

## Glossaries

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

#### β. words beginning with the letter 'b'.

**bifurcation** ■ the typically 2<sup>+</sup>-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 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, and the *control parameter shifts* that induce bifurcations are tacitly seen as exclusively *interactive* or '*flexive*', i.e., as resulting from the actions of an *external* controller, of another system, distinct from the system which undergoes the resulting bifurcation, rather than as also possibly '*self-active*' or '*self-reflexive*'. There is 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 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-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**, **ontological self-conversion**] "**singularity**" and ['deep' **self-**]bifurcation.

**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", "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* 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 involve an "'instant'" in finite time,  $t^*$ , 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* the ancient Greek "'ultimate indivisibles", but in the *modern* sense], 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-dynamiasis*', 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 [aistheto]*' or '*meta-arithmoi [aistheto]*', 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  $\underline{rU}$  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** = The algebra, or '*Logical Ideography*', of the 'restricted',  $\{0, 1\}$  or  $\{0/1, 1/1, 0/0, 1/0\}$  arithmetic discussed by George Boole 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 [external/objective] "things", and (2) the logic of "secondary propositions", i.e., of those propositions concerning those very propositions as '[internal-objective]', 'collective-/inter-subjective' 'mental materialities'; 'psyche-ological', 'idea[l]-things'; those human-'speciel', specifically 'human[oid]', 'memetic', 'psycho-historical materials' called [other] "propositions" themselves; i.e., the logic of '[meta-]propositions about/[made up out of] propositions'. [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** = That putative "*Law of the Operations of the Human Mind*" which, in Boole's standard version of 'Boolean-logical arithmetic', herein denoted **E**, 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 **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  $x^2 = x$ . Boole casts his arithmetic as a calculus of "'Election" operations, and his 'logical numbers' as "'Election Operators". Thus,  $x^2 = x(x) = x$  'of **x** commands us to [s]elect, out of the 'concept' **x**, all "things" belonging to that concept, **x**. The assertion that, always, for every **x**,  $x^2 = x(x) = x$ , means that Boole's algebra models a human universe of discourse that is in *complete* [ideo-onto-]stasis; in which all conceptual progress, or 'psycho-historical [meta-]evolution', is ignored or abstracted away, including that of '*The Gödelian Ideo-Meta-Dynamic*'. The Boolean "solution set" or "solution-space" for this equation is **E** =  $\{0, 1\}$  -- 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 **Q** arithmetic, the «arché» arithmetic of the *Dialectical Ideographies* described herein, models an «aufheben»-logic or '*dialectical*' logic of '*dynamical ontologies*' or of '[ideo-]onto-dynamasis'; a 'rules-system' whose most fundamental rule is the '*strong contrary*' of Boole's "*Fundamental Law*", which we may formulate as  $[\forall x \in \mathbf{E}] [x^2 = x]$ , namely, the rule  $[\forall \hat{x} \in \mathbf{Q}] [\hat{x}^2 \stackrel{\hat{x}}{\neq} \hat{x}]$ , wherein  $\hat{x}$  denotes that which is also 'denote-able' by  $\hat{A}x$ : the generic '*dialector*' or '*dialectical meta-vector*'; the generic **Q** '*dialectical meta-number*'; the general variable/unknown of *The Q Ideography*, each constituent of whose 'space', denoted **Q**, is interpretable as an «aufheben»-operator and as an 'unquantifiable ontological qualifier'. The algebra of the **Q** arithmetic can be interpreted to model '*ontological dynamasis*'; to model '*self-inducedly*' [ideo-]onto-dynamical universes[-of-discourse] made up out of external 'things' or 'eventities', and of 'internal' 'things' or 'eventities' as well.

**Boole's Law Of Duality** ■ 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 [ = 1 ] take away ["minus"] x*', or "*not-x*", denoted (**1 - x**):

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

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

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

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 *uninterpreted*  $\mathbb{Q}$  arithmetic, for (2) that arithmetic interpreted for *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*:

- (1)  $(\forall \hat{x} \in \mathbb{N}\mathbb{Q}) (\hat{x} \rightarrow \neg \hat{x}) = \text{«aufheben»} (\hat{x}) = \text{auf}(\hat{x}) - \hat{x}(\hat{x}) - \hat{x}^2 - (\hat{x} \oplus \Delta(\hat{x})) \frac{1}{2} \hat{x};$
- (2)  $(\forall \hat{x} \in \mathbb{N}\mathbb{Q}) (\hat{x} \rightarrow \neg \hat{x}) = \text{«aufheben»} (\hat{x}) = \text{auf}(\hat{x}) - \hat{x}(\hat{x}) - \hat{x}^2 - (\hat{x} \oplus \Delta(\hat{x})) \frac{1}{2} \hat{x};$
- (3)  $(\forall \hat{x} \in \mathbb{N}\mathbb{Q}) (\hat{x} \rightarrow \neg \hat{x}) = \text{«aufheben»} (\hat{x}) = \text{auf}(\hat{x}) - \hat{x}(\hat{x}) - \hat{x}^2 - (\hat{x} \oplus \Delta(\hat{x})) \frac{1}{2} \hat{x}.$

This is the foundational principle of *Dialectical Ideography*. The above expressions each assert, among other propositions, one which holds that each  $\hat{x}$  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.** ■ **Before Unification Era.**