F.E.D. Vignette #1 --

Two Interpretations of F.E.D.'s *Fundamental* [*In-*]*Equation of Dialectic*(*s*)

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0. *The Generic* [*In-*]*Equation*. What **F.E.D.** has called *'The Fundamental "Law" of Dialectical Thought'*, and what our most recent guest author, in **Brief #3** of this website, calls the *"Fundamental Equation of Dialectic"* --

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

-- can be expressed, generically, using **Encyclopedia Dialectica** standard notation, in this way --

$$[\![\forall \underline{\overline{\mathbf{X}}} \in {}_{\mathbf{N}}\mathbf{\underline{Q}}]\!] [\![\underline{\overline{\mathbf{X}}} \dashv \vdash [\![\underline{\overline{\mathbf{X}}}]\!] \equiv \text{«}aufheben\text{»} [\![\underline{\overline{\mathbf{X}}}]\!] \equiv \underline{\text{auf}} [\![\underline{\overline{\mathbf{X}}}]\!] = \underline{\overline{\mathbf{X}}} [\![\underline{\overline{\mathbf{X}}}]\!] = \underline{\overline{\mathbf{X}}}^2 = [\![\underline{\overline{\mathbf{X}}} \boxplus \square [\![\underline{\overline{\mathbf{X}}}]\!] \;\; \ddagger \;\; \underline{\overline{\mathbf{X}}}]\!]$$

-- or, in its simplest form, as the **non**-**quant**itative **in**equality [**qual**itative **in**equality; *'ontological in*equality*'*], or *'in*equation*'* --

$$\underline{\overline{\mathbf{X}}}\,\underline{\overline{\mathbf{X}}} \;\; \ddagger \;\; \underline{\overline{\mathbf{X}}}$$

-- which can be read off as the assertion that the ideogram '$\underline{\overline{\mathbf{X}}}$' represents a **kind** of **value**, which, when **applied to itself**, yields a [**new**] **value**, one otherwise standardly denoted by $\underline{\overline{\mathbf{X}}}^2$, and one that is **non**-**quant**itatively or **qual**itatively -- **ontologically** -- different from '$\underline{\overline{\mathbf{X}}}$' itself; one that stands for a different *'''kind'''*, a different *'''ontological category'''*, e.g., a different «*species*», or a different «*genos*», than that which its 'factor', $\underline{\overline{\mathbf{X}}}^1 = \underline{\overline{\mathbf{X}}}$, symbolizes.

<u>Note</u>:   the *'''overscore'''*, '⎺', topping the **X**-like ideogram, '$\underline{\overline{\mathbf{X}}}$', in the *'**qual**itative inequality'* expressed above, is for the purpose of indicating that this **variable qual**itative **value**, '$\underline{\overline{\mathbf{X}}}$', is a *"unit"* [is of absolute value, or of 'dialector-length', **1** *unit*], rather than a *'cumulum'*, i.e., rather than a heterogeneous, non-amalgamative *sum* of two or more such *units*. The *'''underscore'''*, '＿', 'bottoming' that **X**-like ideogram, '$\underline{\overline{\mathbf{X}}}$', is for the purpose of indicating that this **variable qual**itative **value**, '$\underline{\overline{\mathbf{X}}}$', is '<u>contra</u>-*Boolean'* in its *'''self*-multiplicative'''*, or in its *'''self*-operative''', behavior, i.e., that $\underline{\overline{\mathbf{X}}}^2 \neq \underline{\overline{\mathbf{X}}}$, meaning either that $\underline{\overline{\mathbf{X}}}^2 \gtrless \underline{\overline{\mathbf{X}}}$, or that $\underline{\overline{\mathbf{X}}}^2 \;\ddagger\; \underline{\overline{\mathbf{X}}}$. Since the **variable value** in this case, '$\underline{\overline{\mathbf{X}}}$', is **purely qual**itative -- a *'pure ontological **qual**ifier' value* -- it must be the case that $\underline{\overline{\mathbf{X}}}^2 \;\ddagger\; \underline{\overline{\mathbf{X}}}$.

The longer version of this *'''Fundamental* [*In-*]*Equation'''* that we gave first above involves both five *equations*, and one *in**equality*** -- i.e., one **negation** of an 'equational' relation. We therefore describe it as an *'equation/in**equation'***, or as an '[*in-*]*equation'*.

We will use the term «*arithmos*» -- the root of the word *"arithmetic"* -- in describing our equations' meanings.

That ancient Greek term is usually translated into modern English as simply *"number"*, which connotes, for most of us, *'abstract, purely-**quant**itative, **un*qual**ified number'*.

That translation unconsciously reflects the modern «*mentalité*» -- the modern *'''human phenome'''*.

That '''*phenome*''' has emerged, '''*psychohistorical-dialectically*''', with robust sub-conscious support from an experience deeply permeated by the *"law of* [*capital-*]*value"* -- by '''*the elementary or accidental form of* [*commodity*[*-capital*]-]*value*''' [cf. Marx], by which definite [price-]**quant**ities of **qual**itatively/**ontologically hetero**geneous "goods" are treated as **qual**itatively **homo**geneous, are **equated by exchange**, if their money-prices represent the same **quant**ity of money-value -- the same quantity of the money-**unit** -- a **unit** whose **qual**itative meaning is obscure to most human beings [but discovered, by human-scientists, as **un**consciously tending to represent transmuted **units** of abstract/generic human labor-time, goods-**units'** ultimate production-costs], thus semi-consciously intimating, to most, **equalization** of **different qual**ities in terms of **quant**ity alone.

To the '''*phenome*''' of ancient Mediterranean humanity, «*arithmos*» meant '''*a number* **of** [*qualitative*] *things*''' of a given **kind**; '''*a number of* [**qual***itative*] *units*''' -- an *"assemblage"* or *"ensemble"* of **qual***itative* «*monads*». This -- ancient and original -- sense is the sense for which we shall use the term «*arithmos*» here, thus using it in a way which is [*immanently*] **critical** with respect to the **un**conscious, but pervasive, modern human «*mentalité*», and in a sense which is ['meta-']*Pythagorean* in a **concrete**, **practical**, *'psychohistorical material'* sense, one which may also reflect the original sense of the claim *'all is number'*. That is the **kind** of «*arithmos*», or of '''[*meta-*]*number*''', for which '⌱' generically stands.

The richer, and **largely implicit**, *ideogramic* assertion of meaning made by the longer version of our '''*Fundamental* [*In-*]*Equation*''' can be 'explicitized' -- in translation to a *phonogramic* assertion -- as:

"a generic **ontological category** represents a *swarm* [«*arithmos*»; **population**; **number**] of «*monads*» [**individuals**; **units**], which, as it first emerges into explicit existence, thereby begins to apply the *historically-specific* «*species*» of **dialectical**, «*aufheben*» operation that it represents to all *other* **kinds** of such *swarms* that are *already* in existence. I.e., it "lawfully" **becomes** applied to *everything* that exists, which now increasingly *includes* **becoming applied to itself**. As its *"population" expandedly reproduces itself* **quant**itatively, producing more and more **units** of its own **qual**ity/**kind**, and as it also concentrates its increased **numbers** of its **units** in numerous 'physical-spatial', physical-space-separated, *'self-localizations'*, a critical threshold of *'self-environment'*, *'self-surroundment'*, or *'self-envelopement'* is eventually crossed, whereby, in the *cores* of these dense *'self-localizations'*, the interactions of the «*monads*», or **units**, in question becomes *primarily with each other*, and *no longer* primarily with the **units**, or «*monads*», of the earlier-extant, *other* **kinds**, surrounding it, thus inducing the irruption of a **qual***itatively new* **kind** of **units**, or «*monads*», which are most typically describable as being [self-]constructed as *'meta-units'*, or as *'meta-«monads»'*, of its **units**, or «*monads*», thereby populating **a new kind** of «*arithmos*» / **ontological category** / «*species*» or «*genos*», emerging from out of the very heart of its predecessor «*arithmos*»."

Explicitly, the "long form" of our *"Fundamental* [*In-*]*Equation of Dialectics"* says the following --

"For any ['∀'] «*arithmos*» representable" by the '[*meta-*]*numbers'* of the ₙ**Q** arithmetic, ['⌱ ∈ ₙ**Q**'], such an «*arithmos*» "lawfully" works ['⊐'] its own **dialectical**, or *'self-«aufheben»'*, **self-negation**, or **internal negation**, ⌐[[⌱]] = ⌱[[⌱]] [implying that, **for** ⌱, ⌐ = ⌱], in the form of its own **dialectical**, *'self-refl**e**xive'*, *'self-refl**u**xive' self-operation*, or *self-application*. This means that it constructs, **inside itself**, and **from itself**, its own *'self-«aufheben»' self-*subsumption. It thus yields both an outer, *'evolute' conservation* of itself, **plus** ['⊞'] something **qual**itatively, **ontologically new**, *a new* **kind** of being, a **qual***itative*, **ontological** "**delta**" ['⧇'] of itself, forming a *'**qual***itative, **non**-amalgamative sum'*, or *'**cumul**um'* [i.e., an '[ac]**cumul**ation' of **multiple kinds** [of two [or more] **kinds**]], '⌱ ⊞ ⧇[[⌱]]', or just '⌱ ⊞ ⧇⌱', a '''mixture''' of multiple **ontological sub**-universes, each with a **different ontology**], which is **qual**itatively, **ontologically un**equal to -- different from -- itself prior to its attaining its concentrated, threshold-crossing degree of '''*self-*[*inter-*]*action*''',

['⧈⟦⧈⟧ ⧧ ⧈⟧', or just '⧈⧈ ⧧ ⧈', so that also, as a result, '⧈ ⊞ ⧈⟦⧈⟧ ⧧ ⧈', or just

'⧈ ⊞ ⧈⧈ ⧧ ⧈']."

Example **1**. A concrete, external-physical, *'physio-«arithmos»'* example. Early 'intra-galactic', "inter-stellar" local «*arithmoi*», '''*atomic clouds*''', as their number [population count], variety, and density of atoms increased in them, irrupted the first molecules, and thus *'meta-evolved'* into *"molecular clouds",* from which, e.g., later-generation stars were born. Molecules are *'meta-«monads»'* of atoms as «*monads*», each molecule *unit* being made up out of a typically <u>heterogeneous</u> multiplicity of atom *units* as its <u>*sub*</u>-*units*.

Example **2**. An abstract, internal-mental, *'ideo-«arithmos»'* example. As **1**s *units* proliferate, it may be useful to define a new, higher level/scale of *'unit*-y', with **10**s as its *units*, then another, even higher level/scale, *'unit-ed'* by *units* for the next *"order of magnitude"*, i.e., with **100**s as *units*. Each **10**s *unit* is a *'meta-unit'* of the base *units*, the **1**s, made of a <u>homogeneous</u> multiplicity of exactly ten **1**s *units*. Each **100**s *unit* is a *'meta-unit'* to **10**s *units*, *uniting* a <u>homogeneous</u> multiplicity of exactly ten **10**s *units*, and is a *'meta-meta-unit'* to **1**s *units*, *uniting* a <u>homogeneous</u> multiplicity of exactly **1** hundred **1**s *units*.

Our interpretation of the "long form" of our *"Fundamental [In-]Equation of Dialectics"* thus has ***implicit <u>quant</u>itative**-process* connotations, as well as ***explicit <u>qual</u>itative**-process* -- or *'ontological process'* -- connotations. Indeed, as a whole it describes the fundamental <u>**dialectical**</u> **process** of *'<u>quant</u>itative change turning into <u>qual</u>itative [ontological] change'*.

Ordinary, ***purely-<u>quant</u>itative arithmetics*** -- those of the **N** or **R** *pure-<u>quant</u>ifier* *"numbers"* -- are capable of expressing ***only <u>quant</u>itative*** change; *"evolutions"*, confined to within the same ***ontology***, to within the same ***<u>qual</u>ity*** -- e.g., the growth or decline of its «*monads*»' population-count and of the *'physical-spatial'* concentration of its «*monads*» -- and cannot express the ***implicit <u>qual</u>itative change***, ***ontological change***, *'<u>meta</u>-evolutionary change'* -- the ***ontological*** *'self-<u>revolutions</u>'*, featuring the irruption into being of new, previously unprecedented ***kinds*** -- ***except*** via -- *"undefined"* or *"infinite"* -- ***division by zero*** [*"singularity"*].

On the contrary, Karl Seldon's <u>***extra***</u>-ordinary, *'purely-<u>qual</u>itative arithmetics'* -- in particular, those of the $_N$**Q** or $_R$**Q** *pure-<u>qual</u>ifier* [*meta-*]***numbers*** -- are capable of expressing ***only <u>qual</u>itative***, ***ontological change***, <u>only</u> the *'self-<u>revolutions</u>'*, <u>only</u> the *'ontological **revolutions**'*, <u>only</u> the *'[self-]<u>meta</u>-evolutions'*, <u>only</u> *'meta-<u>finite</u>' singularities*. [That is why the '''models''' constructed using the *'<u>dialectical</u> ideographies'* are [usually] called *'<u>meta</u>-models'*:   because they describe the '''*revolutionary*'''/'''<u>meta</u>-*evolutionary*''' *transitions* <u>from</u> one epoch of ***<u>quant</u>itative*** '''*evolution*''' <u>to</u> the next, not the '''***<u>quant</u>itative evolution***''' within a <u>single</u> epoch, as would a <u>mere</u> *'model'*].

The *gradual*, ***<u>quant</u>itative growth***, confined within the ***old ontology*** / ***ontological <u>qual</u>ity***, that, beyond a definite, critical threshold, gives rise to *sudden*, ***<u>qual</u>itative***, ***ontological growth*** -- the ***<u>quant</u>itative growth*** that is ***<u>implicit</u>*** in the *"Fundamental [In-]Equation of Dialectics"* -- cannot be expressed in the language of the ***purely-<u>qual</u>itative*** $_N$**Q** or $_R$**Q** <u>***dialectical***</u> ***arithmetics***, ***<u>except</u>*** *'extra-arithmetically'*, e.g., via *'non-computative'* expressions, such as the expression '⧈^{1} ⊸ ⊸⟦⧈^{1}⟧ $= \ldots =$ ⧈⟦⧈^{1}⟧ $=$ ⧈^{2}, [which *does* exhibit *some* computation, but only at the superscript, exponent level], whereas the <u>***core***</u> *'**ontological multiplication calculation**'* of the *"Fundamental [In-]Equation of Dialectics"*, '⧈⧈ $=$ ⧈ ⊞ ⧈⧈', is a *'purely-<u>qual</u>itative computation'*, located fully at the <u>***non***</u>-***super****script* / <u>***non***</u>-***sub****script*, or, simply, at the '''*'script'*''', level.

Higher ***syntheses*** of the **N** and $_N$**Q** <u>*systems of arithmetic*</u>, of the **R** and $_R$**Q** <u>*systems of arithmetic*</u>, are needed -- new, higher, richer languages, deploying new, higher *'ideo-ontologies'*, <u>***dialectical***</u> '''***complex unities***''' of those pairs of axioms-systems, such as $_N$**U** $= {_N}\char"0298_{QN} = {_N}\char"0298_U$, or $_R$**U** $= {_R}\char"0298_{QR} = {_R}\char"0298_U$, and such as $_N$**μ** $= {_N}\char"0298_{MQN} = {_N}\char"0298_{MU}$, or $_R$**μ** $= {_R}\char"0298_{MQR} = {_R}\char"0298_{MU}$, and beyond -- to enable *fuller, more concrete, more complex*, *'<u>qualo</u>-<u>quant</u>itative'*/*'<u>quanto</u>-<u>qual</u>itative'* signing of our *fundamental, universal, paradigmatic*:

'''<u>**quant**</u>*itative change/growth* ⇉ <u>**qual**</u>*itative change/growth*''' <u>***dialectic***</u> *of* ***nature*** *'meta-model'*.

Having considered the '«*gene*»-*ric*' meaning of our *"Fundamental [In-]Equation of Dialectics"*, in both its "short" and its "long" forms, our next and final task, for this *vignette*, is to provide two more '«*speci*»-*fic*' *interpretations* of that '[*In-*]*Equation'*, both of which belong implicitly to/under/within the «*genos*» of that '«*gene*»-*ric*' *interpretation*, and yet each of which also differs **_quali_**_tative_ly -- '*ideo*-ontologically' -- from the other, and each of which pertains to a different «*species*» '*sub*-«*arithmos*»' of the «*arithmos*» of the «*genos*» of our *"Fundamental [In-]Equation of Dialectics"*.

1. _The Specific Fundamental [In-]Equation of "Pure" **Ideo**-Dialectics'_.

Short form:

Long form:
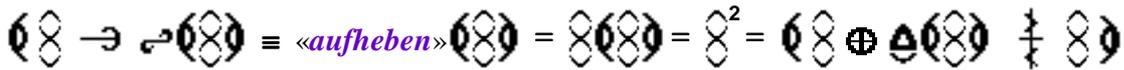
'Phonogramic' Translation of 'Ideogramic' [In-]Equations' Meaning: The work of intellectual *reflection* upon previous *'ideo-product'*, held in mind -- upon previous products of intellectual reflection -- produces **_quali_**_tative_ **_gain_**; '*ideo*-**ontological gain**': new **_kinds_** of '*ideo*-product'; new '*ideo*-ontology'.

Example: $\underline{\mathbf{N}} \rightarrow \rightharpoonup (\underline{\mathbf{N}}) \equiv$ «*aufheben*»$(\underline{\mathbf{N}}) = \underline{\mathbf{N}}(\underline{\mathbf{N}}) = \underline{\mathbf{N}}^2 = \underline{\mathbf{N}} \oplus \triangle\underline{\mathbf{N}} = \underline{\mathbf{N}} \oplus_{\mathbf{N}}\underline{\mathbf{Q}}$

When a self-aware, psychohistorically-aware, immanently critical **human subject**, having emerged into *'the **dialectical** operations phase of adult cognitive development'*, mentally embodies/simulates the first-order axioms-system, $\underline{\mathbf{N}}$, for the arithmetic of the "**N**atural" Numbers, **N**, and then reflects upon that idea-object, that subjectivity notices the *'purely-**quant**itative'* bias of the «*mentalite'*», or *phenome*, of modern humanity -- the humanity of the epoch of the pre-eminence of the capital-relation as the predominant social relation of human society's self-re-production, and of *'''the elementary form of* [commodity[-capital-]]*value'''* [cf. Marx] as unconscious universal paradigm, in relation to that of ancient Mediterranean humanity, and it thereby raises into explicit consciousness the *'purely-**quali**tative'* alternative, $_{\mathbf{N}}\underline{\mathbf{Q}}$ [, that equally adheres to the first order *'''Peano axioms'''*, intended for the *"**Standard**"* **N** alone], as a *'''**Non**-Standard Model of the **N**atural Numbers'''* [cf. *Löwenheim-Skolem Theorem*; first-order co-implication of Gödel's *completeness* and *incompleteness theorems*], and as the **_dialectical antithesis_** of $\underline{\mathbf{N}}$.

2. _The Specific Fundamental [In-]Equation of '[Ideo-]**Physio**-Dialectics'_.

Short form:

Long form:
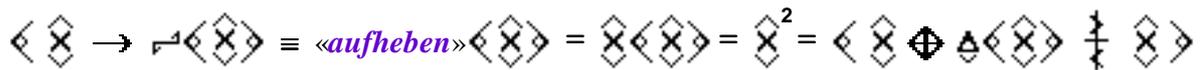
'Phonogramic' Translation of 'Ideogramic' [In-]Equations' Meaning: The work of **_self_**-*action* by previous *'physio-product'* -- by physical products of previous such physical **_self_**-*action* -- produces **_quali_**_tative physical_ **change**, **growth**, and **gain**; '*physio*-**ontological gain**', including **new** **_kinds_** of '**_physi_**[**_c_**]**_o_**-*product'*; new '«*physis*»-ontology' [as well as producing the **_quant_**_itative physical change_, **growth**, and **gain** *within* the **old** *'physio*-ontology'/**_qual_**_ity_, including that which grows up to, and then crosses, the critical threshold for the **new** *'physio*-ontology' formation, the critical threshold of the '**_quali_**_tative, ontological_ **change**, **growth**, and **gain**'].

Example:

During that epoch of natural history at whose beginning the [*physio*-]*ontology* of the *cosmos* consisted of **units** belonging essentially only to the *'physio*-**ontological categories'** of the *'''pre-**n**uclear'''* "particles", of the *'''**s**ub-atomic'''* "particles", and of the "**a**toms", the latter denoted ' ', the growth in the populations of local concentrations/«*arithmoi*» of **a**tom **units**/«*monads*» eventually led to the irruption of a **new kind** of **units**/«*monads*», representing the manifestation of a new, fourth basic *ontology*-«*arithmos*», instantiating a new *'physio*-**ontological category'** of **m**olecules, i.e., of *'**meta**-**a**toms'*, ' ', which are «*aufheben*» '*meta*-«*monads*»' of "**a**toms" as «*monads*», *'''negating'''*/**_qual_**_itatively transforming_ , *'''elevating'''*, and also *'''conserving'''* "**a**toms", formerly the highest *'out*-sides' of "matter", as the immediate *'in*-side' of **m**olecules [the new maximal *'out*-sides']. In general, the **_Encyclopedia Dialectica_** researches have found '[*self*-]*meta*-«*monad*»-*izing'*, «*aufheben*»-**_dialectical_** *'ontology-progressions'* such as this one, almost everywhere they have looked among the *'physio*-**ontological**' contents of 'extra-human' *nature*, and among the '*ideo*-**ontological**' contents of the various historical epochs of '*the human phenome*', as a part of the human part of **_nature_** / **_natural history_**.