

Glossaries

Glossary of Technical [Phonetic/Phonogramic] Terms, including Neologia

β. words beginning with the letter 'b'.

“**B.C.E.**” ≡ **B**efore **C**ommon **E**ra.

“**bifurcation**” ≡ the typically 2^{τ} -patterned, '2-furcating', or '**bi**-furcating', branching proliferation of solutions [attractors] and of *state-space trajectories* of a *dynamical system*, triggered when the *path* of a system *control parameter-value* crosses a critical threshold in the *control parameter-space* for the *state-space* describing a *dynamical system's* “evolution”. In the conventional concept of “state-dynamics”, the system's *control space* is conceived as a space external to and separate from its *state-space*. The *control parameter shifts* that induce **bifurcations** are tacitly seen as exclusively *interactive* or '*flexive*'. That is, they are seen as resulting from the actions of an *external* controller -- of *another dynamical system*, distinct from the *dynamical system* which undergoes the resulting **bifurcation** -- rather than as also possibly including a '*self-active*' or '*self-reflexive*' effect of the activity modeled as the *state-space trajectory* back upon that same activity, *mediated through* the activity modeled as the system's *control parameter-space path*, as a mathematical representation of the 'self-control', or “self-determination”, of that *dynamical system*. There is thus typically no idea of any possible coupling between *state-space* and *control parameter-space* such that the trajectory of the system in its *state-space* can trigger shifts in the path of one or more control parameters of that very *dynamical system*. That is, "**bifurcations**" are typically conceived of as exclusively *externally-induced*, not as potentially *internally-induced* or *self-induced* '**self-bifurcations**'. Likewise, "**bifurcations**" are typically conceived as occurring within the context of a *fixed* dimensionality and dimensional content of both the *state-space's* "state-variables" dimensions and the *control parameter-space's* control-parameter dimensions. That concept of "**bifurcation**" encompasses "dynamics", but does *not* encompass the “*meta-dynamics*” of '*change of system-space*', such as would model a '*change-of-system-dynamics*', by which we mean "law"-of *motion-self-induced* '*change-of-law*-of-motion', in terms of both the '*control-parameter(s)-sub-space*' and the '*state-variable(s)-sub-space*' of a *unified state/control meta-space*, modeling system [self]-*evolution* & [self]-**meta-evolution**, '*system-induced change-of-system*', or "meta-system transition" [cf. Turchin]. The typical conception consequently misses the connexion between [**meta-finite**], **conversion** & **resonance**] "**singularities**" and [**deep**] '**self-****bifurcations**.

bion ≡ a "unit of life"; a biologically-living [*bio-logical*] and "*logical*" *individual*; a biological «*monad*».

“**biota**” ≡ plural form for '**bion**' [see above].

“**Boltzmann-Vlasov-Maxwell Equations**” ≡ The equations-system first published by A. A. Vlasov in 1945. This classical *nonlinear* partial differential equations-system *quantitatively* describes the "*dynamics*" of "*plasmas*", or of "electrically-charged", or "ionized", "gases", i.e., of the "4th phase" of atomic matter [4th in order of manifestation, with rising temperature, after the *solid*, *liquid*, and *gaseous* "phases"]. This equations-system also *partially*, via its "*singularities*" and "*resonances*", including *implicit* ["infinite"-Coulomb-force] *collision singularities* [which become *singularities* when the charged particles of the plasma are idealized as "point-charges" and as "point-masses"] in the form of nuclear species' *nuclear fusion*, describes, at its 'periphery', aspects of the '*meta-evolutionary meta-dynamics*' of "plasmas". That is, the *atom-to-atom collisions* -- or, more aptly, the *ion-to-ion, nucleus-to-nucleus*, or, e.g., the *electron-naked-proton-to-electron-naked-nucleus collisions* -- which lead to the *fusion* of two [or, more rarely, more] nuclei into a single, larger nucleus, unleashing huge energies in the process, are also '*Coulomb [ontological]-self-conversion singularities*' per the standard, 'pure-quantitative'/'unqualified' versions of the Coulomb equations. Those equations incorrectly indicate that the fusion-collisions that convert [two] nuclei of lower atomic species into one nucleus of a higher atomic species [that 'up-convert' atomic [sub-]ontology], involve *quantitatively infinite* magnitudes of electrodynamic force. Two nuclei, labeled, say, **j** and **k**, are idealized as "'point-particles'", or "'unextended mass/charge-points'" in Coulomb models. Because the "'Coulomb'" or "'electrodynamic force'" as of time **t**, denoted $f_{jk}(t)$, is quantified as proportional to the product of the number of electric charge units in one nucleus [say **c_j**] times the number in the other nucleus [say **c_k**], *divided by the radial distance between them as of time t*, $r_{jk}(t)$, *squared*, collisions idealize as a definite "'instant'" in finite time, which we denote here by **t***, when these *two* "points" become '*one*', *coinciding* in spatial position. The radial distance "between" them is then $0: r_{jk}(t^*)^2 = 0^2 = 0$. So, at **t = t***, we get $f_{jk}(t^*) \propto c_j \cdot c_k / r_{jk}(t^*)^2 = c_j \cdot c_k / 0^2 = c_j \cdot c_k / 0 = \infty$. [Note: If we classify "atoms" [*not*, of course, the *ancient* Greek "'ultimate indivisibles", but in the *modern* sense of, e.g., "chemical elements"], as belonging among our '*taxonomy level one*' ontology, *ontological* categories, or '*ontos*' -- our major "'types'" or "'kinds'" of being(s) -- along with, e.g., on the 'past side', "pre-nuclear particles" and "pre-atomic particles", and, on the 'future side', "molecules" and "prokaryotic cells", then those ontic categories which describe, e.g., distinctions *within* the 'onto' of "atoms" [which, for example, distinguish "Hydrogen atoms" from

"Helium atoms", from "Lithium atoms", etc.], belong to our '*taxonomy level two*', thus forming a '*sub-ontology*' of '*sub-ontos*' of the "atoms" '*onto*'. So, those "collisional" [sub-]ontological *self-conversion/self-bifurcation singularities*', which lead to nuclear fusion nucleosynthesis, i.e., to atomic sub-species '*onto-dynamasis*', belong to the '*meta-dynamics*' of plasmas. The Vlasov equations quantitatively map the "collective behavior" [the "*dynamics*", as well as '*boundary aspects*' of the '*meta-evolutionary meta-dynamics*'] of the '*multi-meta*-[sub-]ontic', '*multi-meta*-[sub-]monadic '*cumula*', i.e., of the '*concrete multi-«arithmoi [aisthetoï]»*' or '*meta-«arithmoi [aisthetoï]»*', of idealizations of physical systems made up out of ionized nuclei and their formerly "*sub-atomic*" electrons; atomic nuclei [typically] of *multiple/various* atomic-number "*species*" and isotopic atomic-mass; i.e., of "manifolds" or 'concrete sets' of [typically] different "*species*" of atomic «*monads*», organized up to, *at most*, the "*atomic*" level of *organization*, the "*atomic*" level of '*ontological meta-evolution*', of the cosmos. These equations describe this collective behavior at a *summary level*, replacing granular accounting for the individual sub-atomic particle, individual-nucleus, and individual-electron orbital details underlying these '*multi-population meta-distributions*' [of, e.g., a \mathbb{U} model of plasma [meta-]dynamics], using a 6-dimensional, '*phase-space*'- or '*state-space averaging*', physical-space/velocity-space 'flow-evolution', or 'distribution-function/density-field-evolution' picture of these self-moving, [self-[meta-]]evolving/'*auto-kinesic*' clouds of plasma [describing plasma 'eventities' in vastly less detail than does, e.g., the Klimontovich Equation].

“**Boole's Algebra**” \equiv The *algebra*, or '*Logical Ideography*', of the 'restricted', $\{0, 1\}$ or $\{0/1, 1/1, 0/0, 1/0\}$ arithmetic presented by George Boole, especially in his 1847 *The Mathematical Analysis of Logic: Being an Essay towards a Calculus of Deductive Reasoning*, and in his 1854 *An Investigation of The Laws of Thought on which are Founded the Mathematical Theories of Logic and Probabilities*. Such algebras may be seen to abstractly and at least homeomorphically "capture", or model, ideographically, the patterns, "laws", or axiomatized 'rules-systems' *normatively* describing the "mental operations" of formal logic. Such algebras may model both *the logic of sets* and *the logic of propositions*: (1) the logic of "*primary propositions*", of those propositions concerning [what we hold to be *external/objective*] "things", and (2) the logic of "*secondary propositions*", i.e., of those propositions concerning those very propositions as things -- as ['*internal-objective*', '*collective-/inter-subjective*' '*mental materialities*'; '*psyche-ological*', '*idea*[l]-[things]; as those human-'*speciel*', specifically 'human[oid]', '*memetic*', '*psychohistorical materials*' called [other] "*propositions*" themselves; i.e., the logic of [meta-]propositions [“of second degree”] about[/made up out of a typically heterogeneous multiplicity of] *propositions* [“of first degree”]. [In the manner of Ockham, we might refer to the former as '*propositions of the first intension*', emphasizing "*categorematic*" terms, and to the latter as '*propositions of the second intension*', involving a greater emphasis upon "*syncategorematic*" terms].

“**Boole's Fundamental Law of Thought**” \equiv That putative “*Law of the Operations of the Human Mind*” which, in Boole's standard version of 'Boolean-logical arithmetic', herein denoted by \mathbf{wE} , and of its algebra, implicitly encompasses all three of the Aristotelian fundamental "laws" or 'rules' of the 'rules-system' of formal/syllogistic logic -- namely, the law of *non-contradiction*, the law of the *excluded middle*, and the [implicitly assumed] law of *identity*. In Boole's algebra of logic, using \mathbf{x} do denote a variable/unknown value, "allowed" to "range over" the totality or total 'space' -- $\{0, 1\}$ or $\{0/1, 1/1, 0/0, 1/0\}$ -- of Boolean values or of '*Boolean-logical [hyper-]numbers*', this "law of thought" takes the form $\mathbf{x}^2 = \mathbf{x}$. Boole casts his arithmetic as a calculus of "*Election*" operations, and his 'logical numbers' as "*Election Operators*" ['*Electors*']. Thus -

$$\mathbf{x}^2 = \mathbf{x}(\mathbf{x}) = \mathbf{x} \text{ 'of' } \mathbf{x}$$

-- commands us to [s]elect, out of the 'concept' \mathbf{x} , all "things" belonging to that concept, \mathbf{x} . The assertion that, always, for every \mathbf{x} , $\mathbf{x}^2 = \mathbf{x}(\mathbf{x}) = \mathbf{x}$, means that Boole's algebra models a human universe of discourse that is in *complete* ['*ideo-onto-*']*stasis*; in which all conceptual progress, or '*psychohistorical [meta-]evolution*', is ignored or abstracted away, including that of '*The Gödelian Ideo-Meta-Dynamic*' [aka '*The Gödelian Dialectic*'].

The Boolean "*solution set*" or "*solution-space*" for this equation is $\mathbf{E} \equiv \{0, 1\}$ -- i.e., the set containing only the end-points of the "*unit interval*" of "*Real*" arithmetic -- or, arguably, even the larger set $\{0/1, 1/1, 0/0, 1/0\}$.

The \mathbf{Q} arithmetic, the «*arché*» arithmetic of the *Dialectical Ideographies* described herein, models an «*aufheben*»-logic, or "*dialectical*" logic, of '*dynamical ontologies*' or of [i]de[on]to-dynamasis'; a 'rules-system' whose most fundamental rule is the '*strong contrary*' of Boole's '*Fundamental Law*', which we may formulate as $[\forall \mathbf{x} \in \mathbf{E}][\mathbf{x}^2 = \mathbf{x}]$, namely, the rule $[\forall \mathbf{x} \in \mathbf{Q}][\mathbf{x}^2 \stackrel{!}{=} \mathbf{x}]$, wherein \mathbf{x} denotes that which is

also 'denote-able' by \mathbb{Q} _x: the generic '*dialector*' or '*dialectical meta-vector*'; the generic \mathbb{Q} '*dialectical meta-number*'; the general variable/unknown of *The \mathbb{Q} Ideography*, each constituent of whose 'space', denoted \mathbb{Q} , is interpretable as an «*aufheben*»-operator, and as an '*unquantifiable ontological qualifier*' operator. The algebra of the \mathbb{Q} arithmetic can be interpreted to model '*ontological dynamasis*'; to model '*self-inducedly*' [*ideo*]-*ontodynamical* universes[-of-discourse], made up out of external 'things' or 'physio-eventities', and/or out of '*internal*' 'things', or 'ideo-eventities', as well.

“**Boole's Law Of Duality**” \equiv Another name given by Boole to his "**Fundamental Law of Thought**". It refers to the '*exo-duality*', the *mutually-exclusive, mutually-external dualism* of the two multipliers or factors in the equation into which Boole's *Fundamental Law* equation is factorable, namely, the factor which is just (**x**) itself, versus the factor interpreted as '*Universe [$\equiv 1$] take away ["minus"] x*', or as "'*not-x*", & denoted by (**1 - x**):

$$[\mathbf{xx} = \mathbf{x}] \Rightarrow [\mathbf{xx} - \mathbf{xx} = \mathbf{x} - \mathbf{xx}] \Rightarrow [\mathbf{0} = \mathbf{x} - \mathbf{xx}] \Rightarrow [\mathbf{x} - \mathbf{xx} = \mathbf{0}] \Rightarrow [(\mathbf{x})(\mathbf{1} - \mathbf{x}) = \mathbf{0}].$$

The latter equation may be interpreted as a Boolean version of the Aristotelian "*Law of Non-Contradiction*":

$$"\mathbf{x} \text{ and } [\text{"times"}] \mathbf{not-x} \text{ equals } [\text{"is"}] \mathbf{Nothing} [\equiv \mathbf{0}]"$$

The 'contra-Boolean' algebra of the \mathbb{Q} arithmetic formulates a contrary principle, which we sometimes refer to as '*The Principle of Intra-Duality*', '*The Principle of Self-Duality*', or as '*The [chronogenic] Principle of Ontological /Existential* [as distinct from '*Propositional*'] *Self-Contradiction*'; of *internal, immanent, intrinsic dualism*, or '*endo-duality*', *temporally-entailing 'existential self-instability', 'self-destabilization', and «aufheben» "self-transcendence" or 'self-conserving self-supersession'*.

This 'contra-Boolean' principle of *dialectical, «aufheben» logic*, is formulated as follows for (1) the *un*interpreted \mathbb{Q} arithmetic, for (2) that arithmetic interpreted for [*psycho*]*historical dialectics*, and for (3) that arithmetic interpreted for [*meta*]-*systematic dialectics*', or *metasystem[-atic] dialectical, 'Gödelian-dialectical', categorial-progression or 'categories-progression', systems-as-categories, systems-progression idea-systems exposition*:

$$\begin{aligned} (1) \quad [\forall \mathbb{Q} \in \mathbb{N}] [\mathbb{Q} \rightarrow \neg \mathbb{Q}] &\equiv \ll \textit{aufheben} \gg [\mathbb{Q}] &\equiv \textit{auf} [\mathbb{Q}] = \mathbb{Q} [\mathbb{Q}] = \mathbb{Q}^2 = [\mathbb{Q} \oplus \Delta [\mathbb{Q}]] \dagger \mathbb{Q}; \\ (2) \quad \langle \forall \mathbb{Q} \in \mathbb{N} \rangle \langle \mathbb{Q} \rightarrow \neg \mathbb{Q} \rangle &\equiv \ll \textit{aufheben} \gg \langle \mathbb{Q} \rangle &\equiv \textit{auf} \langle \mathbb{Q} \rangle = \mathbb{Q} \langle \mathbb{Q} \rangle = \mathbb{Q}^2 = \langle \mathbb{Q} \oplus \Delta \langle \mathbb{Q} \rangle \rangle \dagger \mathbb{Q}; \\ (3) \quad (\forall \mathbb{Q} \in \mathbb{N}) (\mathbb{Q} \rightarrow \neg \mathbb{Q}) &\equiv \ll \textit{aufheben} \gg (\mathbb{Q}) &\equiv \textit{auf} (\mathbb{Q}) = \mathbb{Q} (\mathbb{Q}) = \mathbb{Q}^2 = (\mathbb{Q} \oplus \Delta (\mathbb{Q})) \dagger \mathbb{Q}. \end{aligned}$$

This is the foundational principle of *Dialectical Ideography*. The above expressions each assert, among other propositions, one which holds that each \mathbb{Q} is its own '*auf*' -- its own *self-«aufheben»* operator; its own *dialectical, ontological* [as opposed to *propositional*] *self-negation/self-transformation/«auto-kinesis»* operation.

'**B.U.E.**' \equiv **B**efore **U**nification **E**ra.