noting that atmospheric CO<sub>2</sub> levels today are still at Ice Age levels [see Graph: link below] --

"Earth's atmosphere today contains about 380 ppm CO<sub>2</sub> (0.038%) ["ppm" = parts per million --  $F.\underline{E}.\underline{D}$ .]. Compared to former geologic times, our present atmosphere, like the Late Carboniferous atmosphere, is CO<sub>2</sub>-impoverished! In the last 600 million years of Earth's history only the Carboniferous Period and our present age, the Quaternary Period, have witnessed CO<sub>2</sub> levels less than 400 ppm. There has historically been much more CO<sub>2</sub> in our atmosphere than exists today. For example, during the Jurassic Period (200 mya), average CO<sub>2</sub> concentrations were about 1800 ppm or about 4.7 times higher than today ["mya" = million years ago --  $F.\underline{E}.\underline{D}$ .]."

"The highest concentrations of CO<sub>2</sub> during all of the Paleozoic Era occurred during the Cambrian Period, nearly 7000 ppm — about 18 times higher than today. The Carboniferous Period and the Ordovician Period were the only geological periods during the Paleozoic Era when global temperatures were as low as they are today."

"To the consternation of global warming proponents, the Late Ordovician Period was also an Ice Age while at the same time  $CO_2$  concentrations then were nearly 12 times higher than today — 4400 ppm. According to greenhouse theory, Earth should have been exceedingly hot. Instead, global temperatures were no warmer than today.

Clearly, other factors besides atmospheric carbon influence earth temperatures and global warming.

Late Carboniferous to Early Permian time (315 mya – 270 mya) [i.e., that of the Carbo-Permian *Ice Age* – **F.<u>E.D.</u>]** is the only time period in the last 600 million years when both atmospheric CO<sub>2</sub> and temperatures were as low as they are today (Quaternary Period)."

To view chart provided at URL given below, Global Temperature and Atmospheric  $CO_2$  over Geologic Time, which graphs the data cited in the passage quoted above, and more, use the following links –

View graph at <u>http://www.geocraft.com/WVFossils/PageMill\_Images/image277.gif</u>. View full text at <u>http://geocraft.com/WVFossils/Carboniferous\_climate.html#anchor147264</u>.

Temperature after C. R. Scotese <u>http://www.scotese.com/climate.htm</u>. CO<sub>2</sub> after R. A. Berner, **2001** (<u>GEOCARB III</u>). http://geocraft.com/WVFossils/Reference\_Docs//Geocarb\_III-Berner.pdf Jose Peixoto and Abraham Oort describe the nonlinear nature of 'climato-dynamics' thusly:

"The changes in the purely external factors that affect the climatic system, but are not influenced by the climatic variables themselves, constitute what may be called the external causes of climatic changes, whereas those changes that are related to nonlinear interactions among the various physical processes in the internal system are called *internal causes*. The distinction between the two classes of causes is not always clear . . . Our discussion will be organized around the governing [note 'reificatory', subject/object inverting language - F.E.D. | equations of the atmosphere taken as one of the internal subsystems of the climatic system ... These three-dimensional equations are *nonlinear* and each variable is related to the others. Any change in one of the variables may induce variations in the others which, in turn, will generate a feedback on the original variable [we refer to such 'mediated self-action' as 'self-refluxion' - F.E.D.]. The set of coupled partial differential equations can, in principle, be solved subject to the solar radiation input and other specified boundary and initial conditions that define an instantaneous state of the climate system. This mathematically closed set of equations constitutes a well-posed mathematical problem and forms the core of all mathematical model simulations of climate ... A climate model is a set of specialized thermo hydrodynamic equations with usually prescribed boundary and initial conditions, certain given values of the physical constants, and specified schemes of parameterization of the subgrid-scale fluxes of water vapor, momentum, and energy ... The climate equations are highly nonlinear in nature and no general analytical methods are available to solve them. It suffices to say that, e.g.,

| du | = | $\partial u +$ | u <u>∂u</u> | + | v <u>du</u> | + | w <u>du</u> . |
|----|---|----------------|-------------|---|-------------|---|---------------|
| dt |   | ðt             | <i>dt</i>   |   | <b>∂</b> t  |   | ðt            |

where, of course, the last three terms are nonlinear [the immediately "'self-reflexive'", 'self-reflexive' term is shown above with **bold italics emphasis** – F.<u>E</u>.<u>D</u>.]. We then have to rely on numerical analyses to provide the desired solutions. Thus, the partial differential equations have to be either replaced by equivalent finite difference equations or solved by spectral techniques. Even so, the primitive equations contain all scales of motion from sound and gravity waves up to planetary waves. Some of these scales of motion do not influence the weather processes significantly and may produce a noise level during integration that obscures the real meteorological signal. This appears to be the case for sound and some of the gravity waves. These must then be filtered. The filtering may be accomplished by using the hydrostatic equilibrium hypothesis and, in some models, by using the quasigeostrophic approximation in the middle and high latitudes . . . utilization of numerical methods may give rise to other problems of a mathematical nature, such as the convergence of the solutions and their stability. . .".

Jose Peixoto, Abraham Oort, *Physics of Climate*, [NY: American Institute of Physics, **1992**], pp. **23**, **32**, **450-451**, **453**, **456**.

Regarding the assertion that the "White Earth climate" has never come about on Earth: A major accumulation of evidence that this regime <u>has</u> occurred *repeatedly* on this planet has been presented to the scientific community, building on a theory that gained evidence as early as **1964** in work by W. Brian Harland, as noted, for example, in –

Hoffman, Paul and Schrag, Daniel, "Snowball Earth", Scientific American, January 2000, pp. 68-75

-- from which the excerpt below was extracted. This excerpt describes a self-iterating sequence of 'eco-geoclimatological' 'metafinite self-bifurcation singularities' by which Earth repeatedly and progressively oscillated itself between ice-house and hot-house extrema:

"Our human ancestors had it rough. Saber-toothed cats and woolly mammoths may have been day-to-day concerns, but harsh climate was a consuming long-term challenge. During the past million years, they faced one ice age after another. At the height of the last icy episode, 20,000 years ago, glaciers more than two kilometers thick gripped much of North America and Europe. ... Dramatic as it may seem, this extreme climate pales in comparison to the catastrophic events that some of our earliest microscopic ancestors endured around 600 million years ago. Just before the appearance of recognizable animal life, in a time period known

as the Neoproterozoic, an ice age prevailed with such intensity that even the tropics froze over. Imagine the earth hurtling through space like a cosmic snowball for 10 million years or more. Heat escaping from the molten core prevents the oceans from freezing to the bottom, but ice grows a kilometer thick in the -50 degree Celsius cold. All but a tiny fraction of the planet's primitive organisms die. Aside from grinding glaciers and groaning sea ice, the only stir comes from a smattering of volcanoes forcing their hot heads above the frigid surface. Although it seems the planet might never wake from its cryogenic slumber, the volcanoes slowly manufacture an escape from the chill: carbon dioxide. With the chemical cycles that normally consume carbon dioxide halted by the frost, the gas accumulates to record levels. The heat-trapping capacity of carbon dioxide -- a greenhouse gas -- warms the planet, and begins to melt the ice. The thaw takes only a few hundred years, but a new problem arises in the meantime: a brutal greenhouse effect. Any creature that survived the icehouse must now endure a hothouse. As improbable as it may sound, we see clear evidence that this striking climate reversal -- the most extreme imaginable on this planet -- happened as many as four times between 750 million and 580 million years ago."

3. British climatologist H. H. Lamb comments as follows: "... The cooling of the general run of European summers since 1953, albeit with the year-to-year variations stressed in this chapter, has had another consequence which marks out the change of climatic tendency since the middle of the century. The long retreat of the glaciers in the Alps first slowed down; then in 1965 some, mostly small, glaciers which were evidently nearly in equilibrium showed advances; and since 1972 in some regions, 1975 in others, in most years the majority of glaciers, including the big ones, in Italy, Austria, and Switzerland have been advancing. Also in west and north Norway these years have produced the first general advance of the glaciers for many decades past. Similarly, in North America the earlier twentieth-century predominance of glacier retreat has been followed by advances in some areas, in the Cascade Range in the northwest of the United States from as early as the 1950s. And on [the large] Baffin Island in northeast Canada, in the central part of which 70 percent of the highland region seems to have been covered by 'permanent' ice and snow between two hundred and four hundred years ago [the approximate interval of the "Little Ice Age", including its coldest part, coinciding with the "Maunder Minimum" - F.E.D.] and where this had been reduced to 2 percent by 1960, the 'permanent' snow beds have been increasing again since and incipient new glaciers have been found. This has been brought about by a lowering of the summer freezing level by nearly 300 m [1000 ft] in the later years."

H. H. Lamb, *Climate, History and the Modern World*, [New York: Metheun, **1982**], p. **267**, see also pp. **60-61**, **63**, **90**, **107**, **114-116**, **135-136**, **259-262**, **313**, **315-318**, **349-352**, **361**, **& 374**.

- 4. R. G. Johnson, "Climate Control Requires a Dam at the Strait of Gibraltar", Eos, 78: 27, July 8, 1997.
- 5. H. H. Lamb, ibid., p. 318.
- 6. Valentin F. Turchin, <u>The Phenomenon of Science: A Cybernetic Approach to Human Evolution</u>, [New York: Columbia University Press: 1977], pp. **101-105**.
- 7. The two major exceptions are the linear Faraday-Maxwell equations for "photonic", or Electro-Magnetic, Radiation [EMR], and the linear Schrödinger equation for atomic and sub-atomic "material particle" quantum mechanics. Issues raised by the apparent <u>non</u>-nonlinearity of the equations which describe the self-propagation of such "quanta" for the F.<u>E.D</u>. 'Reflexivity Paradigm' are addressed in the sequel. However, some preliminary indication of the content of that discussion can be provided here and now. The three following extracts concern the scientific need for a <u>nonlinear</u> basis for quantum mechanics:

Bart Kosko, Fuzzy Thinking: The New Science of Fuzzy Logic, Hyperion [New York, 1993], p. 107.

"Might the apparent randomness of quantum mechanics be fraudulent? Is it really deterministic chaos? Think of an atom as some kind of vibrating droplet of cosmic fluid. Radioactive atoms vibrate very energetically, and every so often a smaller drop can split off -- decay. The vibrations are so rapid that we can't measure them in detail: we can only measure averaged quantities, such as energy levels. Now, classical mechanics tells us that a drop of real fluid can vibrate chaotically. When it does so, its motion is deterministic, but unpredictable [unpredictable in practice, due to the limited accuracy of measuring apparatus, coupled with the large later divergences between two state-space trajectories that arise from different states / positions that are earlier too proximate in state-space for that measuring apparatus to distinguish those positions -- F.<u>E</u>.<u>D</u>.]. Occasionally, "at random", the vibrations conspire to split off a tiny droplet. The butterfly effect makes it impossible to say in advance just when the drop will split; but that event has precise statistical features, including a well-defined half-life. Could the apparently random decay of radioactive atoms be something similar, but on a microscopic scale? After all, why are there any statistical regularities at all? Are they traces of an underlying determinism? Where else can statistical regularities come from? Unfortunately, nobody has yet made this seductive idea work. ....."

Ian Stewart, Nature's Numbers: The Unreal Reality of Mathematics, Harper Collins [New York, 1995], pp. 125.

"Since the quantum theory was first formulated, the relationship of determinism to predictability and controllability has been clarified by the discovery that a very general class of deterministic systems [i.e. those [nonlinear systems -- F.<u>E.D.</u>] having unstable and chaotic motions] are neither predictable nor controllable . . ."

"Consider, for example, an atom emitting a quantum of light. We have two distinct states. [a] The atom in an excited state and no quantum present. And [b] the atom in its ground state and a quantum present."

"The process of going from [a] to [b] is said to be a 'quantum jump' in the sense that there are no phenomena that correspond to any state in between. Of course, we may try to find such phenomena by observing the system in its process of transition. But as implied in Bohr's views, this would constitute an entirely different experimental arrangement that would be incompatible with the process of transition that we are considering."

"From this however it does not follow that there is no more complete description perhaps at a deeper more complex level in which this process can be treated as continuous and analysable. One can indeed easily conceive of such a process in general terms. For example, the same kind of non-linear equations that give rise to unstable and chaotic motions can also lead to what are called stable limit cycles in which the system stays near a certain state of motion. But more generally this stability may be limited so that the system can 'jump' from one such limit cycle to another [e.g., called a "[self-]bifurcation" -- F.<u>E.D.</u>], in a movement so fast and unstable ["transient" -- F.<u>E.D.</u>] that it could be neither predicted, controlled, nor followed. Thus it would not appear in the phenomena. Indeed...our interpretation of quantum mechanics implies just such 'jumps' between what are in essence stable limit cycles. In this way one may explain processes that in the quantum theory are called "unpredictable, uncontrollable and indivisible quantum transitions between discrete orbits"....."

"An important part of de Broglie's early approach was to try to explain the assumptions underlying *the pilot wave interpretation* in terms of what he called the theory of the 'double solution'. This was based on the assumption of a nonlinear field equation which, in *linear approximation*, approached the ordinary [*linear --* F.<u>E.D</u>.]. Schrödinger equation. However, for *large amplitude* the *non-linearity* became *important*. He suggested that there would exist solutions which would correspond to a stable singularity or pulse when the amplitude was high and would gradually shade off into solutions of the linear Schrödinger equation at larger distances. The pulse would evidently correspond to the particle. ..."

"In our approach, it is this form which in-forms the energy of *the self-movement of the particle*. Therefore the key difference of our idea from that of de Broglie is that we do not attempt to explain the guidance relation in a simple mechanical way as *an effect of nonlinear propagation of fields*. Instead, we are appealing to the notion that *a particle has a rich and complex inner structure* which can respond to information and direct its *self-motion* accordingly."

David Bohm and B. J. Hiley, *The Undivided Universe: An Ontological Interpretation of Quantum Theory*, Routledge [New York, **1993**], pp. **25**, **39-40**.

The following two extracts describe aspects of the unexpected phenomenology of *nonlinear* ["coherent", or laser, and even 'nonlinear-incoherent' EMR [Electro-Magnetic Radiation]] "photonics" --

"Although people have always been fascinated by visual manifestations of *nonlinear wave phenomena*, such as *tsunamis* and *tidal waves*, the first scientifically documented report of a *self-trapped wave* did not come until 1834, when a Scottish scientist, John S. Russell, observed a "rounded, smooth and well-defined heap of water" propagating in a narrow and shallow canal "without change of form or diminution of speed" *The water was calm on both sides of this unusual wave*, and Russell noted that it had the form of a "*solitary elevation*"."

"Fifty years later, two Dutchmen, Diederik Johannes Korteweg and Gustave DeVries, realized that this phenomenon required an unusually large amplitude and that the medium must behave in a fundamentally different manner to waves of different amplitudes -- that is, its behavior must be nonlinear. In 1965, Norman Zabusky and Martin Kruskal realized that such localized pulses, or "wavepackets", maintain their identities even when they undergo collisions with each other, and that they conserve power and linear momentum. Zabusky and Kruskal concluded that these pulses behave like particles and named them solitons."

"In a manner similar to Russell's observation, the broadening of [*EMR* -- F.<u>E</u>.<u>D</u>.] pulses can be eliminated with *nonlinearity* in which the material properties [*of the transmitting medium* -- F.<u>E</u>.<u>D</u>.] change in the presence of light and can counteract dispersion or diffraction by what is termed light-induced lensing. The process eliminates the accumulated phase differences between the components composing the "pulse", thus allowing a non-diffracting, nondispersing beam to propagate. ..."

"The mathematical foundations of *solitons* pose a difficult theoretical challenge. However, the problem is soluble exactly in [1+1]D waveguides when the nonlinearity is due to weak symmetric anharmonicity in the polarization response of a medium to an applied optical field. ... This behavior is the optical Kerr effect, and it produces the self-lensing needed for spatial solitons. Following Michael Hircher's 1964 observation of the self-focusing of laser light, Raymond Chiao, Elsa Garmire and Charles Townes theorized that the nonlinear Schrödinger equation with a cubic potential governs [Note 'reificatory', subject/object 'invertive', cause/effect 'invertive' language here. A truer rendition?: "...is described, with a certain degree of 'homeomorphic defect', by..."-- F.E.D.] the phenomenon and that a beam propagating in [1+1]D Kerr medium can self-trap. Several years later, Vladimir E. Zakharov and Alexei Borisovich Shabat solved the full [1+1]D problem analytically using a method called inverse scattering. These nonlinear Schrödinger equation soliton solutions have properties that are unique to nonlinear dynamic systems. For example, upon collision, these solitons conserve power, velocity, and their number, and interactions among solitons are fully elastic [sounds rather '''billiard-ball particle-like''', no? -- F.E.D.]. ...."

"In the usual context, photorefractives are used to record volume holograms for applications such as optical data storage and phase conjugate mirrors. A soliton is a different animal: It entails *self-action* of a beam [instantiating what we call '*Self-Re-Fluxion*', 'modelable' by operatorial '*Self-Re-Fluxion*' -- F.<u>E.D</u>.] and is unrelated to holography..."

"Soliton physics appears to be evolving in a new direction toward a focus on what are termed <u>incoherent solitons</u>. Until 1995, all soliton experiments employed a coherent "pulse" -- that is, the phases were correlated across the beam [as in laser light --  $F.\underline{E}.\underline{D}$ .]. However, pulses [wavepackets] do not necessarily need to be coherent. For example, one can focus into a spot a beam from a natural source such as the Sun or an incandescent light bulb. Can such a beam self-trap in a nonlinear medium? In 1996, Mordechai Segev's group at Princeton University demonstrated self-trapping of beams in which the phase varied randomly in time and space across any plane intersecting the beam. Coherent interactions occur when the nonlinear medium responds instantaneously to interference effects between overlapping beams, through, for example, the optical Kerr effect or a quadratic nonlinearity. For slow nonlinearities, such as photorefractive or thermal ones, the relative phase between the interacting beams must be kept stationary for times longer than the medium's response time. For <u>in</u>-phase beams, the intensity and hence refractive index between the beams' induced waveguides are increased. This development attracts more light to the center, moving the solitons toward it, and so the solitons appear to attract each other. When the interacting beams are  $\pi$  [i.e., if measured in units of "radians", or **180°**, if measured in units of "degrees" -- F.<u>E.D.</u>] out of phase, they interfere destructively, reducing the index in the central region, and the solitons "repel"." "... the *self-induced* waveguides in saturable nonlinear media can guide more than one mode, giving rise to phenomena such as soliton *fusion*, *fission*, and *annihilation* [begins to be reminiscent of sub-atomic and sub-nuclear, "quantum" -- including matter/anti-matter "particle" -- phenomena, F.<u>E.D.</u>]. In 1992, S. Gatz and Joachim Herrmann at the Max Born Institute for *Nonlinear Optics* in Berlin found that solitons colliding coherently at shallow relative angles in a saturable nonlinearity can *fuse* together. Theorists Snyder and Adrian Sheppard subsequently showed that colliding solitons can undergo *fission* -- that is, *generate additional solitons* [à la collisional "shattering" and "scattering" of "quantum particles" in laboratory "particle accelerators", F.<u>E.D.</u>] -- or annihilate each other [à la "mutual annihilation" of "quantum" "particle / anti-particle pairs", F.<u>E.D.</u>]...."

"Solitons in [2+1] dimensions in saturable nonlinear media offer an opportunity to examine collisions of solitons with *three-dimensional trajectories*. Solitons launched individually move in their initial trajectories. If they are launched simultaneously so that their *attraction* balances the centrifugal force due to rotation, *the solitons can capture each other into orbit and spiral about each other like celestial objects or moving charged particles do*. This effect, suggested first in the context of *coherent* collisions, has recently been demonstrated . . . by employing *in*coherent collision between photorefractive solitons. When the *initial distance between the solitons is increased, the solitons' trajectories <u>bend</u> slightly toward each other [an instance of 'hybrid-action', or <i>int<u>er</u>*-action', which we describe via the term '*flexion*' -- **F**.*E*.*D*.], but their relative velocity is too large to form a bound pair. Conversely, if their separation is too small, they spiral in a *converging orbit* and eventually *fuse*. Spiraling fusion effects have also been observed by Barry Luther-Davies and his coworkers at the Australian National University. . . ."

"In self-<u>defocusing</u> media, for example, solitons take on the form of vortices in [2+1] dimensions [cf. the ubiquitous **3-D** toroidal-vortical or cyclonic flow-form as a 'self-re-fluxive' flow-form, a form of 'self-[re-]fluxion', 'modelable' via operatorial 'self-[re-]flexion' --  $F.\underline{E}.\underline{D}$ .] or dark stripes in [1+1] dimensions. [2+1]D waveguides feature vortices and [1+1]D waveguides carry dark solitons, which are linear voids borne on uniform beams. Another important topic consists of multi-component solitons, in which several electric-field components participate in the self-trapping process, by jointly creating an induced waveguide and guiding themselves in it [exemplifying 'self-[re-]fluxion', 'modelable' via ideographic-model operatorial 'self-[re-]flexion' --  $F.\underline{E}.\underline{D}$ .]."

Mordechai Segev, George Stegeman, "Self-Trapping of Optical Beams: Spatial Solitons", *Physics Today*, August **1998**, pp. **42-44**; **45-47**.

"Fully three-dimensional light pulse propagation in bulk media with group velocity dispersion, is <u>governed</u> [Note 'reificatory', subject/object 'invertive', cause/effect 'invertive' language here. A truer rendition would be: "...is <u>described</u>, with a certain degree of homeomorphic defect, by..." -- F.<u>E.D.</u>] by the generalised nonlinear Schrödinger equation [GNLSE] of space and time, taking the dimensionless form:

#### $iu_z + [1/2][u_{xx} + u_{yy} + u_{tt}] \pm f[1 = |u^2|]u = 0$

[the cubically <u>nonlinear</u> term, which makes the whole equation <u>nonlinear</u>, is indicated in bold italics --  $F.\underline{E}.\underline{D}$ .] where u represents the normalized complex amplitude envelope of the electric field, x, y are the re-scaled transverse coordinates, t is the group velocity retarded time, and f[l] is a function proportional to the intensity-dependence of the <u>nonlinear</u> refractive index change, the "+" corresponds to self-focusing and "-" to self-defocusing <u>nonlinear</u> media..." ["complex amplitude" above refers to amplitude values belonging not just to the so-called "Real" numbers, but to their «aufheben» ""conservative extention"", in the sense of the so-called "Complex" numbers, of the form **ar + bi**, wherein **r = +1** and **i** denotes a 'quantifiable operatorial <u>qualifier</u>', the so-called "imaginary" unit, the square root of +1 - F.<u>E.D</u>.]. Despite the wealth of investigation into properties of the [1+1]D NLSE and its solutions, it is only relatively recently that the higher dimensional forms of the NLSE and the GNLSE [i.e., non-Kerr nonlinearity] have become more intensively studied. This is the result of a certain analytic intractability inherent in these extended forms of the NLSE, combined with a proliferation of powerful computing resources, enabling the recalcitrant equations to be overcome through brute-force numerical methods."

Barry Luther-Davies, "Non-Dispersing, Non-Diffracting Propagation of Light for Three-Dimensional Photonic Applications", http://laserpark.anu.edu.au/~jay111/proposal.html [Australian National University, 1997].

8. In October of 1993, Jay Rockefeller, Chairman of the U. S. Senate Subcommittee on Science, Technology, and Space, publicly announced his family's, and their government's, crackdown on U.S. government support to advanced physics, just as a parallel but far deeper collapse of physics -- and of scientific activity and infrastructure in general -- was being imposed by them upon the Republic of Russia, in the manner of a feudal lord of old, barking out decrees to his serfs : "Addressing the National Academy of Engineering in Washington, D. C., on October 7, [1993], Rockefeller said that ... Congress has begun a push for the redirection of federal science and technology, and the administration is moving in the same direction ... Referring specifically to scientific research, Rockefeller noted that "Congress is making clear that the old era is over," and recent Congressional action attests to this reality. The killing of the Superconducting Super Collider and the Senate appropriations committee report calling for more strategic research at the National Science Foundation illustrate the shift in spending priorities. This shift means that nuclear physics is becoming less important, and areas such as manufacturing engineering, materials science, and biotechnology will receive higher priority. Rockefeller disputed the perceptions of many members of the scientific community that Congress is criticizing basic research ..."

"According to Rockefeller, the report was not a proposal to convert universities into applied research centers. "Rather,... the Senate is telling universities to do more... basic research in the national priority areas identified by the Federal Coordinating Council on Science, Engineering, and Technology, which are currently high-performance computing, advanced materials, manufacturing research and education, biotechnology, and global change [ ■ euphemism for "global warming" hysteria-promotion "research" ■ - F.<u>E.D.</u>]. ... "I will urge NASA to do more to help this country's technological and environmental needs"."

"Rockefeller sees the Senate appropriations bill as offering a *social contract* to the research community: more strategic research will mean more funding. Otherwise, extra federal research money will go to NIST [National Institute of Standards and Technology]... Rockefeller was also a cosponsor of the National Competitiveness Act of 1993 [S4]... The bill calls for increasing appropriations to NIST, which now plays a lead role in civilian research ... Rockefeller said that in the future his subcommittee will continue to reshape existing agencies ....".

S. B. Mockler, "Rockefeller Describes New Era in Science and Technology Policy", *Eos*, **74**: **48**, November **30**, **1993**, pp. **569-570**.

More recently, a considerable portion of the physics 'human capital' resources of the U.S. have been diverted to Wall Street, to the calculation-intensive design of purportedly "zero-risk" transaction-specific hedges, using variations of the physics-inspired, Nobel-price-winning Black-Scholes asset valuation model for the valuation of "derivatives", that is, for the formation of various kinds of 'transient', 'ephemeral', or 'fictitious' paper capital, not backed up by any incrementation of physical-wealth production. "Risk management" is the ostensible purpose of these operations. However, some would argue that speculative "risk creation" or "risk exacerbation" is the actual result of this activity, given the extreme volatility typical of many "derivative" 'meta-securities' instruments. They would cite the case of Long Term Capital Management L. P. as a case in point, where activity involving the very formulators of the Black-Scholes model themselves nearly collapsed the global financial system. Later, after the preceding paragraph was first formulated, circa **1999**, related – "CDO", "SIV", "MBS", etc. – 'meta-securities' machinations did succeed in collapsing the global economy, precipitating, circa **2007+**, the worst crisis of global contracted human social reproduction since the similarly orchestrated "Great Depression".

"Failed Wizards of Wall Street", Business Week, **21** September **1998**, pp. **114-120**.; "How Long-Term Rocked Stocks, Too", Business Week, **09** November **1998**, pp. **160-162**.

- 9. G. N. Watson, A Treatise on the Theory of Bessel Functions, Second Edition, [Cambridge, UK: 1966], p. 111.
- Charles Saunders Peirce, <u>Collected Papers</u>, Volume I., Principles of Philosophy, [Harvard University Press, Belknap Press, Cambridge, MA, USA: 1974], Paragraph # 409, p. 223-224.