An Introduction to '*Metafinite Singularity*'

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Author's Preface. The purpose of **F**.**E**.**D**. Vignette **#17** is to present a readily accessible illustration of the *generic* phenomenology that **F**.**E**.**D**. conceptualizes under its special term '*metafinite singularity*'.

***A Note about the On-Line Availability of Definitions of* F**.**E**.**D**. *Key Technical Terms*. Definitions of **Encyclopedia Dialectica** technical terms, including of **E**.**D**. 'neologia', are available on-line via the following URLs --

http://www.dialectics.org/dialectics/Glossary.html

https://www.point-of-departure.org/Point-Of-Departure/ClarificationsArchive/ClarificationsArchive.htm

-- by clicking on the links associated with each such term, listed, in alphabetic order, on the web-pages linked-to above.

Links to definitions of the **Encyclopedia Dialectica** special terms most fundamental to this vignette are as follows --

«*aufheben*»
https://www.point-of-departure.org/Point-Of-Departure/ClarificationsArchive/Aufheben/Aufheben.htm

Historical or *Diachronic* *Dialectics*
http://point-of-departure.org/Point-Of-Departure/ClarificationsArchive/HistoricalDialectics/HistoricalDialectics.htm

$_N$**Q** *dialectical* *arithmetic / algebra*
http://www.dialectics.org/dialectics/Correspondence_files/Letter17-06JUN2009.pdf

-- and we plan to expand these definitions resources as the **Encyclopedia Dialectica Dictionary Project** unfolds.

[**Note**: '''Arithmetical Quantifiers''' vs. 'Arithmetical Qualifiers'. In the phrase "**3** apples", we term "**3**" the "arithmetical ["pure"-]*quant*ifier", and "apples" the '''*ontological*''' -- or *kind* of thing -- '''*qual*ifier'''. In the phrase "**3** pounds of apples", we term "pounds" the '*metrical*[-unit] *qual*ifier' -- or '''unit of measure *qual*ifier''' -- *quant*ified by the **3**, which, together, '*quanto*-*qual*i*fy*' the '*ontological qual*ifier', "apples". A key use-value of the *dialectical arithmetics* is to provide algorithmic, ideographical-symbolic systems for the various kinds of 'arithmetical *qual*ifiers', both with and without the co-presence of '''arithmetical *quant*ifiers'''.].

In a blog-entry recently, I wrote as follows regarding the *'metafinite singularity* meta-dynamics' of 'ontological revolutions', i.e., of '''meta-evolutions''' [re-edited re-print] --

" "**crisis**" *dialectic* -- a '''meta-evolutionary''' crisis, or 'ontological *rev*olution', forms the boundary between one epoch of '''evolution''' and the next, and involves the irruption of "new ontology" -- of new kinds of being. Such is central to the **F**.*E*.*D*. account of [*physio-* and *psycho*]*historical* *dialectic*.

Per **F**.*E*.*D*., such 'ontological revolutions', or 'meta*finite singularities'* [***not*** *fictitious*, "quantitatively *infinite"* singularities, *à la* '''***un*** qualified''', "purely-***quant***itative" nonlinear differential equations, when a division by zero arises therein, as of a finite value of their time-parameter, **t**, in their differential coefficients, and/or in their solution-functions, but, ***on the contrast***, *realistic*, *'finite singularities'*, involving the irruption of ***qual***itative change in the form of new ontology] come in two basic types, those which we call *'resonance singularities'*, and those which we call *'conversion singularities'*.

- *'Resonance singularities'* [i.e., *'self-conversion singularities'*, or *'auto-conversion singularities'*] are exemplified, in the *'physio-dialectics'* of pre-human and extra-human Nature, by, for one, **"cosmological nucleosynthesis"**, induced when early pre-nuclear "particles" cross a certain energy-density threshold in the early cosmos -- when physical-spatially concentrated pre-nuclear "particles", e.g., "gluons" and "quarks", irrupt into the formation of the new, cosmologically unprecedented ontology of the first-ever atomic nuclei, e.g., Helium ions, **He**++;

- *'Resonance singularities'* are exemplified, in the *'psycheo-dialectics'* of human Nature, by, for one, irruptions of previously unprecedented new 'socio-ontology' in the form of the 'meme-etic', psychophysical existence of Capital-value as a new social relation of production [Marx], from a sufficient social 'densification' and concentration of the Money-value-mediated circulation of Commodity-value, which arises when a certain threshold in the growth of the social forces of production [Marx] is crossed, and which begins the '''***formal subsumption'''***, by the Capital 'socio-ontology', of its predecessor, Money and Commodity, exchange-value 'socio-ontology'.

- *'Resonance singularities'* characterize the *'self-«**aufheben**»'* processes of the generation, by a natural '''eventity''', of its own supplementary "other", e.g., via a process of *'self-«**aufheben**»* meta-***unit***-ization'.

- *'Conversion singularities'* [i.e., *'hetero-conversion singularities'*, or *'allo-conversion singularities'*]are exemplified, in the *'physio-dialectics'* of pre-human and extra-human Nature, by *the crises of* **"stellar nucleosynthesis"**. A "star" is a "hybrid" formation -- an 'ontological conversion-formation' -- that converts the ontology of stellar-core pre-nuclear "particles", e.g., of plasma protons ["Hydrogen ions", **H**+], into the new, next 'meta-ontology' of atomic nuclei, i.e., of plasma Helium ions ["alpha particles", **He**++]. Helium is the "ash" -- the 'relative entropy' -- of stellar Hydrogen fusion. When the Hydrogen in the core of a "main sequence" star is exhausted -- essentially completely converted into Helium -- then stellar nucleosynthesis in the stellar core ceases, and the star resumes catastrophic self-gravitational self-implosion, until the density/temperature of the core Helium becomes sufficient for the "Helium flash" to ignite Helium fusion in the stellar core -- a next ontological 'stellar ***rev***olution' forming the transition between/bounding two successive epochs of "stellar evolutions", that of Hydrogen fusion followed by the of Helium fusion, in which the star drives itself off of the stellar "main sequence", in a 'stellar ***meta***-evolution', and drastically changes its dynamics: the ash, the 'relative entropy' of Helium, turns into its opposite, fuel -- into a new free-energy resource -- and fusion-"burning" of Helium yields the new ontology of yet-higher species of atomic nuclei.

- *'Conversion singularities'* are exemplified, in the *'psycheo-dialectics'* of human Nature -- of human-natural history -- by the transition from the *'''formal subsumption'''*, by the Capital-value social-relation-of-production 'socio-ontology', of previously-emerged 'socio-ontology' of the Money-value relation-of-production, and of the Commodity-value relation-of-production, to the *'''real subsumption'''*, by the 'socio-ontological' *conversion* of more and more Money-values and Commodity-values into "Money-***Capital***" and into "Commodity-***Capital***", respectively [Marx, ***Capital***, ***volume II***.].

- *'Conversion singularities'* characterize the *'other-«aufheben»'*, *'hetero-«aufheben»'*, *'allo-«aufheben»'*, *«aufheben»*-conversion of some of the remaining ontology / 'onto-mass' of the immediate-predecessor 'self-hybrid onto' *'''eventity'''* into the ontology of the 'supplementary other' 'self-hybrid onto' that this *'''eventity'''* has generated from out of itself, inside a formation which instantiates the third, 'hybrid of [it]self and of its self-generated, supplementary other' components of the triad of components: '''''category''''', 'contra-category', and 'uni-category'.**"**

My purpose in the present vignette is to illustrate the crucial **F**.**E**.**D**. concept of *'metafinite singularity'* by an ultra-simple example, by an example from the -- more readily humanly accessible -- human-cognitive domain, not from the physical domain, from which most previous examples were drawn [see http://www.dialectics.org/dialectics/Primer_files/3_F.E.D.%20Intro.%20Letter,%20Supplement%20A-1_OCR.pdf pp. 7-14], and by one which unifies the Seldonian concepts of 'densification-driven *metafinite resonance singularity'*, of 'meta-monadization', of '[ideo-]onto-dynamasis', and of divisions-by-zero, as signifying a **2-D**, cognitive/visual version of the crisis-threshold of **3-D** critical physical density.

The domain of discourse for this example is a system of 'numeralic' syntactico-semantical 'ideo-ontology' -- indeed, a system of written arithmetic -- that has ancient roots: the system of the "Roman Numerals".

Broadly similar, systematic, presentational 'ideo-dynamics' and 'ideo-meta-dynamics' obtain for other ancient systems of numerical notation, all from the history of arithmetics prior to the Human-Phenomically revolutionary advent of the Hindu-Arabic system of 'numeralic' notation.

Suppose that the ancient 'ideo-architect(s)' of the "Roman Numerals" system held a view that the semantic **o**bscurity per **n**umeral, to visual '''"uptake"''' by their users, grows rapidly with juxtapositional repetition -- i.e., with **2-D** textual, and cognitive/visual, '''"density"''' -- of such numerals, and becomes '''"critical"''' after **3** such repetitions, i.e., with **4** consecutive repetitions.

More specifically, such **o**bscurity is least with a single, non-repeated occurrence of a numeral, e.g., '**I**', increases by its single consecutive, juxtapositional repetition, e.g., '**II**', worsens further with its double repetition, e.g., '**III**', rises to a '''"critical"''' level at its triple repetition, e.g., '**IIII**', and becomes/remains '''"super-critical"''' at quadruple repetition or more, e.g., '**IIIII**...'.

We can form a crude metric function for this alleged human-cognitive phenomenon as follows:

m₅(·) ≝ obscurity per **n**umeral of expression, **using the parameter-value 5 ≝**

(5/(5 – # of occurrences of same numeral**)) × [o°/n°]** [using the sign '≝' to signify 'is equal to ***by definition***'].

Note that we are '''*qual*ifying''' the otherwise "pure *quant*ity" enclosed in 'curvaceous parentheses', **(...)**, by a ratio of 'metrical *qual*ifiers' -- of '''metrical *units*''' -- enclosed in "square brackets", **[o°/n°]**, by way of 'non-amalgamatively' multiplying former by latter.

This '*qual*ification' will be important to determining the '''super-critical''' value of this metric.

The "degree sign" superscripts, '°', that form part of each of the metrical *unit qual*ifiers, **o°** and **n°**, are to signify that these 'metrical *unit qual*ifiers' are '*quantifiable qualifiers*', i.e., that these *units* can be expressed in multiples and in fractions thereof, e.g., per the *quant*itative value of their 'metrical *quant*ifier', or '''"coefficient'''': '**(5/(5 – #** of occurrences of same numeral**))**'.

Let us therefore see what happens when we apply this metric to various **2-D** textual, cognitive/-visual 'repetition-densities' of the Roman Numeral '**I**' --

$\underline{m}_5$('I') =   (5/(5 – 1)) × [o°/n°] = 5o°/4n° = (1 1/4)[o°/n°];

$\underline{m}_5$('II') =   (5/(5 – 2)) × [o°/n°] = 5o°/3n° = (1 2/3)[o°/n°];

$\underline{m}_5$('III') = (5/(5 – 3)) × [o°/n°] = 5o°/2n° = (2 1/2)[o°/n°];

$\underline{m}_5$('IIII') = (5/(5 – 4)) × [o°/n°] = 5o°/1n° = (5)[o°/n°];

$\underline{m}_5$('IIIII') = (5/(5 – 5)) × [o°/n°] = 5o°/0n° ≝ 5o°/ ⬤ = ⬤.

-- a monotonically mounting amount of '**o**bscurity per **n**umeral' as numeral occurrence count mounts.

0-division *"singularity"* arises in our metric function at the **5** count, when expressed as '**IIIII**'.

That final valuation above is based upon an axiom of the Seldonian arithmetic for "dimensional analysis" -- the Seldonian arithmetic of *quantifiable metrical qualifiers*, of *quantifiable metrical units*, called 'the Mu arithmetic', $\underline{\mu}_R$, the seventh of the dialectical arithmetics in the Seldonian dialectical progression of axioms-systems of dialectical arithmetic. That axiom assigns the value 'full zero', '⬤' -- to cases involving multiplication of a *metrical unit qualifier* by that ordinary **R**eal number which Seldon characterizes as 'empty zero', '**0**', e.g., in this case, **0 ×** n° ≝ ⬤ .

Seldon characterizes the 'full zero' value, ⬤ , as the 'universally dominant' value, as it takes over the entirety of any expression in which it occurs, and converts that entire expression into itself alone, whether ⬤ occurs in the numerator of that expression, or in its denominator, or in both.

Seldon describes ⬤ as an 'existential zero', as an 'ontology-*specific* zero', or as a determinate, *specific* sign of 'no-longer-existence', or of 'non-existence', and characterizes its computational behavior as 'Langolier-like', as 'Hridayamic' / 'all absorbing', and as 'black-hole-like'.

The value ⬤ should ***not*** be conceived as a sign of *general **non**-existence*, or of *generalized absence* -- i.e., of *absolute nothingness* -- but only as signifying the *absence* of a *particular*, determinate [here *'ideo-'*]ontology, e.g., the *absence* of any intelligibility whatsoever for expressions of the form '**IIIII**...', e.g., leading to the *conversion* of such expressions, in the system of the "Roman Numerals", into a different, again [restored] **maximally-intelligible** ['ideo-']ontology, hence also leading to the *absence* of the numerals that had formed the earlier, '*singularly* **o**bscure', expression, i.e., '**IIIII**...'.

So, per our crude, contrived metric, at **5** consecutive occurrences of the same numeral, cognitive '''uptake''' of the meaning of the multi-numeral expression becomes *'**non**-**existent**'*, per the beliefs that we are supposing for the ancient 'ideo-architect(s)' of the Roman Numerals system.

In some cases within the system of the Roman Numerals, even a single repetition -- two occurrences of the same numeral -- seem to be regarded as unintelligible, so that our metric function, for those cases, becomes --

m$_2$(·) ≡ **o**bscurity per **n**umeral of expression, **using the parameter**-value **2** =

(2/(2 – **#** of occurrences of same numeral**))** × **[o°/n°]**.

In summary, then --

New '''[ideo-]ontology''' 'irrupts' at the '''*singularity*''': '[ideo-]onto-dynamasis' there manifests.

I.e., 'meta-monadization' 'irrupts' at that juncture, e.g., Roman Numeral '**V**' supersedes '**IIIII**'.

Let us exhibit the whole sequence of '*ideo-onto-dynamical **metafinite resonance singularities***' which characterizes the Roman Numerals system of 'numeralic memes', i.e., of 'numeralic *ideo-ontology*', as standard counting processes, ***as expressed in Roman numerals***, proceed --

Counting by **I** units: I   →   II   → III   →   IIII   →   IIIII   ↑ V
|Metric of Obscurity|:   **5/4**   5/3   5/2   5/1   5/0   **5/4**

Counting by **V** units: V   →   VV ↑ X
|Metric of Obscurity|:   **2/1**   2/0   2/1

Counting by **X** units: X   →   XX → XXX → XXXX   →   XXXXX ↑ L
|Metric of Obscurity|:   **5/4**   5/3   5/2   5/1   5/0   **5/4**

Counting by **L** units: L   →   LL ↑ C
|Metric of Obscurity|:   **2/1**   2/0   2/1

Counting by **C** units: C   →   CC → CCC → CCC → CCCCC   ↑ D
|Metric of Obscurity|:   **5/4**   5/3   5/2   5/1   5/0   **5/4**

Counting by **D** units: D   →   DD ↑ M
|Metric of Obscurity|:   **2/1**   2/0   2/1

In each case above, a 'division-by-zero singularity' in the "purely-quantitative" version -- the 'quantifier-only version' -- of our metric of 'symbolic obscurity', whose "purely-quantitative" value at that juncture may thus be characterized as "undefined", as "indeterminate", or as "*in*finite", is associated with a '*metafinite* [ideo-]onto-dynamasis' at the level of the numerals, in the form of the occurrence of an 'ideo-ontologically' new numeral.

That new, single numeral **restores** the **minimal** metrical reading for 'numeralic obscurity' by way of a 'meta-monadization' of the numeral used in those counting expressions that come prior to that *"singularity"*, at a certain '*maximum tolerable repetition-density*' of that prior numeral.

In the expressions above, the '→' arrow sign is used to represent the '''evolutionary''', and merely '''dynamical''' stages of the Roman-Numerals-represented counting process, whereas the '↑' arrow sign is used to represent the '''revolutionary''', or 'meta-evolutionary', and also 'meta-dynamical', [ideo-]onto-dynamical', and '''irruptive''' transitions to a new 'qualo-fractal' scale / level of 'numeralic' representation, via 'meta-monadization' of the old scale / level.

The 'meta-monadizations' implicit in the expressions above can be defined as follows --

'**I**' is the '«*arché-monad*»' -- i.e., the '«*arché*»-*unit*' -- of the Roman Numerals system.

'**V**' is a 'meta[1]-I monad', made up out of a *homo*geneous multiplicity of exactly **5** '**I**' monads.

'**X**' is a 'meta[1]-V monad', made up out of a *homo*geneous multiplicity of exactly **2** '**V**' monads.

'**L**' is a 'meta[1]-X monad', made up out of a *homo*geneous multiplicity of exactly **5** '**X**' monads.

'**C**' is a 'meta[1]-L monad', made up out of a *homo*geneous multiplicity of exactly **2** '**L**' monads.

'**D**' is a 'meta[1]-C monad', made up out of a *homo*geneous multiplicity of exactly **5** '**C**' monads.

'**M**' is a 'meta[1]-D monad', made up out of a *homo*geneous multiplicity of exactly **2** '**D**' monads.