

Chrono-Empiricism --

Encyclopedia Dialectica's New, Higher Standard of Scientific Empiricism

by Aoristos Dyosphainthos

Author's Preface. The purpose of this third Vignette in the F.E.D. Vignettes series is to make public, for the first time, one of the key, higher-scientific principles that have guided the research efforts of *the Seldon Project* since its inception. In this case, that principle is '*The Principle of Chrono-Empiricism*'.

A Note about Notation. The Encyclopedia Dialectica notation and notational conventions, employed throughout this vignette, are described in the five '*.jpg' images, reachable via the following link --

<http://www.dialectics.org/dialectics/Welcome.html>

-- by clicking on the **09/30/2011** links marked "1st Module" and "2nd Module", on the **10/01/2011** link marked "1st Module", and on the **07/14/2012** links marked "1st Module" and "2nd Module", in the **Prefatories Series** section on that Home Page.

Background. The Encyclopedia Dialectica [E.D.] 'Dialectical Theory of Everything' -- our theory of the Universe/maximal Totality -- and the E.D. 'sub-theories' of this Universe's 'sub-universes', are all suffused with a pervasive '*Principle of Irrepeatability*'. This principle may be formulated as follows: '*Absolute, exact 're-petition' of events / actions -- or absolutely "circular" 'cyclicity' -- is impossible, because any 'second -petition' must occur in an environment already altered by -- already partly the result of -- 'first -petition', and so the consequences of 'second -petition' must, in part, be different from the consequences of 'first -petition'.*'

This principle holds that there exists, for this Universe, an ineluctably cumulative aspect to all physical existence/action/process: '*Entities/events/"eventities"' cannot be purely "circular" or "cyclical", but must always exhibit some measurable degree of "'spirality"' or "'helicity"'.*' Definition of the "'eventity'" concept applied herein is available by clicking on the link for that word on the www.dialectics.org website's **Glossary Page** -- <http://www.dialectics.org/dialectics/Glossary.html>

This '*Principle of Irrepeatability*', stated above by way of the 'negatory' or 'denialatory' term 'ir-repeatability', can also be re-stated via a 'posit-ory' or 'affirmatory' **term**: '*Distinct "'eventities"'*, as such, may be similar to one another, but they cannot be identical to one another.'

This '*Principle of Similarity*' means that any "two" "'eventities"' in the Universe -- i.e., if they are really "two", not really just "one" -- logically cannot be "one" in the sense of being "identical" -- entirely the same -- since, at absolute minimum, they are different by virtue of occurring in / at different positions in / of space / time / space-time.

This principle is thus one which **affirms** similarity, but **denies** 'identicality', as a relation which can prevail between "different" «monads», or units, of the same «arithmos». This principle is also one which **denies** the entire '*Principle of Identicality*' which is implicit, and endemic, in much of that part of today's scientific reasoning which is vitiated by '*The Modern Ideology*'.

This *'Principle of Similarity'* applies even to the supposed "quanta", or "quantum particles", of linear Schrödinger Equation "Quantum Mechanics". E.g., any "two" «*monads*» of the cosmological "photons" «*arithmos*»; any "two" «*monads*» of the cosmological "electrons" «*arithmos*», although each pair, respectively, is universally in a mutual relation of "similarity", can never be universally in a mutual relation of "identity"; can never be entirely the same and indistinguishable: to be "two", "different", "distinct", "particles", they will have to have *different* histories of *interaction*, i.e., *different* histories of "quantum entanglement", different [e.g., non-local] "correlations".

Seen in a larger, more *general* context, the universal *'Principle of Irrepeatability'* / *'Principle of Non-Identity'* / *'Principle of Similarity'* is a «*species*» of the *E.D.* universal *'Principle of Meta-Fractality'*.

The usual mathematical concept of a *'fractal'* envisions a static, synchronic, 'spatial' [e.g., **2-D** "geometrical"], hyper-idealized self-similarity structure, with an "actually infinite" regress of ever-diminishing size-scales -- e.g., of length-scales, of area-scales, of volume-scales, etc.

The *E.D.* concept of *'meta-fractality'* encompasses also realistic, actually-observed, or actually-constructible, including *'meta-finite'* similarity regresses.

These include synchronic-slice similarity regresses with 'qualitative scaling' [in terms of *qualitative* determinatenesses] -- *'qualo-fractals'* -- as well as with "quantitative scaling" [thus, taken as a whole, as a "unity", with *'qualo-quantitative'* scaling].

They also include «*species*» of *diachronic*, *chronological*, "longitudinal" *'meta-fractals'* in which "temporal acceleration" is an aspect of *'qualo-quanto-fractal'* diachronic scaling', as well as synchronic, diachronic, and 'diachronico-synchronic' sub-«*species*» of the «*species*» of *'qualo-quanto-fractals'*, for which the scaling 'moment' of the «*genos*» of *'meta-fractality'* is relaxed, at least in regard to *quantitative*, **3-D** physical-spatial "size" [e.g., in terms of the *u* dimensional-dialectical arithmetic, to the $|V| = |L|^{+3} = \text{cm.}^{+3} = \frac{\hat{0}}{\underline{+3}} \hat{3}$ dimensional *unit* / *'metrical unit-qualifier'*]. For example, an adult human person is *self-similar*, rather than *self-identical*, through time, not exhibiting much size-scaling [post-adulthood; post-maturity/post-majority].

The *'ontological-categorical progressions'* generated by *E.D.* Dyadic Seldon Function dialectical 'meta-models' of *'physio-onto-dynamics'* generally both instantiate, and model, 'diachronico-synchronic', *temporal-acceleration*-exhibiting, *'meta-finite meta-fractals'*, in the form of *'qualo-quanto-fractals'*.

The *'meta-finite'* character of all of these *'meta-fractal'* «*species*» -- meaning that they may encompass *qualitative*, *ontological* change/expansion between their pairs of scales, but that their scale-regresses *remain finite* in scales-count -- is in alignment with *E.D.*'s *'Principle of Metafiniteness'*, which asserts that *'Infinity is non-actual.'*, i.e., that *'Infinities are empirically unmanifest in this universe.'*

The *generic* *'Principle of Irrepeatability'* has a *specific* corollary, the *'Principle of Historical Irreversibility'*. That is, not only is it impossible to exactly repeat "eventities" in the forward sense of time, relative to past-occurring "eventities", but, likewise, it is impossible to "run time in reverse": to exactly repeat past "event[ities]" in reverse chronological order.

Unfortunately, "time reversibility symmetry" is a *contra-experiential*, *non-objective*, *contra-empirical*, and therefore *'contra-scientific'* feature exhibited by many of the supposedly reality-modeling equations of Standard modern Physics.

If a model of a deterministic process, or dynamic, is *time reversible*, then the *time-reversed*, *'ana-chronic'*, *'anti-temporal'* process -- as [falsely] modeled by that model -- satisfies the same model equation as the true, 'pro-verse', 'pro-time', 'pro-chronological', *actually-observed* process. This model-behavior constitutes a form of model-equations *unrealism*, or *'homeomorphic defect'*, also known as "time-reversible dynamics".

“**Time reversible dynamics**” means, in general, that the model equations are “symmetric” -- “invariant” -- under a change in the sign of **t** -- the “time variable”, as “universal independent variable” -- from **+t** to **-t**.

The model-equations of classical mechanics, for example, and of classical optics, are “**time-reversible**”. Contemporary Quantum Mechanics is not quite “**time-reversible**”, exhibiting, instead, a richer symmetry, called “**Charge-Parity-Time Symmetry**”, or “**CPT Symmetry**”, for short -- a symmetry which is deeply-related to Lorentz Invariance [cf., for example, *Wikipedia* entries on “Time reversibility” and “CPT symmetry” --

http://en.wikipedia.org/wiki/Time_reversibility http://en.wikipedia.org/wiki/CPT_symmetry].

When an **Encyclopedia Dialectica** ‘dialectical definition-equation’, which constitutes that encyclopedia’s definition for a given dialectical ‘**nature**-al’ progression, is supplied with a negative temporal argument -- a minus-signed parameter-value, such as the value $\tau = -1$ -- for **E.D.**’s **NQ** dialectical ‘meta-model’ of the “**meta-evolution**” of the **cosmological totality** --

$$\langle \downarrow_{\nu}^1 \rangle_{\tau_{\nu}=-1} = \langle \downarrow_{\nu}^1 \rangle^{2^{-1}} = \langle \downarrow_{\nu}^1 \rangle^{1/2} = \sqrt{\downarrow_{\nu}^1}$$

-- this means that the «**arché**» of that progression, in this case \downarrow_{ν}^1 , denoting that **primordial** cosmological «**arithmos**» which has sub-**n**uclear “particles” as its «**monads**», is “raised” to the “power” $2^{-1} = 1/2$, i.e., that taking the “square-root” of the «**arché**» **q**ualifier, $\downarrow_{\nu}^1 \mapsto \mathbb{Q}_1$, is indicated. The resulting generic equation --

$$\langle \downarrow_{\nu}^1 \rangle^{1/2} = \sqrt{\downarrow_{\nu}^1} \mapsto \mathbb{Q}_1^{1/2} = \sqrt{\mathbb{Q}_1}$$

-- constitutes an **unsolvable equation** within the “Gödelian incompleteness” of the axioms-system of the **NQ** dialectical arithmetic [for any version thereof which uses an “**evolute**” **product rule** for its Axiom **§9**; only the ‘**meta-heterosis convolute product rule**’ would render square-root taking possible in its version of **NQ**, but still **not** in this case; still **not** in the case of the «**arché**», $\mapsto \mathbb{Q}_1$].

Square roots **can** be meaningfully taken for **NQ un**interpreted, generic arithmetical values, and for **interpreted, applied**, algebraic values, e.g., for/of the ‘multi-**q**ualifier cumula’ that result from $\tau > 0$ values of such **Dyadic Seldon Function** dialectical ‘**meta-models**’. They yield their immediate-predecessor epoch’s cumulum as the value of their square-root, e.g. --

$$\sqrt{\langle \downarrow_{\nu}^1 \rangle^{2^{+1}}} = \sqrt{\langle \downarrow_{\nu}^1 \oplus \downarrow_{\nu}^1 \rangle^{+1}} = \downarrow_{\nu}^1 \mapsto \sqrt{\mathbb{Q}_1^2} = \sqrt{\mathbb{Q}_1 \boxplus \mathbb{Q}_1} = \mathbb{Q}_1$$

However, such values do **not** arise for **any** minus-signed value of a $\tau \in \mathbf{Z}$ epoch-parameter / temporal independent variable of a **Dyadic Seldon Function**.

Instead, the epochal-time values $\tau = -2$, $\tau = -3$, $\tau = -4$, etc., result, respectively, in the $(1/4)^{\text{th}}$ power (or the 4^{th} root) of the «**arché**» **q**ualifier, in the $(1/8)^{\text{th}}$ power (or 8^{th} root) of the «**arché**» **q**ualifier, and in the $(1/16)^{\text{th}}$ power (or 16^{th} root) of the «**arché**» **q**ualifier, etc., which are, again, values which do **not** exist in the **NQ** number-space. Therefore, **Dyadic Seldon Function**, dialectical ‘meta-model’ equations written in the language of the **NQ** dialectical ideography, do not support the “**time reversibility symmetry**” which compromises the scientific, empirical fitness of so many of the “natural law” equations of Standard modern Physics.

Definition. The meaning(s) of the term '**chrono-empiricism**' is (are) also known, within **F.E.D.**, by the 'syno-names' '**time-empiricism**', '**temporal empiricism**', and '**historical empiricism**'.

These words / phrases name the new, higher standard of scientific empiricism offered by **E.D.**, as an included moment of its Marxian paradigm of '**psychohistorical materialism**'.

That paradigm centrally includes the view that the human phenome, human memes, human "ideas" in general, are "idea-**matter**" -- that they are "**material**", **inter-subjectively objective**, and **causative** moments in the social self-production and self-**re**-production of human societies; in the self-production of human [**psycho**]history, and in the historical interaction of the planetary[⊕] **patch** of '**human[-ized] nature**'; of '**humanity's laborious self-objectification in nature**', enveloped, from without *and from within*, by enviroing **extra-human nature**.

The principle of '**chrono-empiricism**' holds that scientific theories that abstract from natural history; that embody only '**natural-historical genericity**'; that fail the test of "'**natural-historical specificity**'" [cf. Marx]; that offer only "'**supra-historical**'" categories, or '**meta-temporal summarizations**', and which exhibit the "**time reversibility symmetry**", e.g., in their mathematical models, represent an insufficient degree of fitness to the **historical content** -- to the **temporal ordinality content** -- of the scientific, empirical data of objective nature. In short, such models **fail to fit the temporal data of nature**.

An example of a mathematical model exhibiting the "'**supra-historical**'", 'historically abstract' -- *abstracting from natural history* -- 'meta-temporal summarization' characteristic is the "black body" **Temperature/Radius /- Luminosity** relation, asserted as an approximate "model" of stellar evolution: $L = 4\pi R^2 \sigma T^4$. As presented, this mathematical, purely-quantitative relation represents a **dis**-ordered -- 'de-ordinalized', 'de-temporalized', and 'de-historicized' -- essentially **random set** of **Luminosity** values, some of which may arise for combinations of **Radius** and **Temperature** values actually encountered in the historical self-development of various classes of stars, but providing no indication as to which **{<L, R, T>}** values those are, or in what temporal-ordinal -- historical -- sequence those values actually occur per empirical observation/reconstruction. A partial fixing of such sub-empirical historical abstractness might be by a model $L(c,m,t) = 4\pi R(c,m,t)^2 \sigma T(c,m,t)^4$, which *modeled the actual timed trajectory* of the **L(c,m,t)** "dependent variable" as a function of those of the **R(c,m,t)** and **T(c,m,t)** "independent variables", with all three being functions of **time**, of stellar **mass** [including of *birth-mass*], and of stellar **composition** [including of *birth-composition*], i.e., in terms of star type/class/«**species**».

That is, this principle holds that truly scientific theories must, as part of their most central explanatory content, "'**reproduce the temporal data**'" of the actual historical "'**order of appearance**'" [cf. Chardin] of the different «**gene**» and «**species**», etc., of «**monads**» that constitute the multiple 'physio-ontological', and/or 'ideo-ontological', categories, or «**arithmoi**» -- the '**kinds** of "'**numbers**'" [of «**monads**»/units] -- that they invoke, as this **order of emergence** is reconstructed, from the data effectively "materially recorded", in human "'**historical present-presents**'", by/from "'**historical past-presents**'", human and pre-human.

The **E.D.** principle of '**chrono-empiricism**' holds that scientific theories must model and explain the **necessary** "'**temporal ordinality**'", or "'**historical logic**'" -- the "'**what follows from what, and why**'" -- of the [**qualo**-Peanic] sequence, or '**consecuum**' -- of the **succession** and, more accurately, of the dialectical **progression** -- of events, of "'**eventities**'", of '**kinds of being/becoming**', that constitute objective, empirical **nature as inherently temporal**, as **inherently dynamical**, as '**nature-al history**': that constitute the very empirical content of "'**concrete duration**'" [cf. Bergson]; of **concrete** "'**time**'".

Thus, the **E.D.** ‘taxonomy level three’ [3_h] within the 1_h ‘ideo-ontology’ of [cf. Marx] ‘*The Psychohistorical Equation of Human Ideology/Knowledge Meta-Evolution*’, $^3_h \text{---} | \text{---} \tau_K \uparrow = \langle ^3_h \underline{M}_K \rangle^{2^{\tau_K} \uparrow}$, **generates** the following “‘order of appearance’” of «ideo-gene» of human[oid] ideology/human[oid] Knowledge forms -- [reconstructed past ‘epochalities’]:

$^3_h \underline{M} = ^3_h \underline{M}_K \leftrightarrow$ **Mythopoeias**, “Myth-makings”; “Mythologies” $\xrightarrow{\square_{L1}}$ $^3_h \underline{R} = ^3_h \underline{R}^K \leftrightarrow$ **Religions**,
codified/standardized/dogmatized ‘**Meta-Mythopoeias**’ $\xrightarrow{\square_{L2}}$ $^3_h \underline{RM} \leftrightarrow$ reconciliations of $^3_h \underline{R}^K$ &
 $^3_h \underline{M}_K$ / conversions from $^3_h \underline{M}_K$ into $^3_h \underline{R}^K$, e.g., Ancient Rome’s Pantheon $\xrightarrow{\square_{L3}}$ $^3_h \underline{P} = ^3_h \underline{P}^K \leftrightarrow$
Philosophies, i.e., ‘**Meta-Religions**’ $\xrightarrow{\square_{L4}}$; ...; $^3_h \underline{PR} \leftrightarrow ^3_h \underline{R}^K | ^3_h \underline{P}^K$ reconciliations, even including
 $^3_h \underline{RP}^K$ **retrograde** $^3_h \underline{P}^K$ into $^3_h \underline{R}^K$ conversions, e.g., Aquinas’ *Summa Theologica* $\xrightarrow{\square_{L6}}$; ...; $^3_h \underline{K} = ^3_h \underline{K}^K$
 \leftrightarrow **Scientific Knowledges**, i.e., ‘**Meta-Philosophies**’ $\xrightarrow{\square_{L8}}$;

[‘pre-constructed’/predicted next epoch]: $^3_h \underline{\Psi}^K = ^3_h \underline{\Psi}^K \leftrightarrow$ **Psychohistories**, i.e., ‘**Meta-Sciences**’
 $\xrightarrow{\square_{L16}}$; ...

All of these ‘meta-model’ dialectical equations of **Universe**, and/or of **sub-Universe(s)**, “‘meta-evolution’”, are “‘time-irreversible’” -- are **unsolvable** for negative values of their τ epochal-time parameters / independent variables. They thus exhibit “‘time reversal **asymmetry**’”, or ‘**temporal directionality / relative anisotropy**’.

Hence they do **not** exhibit “‘time reversal symmetry’”, or support the **contra-empirical, contra-scientific, ‘modern-ideological’ defects** of “‘time reversibility’”, or other forms of **neo-Parmenidean** “‘time-less-ness’”.