A STUDY OF LOGICAL CONTOURS AS AN ORIGIN OF REASON
## (Causes of "Information")
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INTRODUCTION

This essay explores the evolutionary dynamics of active agents (Life) as influenced by natural selection, and therein, a likely *ab initio* unfolding of an agent's reasoning, logic, or informational wherewithal – that is, basic consciousness or intelligence.

Earth's entropic unfolding (environs) affords a stage upon which all Life arises. As such, Earthly entropy must be mapped before a notion of agency or living informatics can be posited. Earthly dynamics, vis-à-vis active agents, are shown below. Figure A depicts Selection Vectors around an existential niche (agency) separated by a Bounded Affordance line. That three-fold constraint presents imagined right-ward, left-ward, and down-ward selection forces on active agents. Any combination and/or amount of those forces can impinge upon the afforded agency, at any time. Evolutionary biology calls the result of this existential constraint-affordance *purifying*, *divisive*, and *directional* selection (Figure B). Hence, *selection* presents three innate or observed "logical contours" to which agents must conform, or become extinct.

Figure A: Three Selection Vectors and three agent responses, as a constrained-contested space.

Figure B: Classic effects between selection forces and agent responses, equally labeled *stabilizing*, *disruptive*, and *directional* selection. Each result depicts a distinct "logical contour," affording *de facto* styles of agent behavior, and thus "agent logic," to support related behaviors. But to claim that such logic may exist requires the presence of agent memories "to be reasoned with." With no extant memory or "content," reason or logic is, *a priori*, not possible.
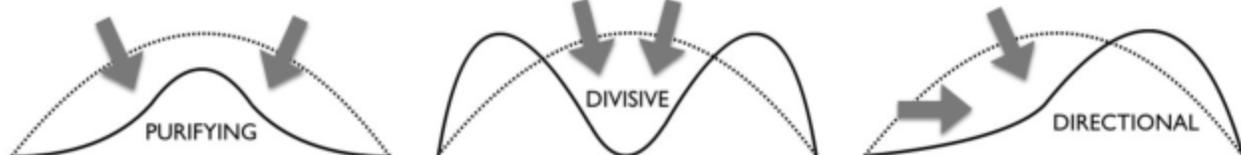
If those three vectors captured the full range of dynamic possibilities for all agents, and if agents behaved passively vis-à-vis those vectors, our map would be complete. But agents exhibit a span of passive and active behaviors. This passive-active "entropic role" must also be mapped, via three "contesting" dynamics, for a complete map. Those classic behaviors are called *fight*, *flight*,

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and *freeze*, but could be equally named *adapt*, *escape*, and *succumb* (Figure A). This constrained-contested schema thus presents a "bounded-yet-ambiguous" *solution space* for all agents, as a range of entropic demands and opportunities – defined via *divisive*, *purifying*, and *directional* selection **contra** *fight*, *flight*, and *freeze* actions – or, collectively speaking: *evolutionary dynamics*. This constrained-contested space exhausts all environment-agent interactions (omitting genetic factors) and conveys an initial behavioral map, but without useful details.

MODEL DEVELOPMENT

To provide the missing details we start with an agent's three-fold entropic response (fight, flight, or freeze) to Earthly entropy, and argue that agent "logical profiles" co-incidentally or reflexively emerge as part of three-fold selection – forced contour fit-ness. This *empiric relationship* then suggests a "reason-able continuum" of adjacent (action-able) possibilities (Kaufmann, 2000) for agents exhibiting resilient behaviors – or what one might call a basic intelligence. This *reason-able continuum* is developed herein as a "first order ➔ fifth order" unfolding of active agency.

To initiate this continuum, first order reason (1D *narcissism*) must be exhibited by all agents that do not simply succumb (requiring fight or flight), where failure (freeze) often points to extinction (Figure C). But these "monadic sensate roles" afford a range of passive-active possibilities. For example, given a crushing surge of selection forces, if an agent stands frozen (relatively inactive), it may succumb to events and be made extinct. But if an agent is passive (relatively pliant), it may "wash" into a protected niche, arriving bruised but not crushed – as a co-incident or *passive flight* response. Alternatively, an *active flight* instinct would drive agents to "single-mindedly" escape Earthly entropy by fleeing hostile environs for a co-incident niche. Agents with a weak flight response remain vulnerable.

Figure C: Model of agent *freeze* and *flight* responses to *directional* selection.
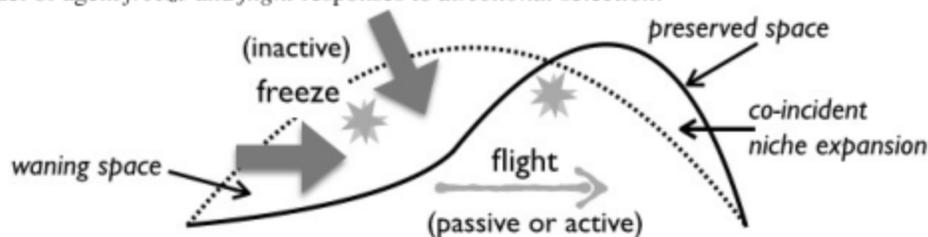
In both cases, <u>passive</u> and <u>active</u> *flight*, primal (empiric, <u>effective</u>) differentiation is initiated as co-incident 1D niche formation/expansion – or, a minimal survival opportunity. Later, as Earth's entropic environs diversify, *flight agency* also differentiates via Earth's more numerous niches. Growing niche opportunities thus afford a further exaptive role (adaptive *latency*) for agents. The **passive-active-latent** parsing (1D logic, flight) of Earthly environs marks <u>selected</u> a priori traits, for a continuum of 1D action-able possibilities for agents. Further, while *freeze* (inactivity) may imply extinction for agents within a waning space, freeze may also linger unmolested within a preserved space; alternatively, inactivity may indicate non-agent (not-alive) status. 1D logic thus identifies vital "*monadic* sensate roles" related to core genetic (minimal) homeostatic function, reflex, and instinct behaviors, which define "active agents" – while not perforce exhibiting an *ab initio* "reason-able behavior."

As a *fight response* (Figure D), 1D reason can yield second order reason (2D *polemic logic*) by inciting and/or affording ever-more complex actions. "Fighting" against growing Earthly entropy (Figure A) marks a type of *entropic mimicry* in agents striving to adapt – specific agent counter-actions. As a counter-action, simple empiric/entropic oppositions afford an <u>opportunistic</u> parsing of Earthly environs via *object-subject* (O-S) *modeling* or *material ideation*. Agents that fail this "diametric sensate task" are bound to 1D niches and co-incident *flight* behaviors. But agents that form <u>effective</u> (entropically counter-active) object-subject "images" – minimal effective actions **joined with** related diametric sensations (memories) – can be said to show reason-able behavior.

Figure D: Model of an agent's *fight* response to directional selection forces.
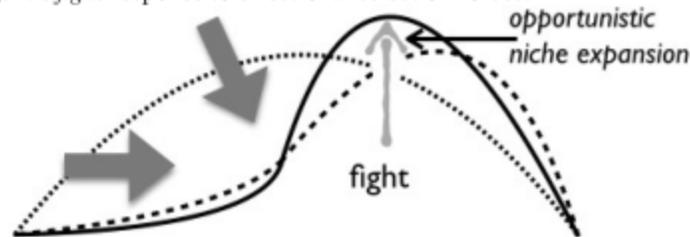
The entropic mimicry (parsing) afforded by <u>diametric</u> *material ideation*: 1) fortifies an agent's role within a niche, likely displacing 1D agents, and 2) allows agents to *willfully* (ideal-ly) *move* into adjacent spaces, when and where selection forces are weak. Further, <u>impotent</u> ideation has no immediate benefit, but if that ideation is benign it affords later exaptation (2D latency). As such, 2D opportunistic *minimal ideation* (**O-S behavior**, diametric roles) would grow over time.

O-S modeling affords a minimal "generative informatics" or incipient creativity, as agents are now *willful* or *ideal narcissists*, versus co-incident narcissists. This willfulness affords agents a helpful 2D pro-active role in formulating behaviors. What starts as 1D flight or fight (*uninformed* empiric roles or counter-actions) can refine and entrain via selection, as an *informed* pro-activity. Willfulness thus sharpens 1D flight: instead of fleeing (base instinct) *from* a threat, agents now flee (ideal intention) *toward* a protected 2D space. Further, a <u>strong</u> *flight* instinct/direction may resemble a <u>weak</u> *fight* intent, implying contiguous rather than discrete adaptive roles. Lastly, as niche diversity grows (1D latency), the afforded O-S/2D agency *also* co-incidentally expands.

2D parsing/mimicry of Earthly environs enlarges to a point to where agents exhibit predator-prey roles or *behavioral ideation*. This incites an evolutionary arms race between agents – Van Valen's (1973) Red Queen's Race, "where it takes all the running you can do, just to keep in the same place." That arms race further expands the action-able demands and opportunities for all agents.

<u>Effective</u> *diametric ideation* of materials **and** behaviors is key to reason-able sensations. Also, as *ideation* requires a sensate split, a divisive role is named – a Sacred Wound or core angst – where agents see nature (Mother) targeting their demise, oddly counter-acted by endless re-creative deeds or Eden-like abundance. Hence, **re-creative** *counter-actions* are central in modeling Earthly and agent (entropic) roles. This *informed creativity* is often excluded in modern science, where "innately creative" uncontrolled variables are the bane of scientific experiment. Finally, labeling "material entropy **contra** behavioral entropy" as a Sacred Wound gives an archetypal base (core psychology) to an essential homeostatic task of material self-regulation. This *now*

meaningful psychological-empiric face allows the later development of cultural roles, while still retaining a core Shannonesque (1948) entropic, or signal-based, sensibility.

Advances past 1D and 2D logic are often derisively labeled New Age (non-scientific), as each shift offers new demands and opportunities, seemingly from "thin air." The retort to this non-scientific derogation is that science is oddly non-self-reflective – that is, it cannot explain the presence of science – it holds no creative narrative. Inversely, a "cognitively creative" 3D *dialectic logic* begins as naive 2D oppositions (thesis and anti-thesis). Here, some agents may notice that the **output** (synthesis) is vital.

This "vital noticing" marks the arrival of meta-perspectives, a 2D ➜ 3D "intelligent" shift, via effective *conceptual ideation*. Here an "output" is imagined conceptually, as it is not materially evident until its actual emergence (proof). *Conceptual ideation* thus seeks to enhance the "willful advance" of material and behavioral ideation. Further, and as before, impotent benign (un-proven) imagined outputs may contribute to later exaptation (3D latency), to augment 1D and 2D latency – all of which sets a stage for "trial-and-error conduct," later called "formal science."

Thus, from co-incident-ally creative 1D and 2D behaviors, a willfully creative 3D role emerges to afford more opportunistic expansion. *Conceptual ideation* entails "reason-able outputs," a re-combinant role – a vital **re-creative** *counter-action*. This "imagined output" can then refine and entrain, again, via selection, to yield an archetypal *idealized imagination* – Psyche. In humans this imaginal shift (psychological informatics) is called the Upper Paleolithic Revolution or the Great Leap Forward, where humans plainly start to exhibit cultural behaviors in the form of ceremonial death rituals, self-adornment, cave painting, etc.

This dialectic (Hegelian) opposition (thesis + anti-thesis = synthesis) begins to reflect an agent's *ab initio* three-fold entropic core, affording self-reflective roles or informational self-awareness. 3D logic offers a parsed scale beyond what is possible with 2D reason, lessening the polemics needed to frame new demands and opportunities. This benevolent shift affords more meta-perspectives and *generative* archetypal elements – in other words, universal informational roles start to unfold. Rigid 1D and 2D riddles now seem solvable (e.g., type theory, Chalmers's Hard Problem, a Symbol Grounding Problem, etc.). A psychological task of "making conscious what is unconscious/latent" via *self*-realization is named by Janet, Freud, Jung and others. Also, 3D logic shows in Peirce's abductive reason and triadic logic, and in nature's fractal forms. Since 3D logic start as 2D polemics, it marks an *augmented fight* behavior rather than a new role – again, implying contiguous rather than discrete adaptive behaviors. In later states of 3D reason, diverse outputs are seen as arising from 2D roles (un-intended consequences, added 3D latency), instead of simple "targeted outputs."

Sociability in some agents allows a leap into 4D *relational roles*. Logically, a fourth node inflates prior triadic vistas to tetrahedron, jointly enlarging and fortifying 3D roles. This four-fold *punctuated leap* in entropic parsing contrasts to more *gradual* 1D ➜ 2D ➜ 3D shifts. This multi-faceted *relational logic* then infers ideas of interiority-exteriority, distributed memory, networks, and systemic complexity. 4D *ideation* **re-creates** 3D and 2D roles with more depth and subtlety.

Logic or Reasoning Modality	Memory/Cognitive Traits
1D Freeze	**strong** <u>material</u> roles (specialist, rigid)
1D Passive Flight	**broad** <u>material</u> roles (generalist, flexible)
1D Active Flight (also weak *2D fight*)	**strong** <u>behavioral</u> roles (instinctual, rigid)
1D Fight (directional variation/exploration)	**broad** <u>counter-actions</u> (adversarial ideation)
2D Fight (polemic logic, also strong *1D flight*)	broad **material/behavioral** <u>ideation</u> (flexible)
3D "Fight" (dialectic logic)	*generative* **conceptual** <u>ideation</u> (creative)
4D Relational Logic	*generative complexity* as **relational** <u>ideation</u>
5D Fully Sensate Logic	maximal flexibility, complexity, and ambiguity

Table 1: Logic and memory reason-able-ness needed to support agent behavior(s): a *reason-able continuum*. High-order 5D logic accommodates (mimics) more Earthly entropy, but at a greater energy cost than low-order material roles. Inversely, specialist roles like 1D *freeze* have low energy costs, but with a smaller adaptive/entropic span.

This inter-subjective realm expands the psychological task by calling for "richer language" that then seeds notions of compassion, empathy, partnership, reciprocity, new sensuality, and the like. This "touchy-feely" 4D role does not erase the call for 1D, 2D, or 3D logic, but extends an agent's reach. Still, emergent 4D roles lessen the need for lower orders. As such, the entropic cost of "fighting" may abate via abstract reason – innately *external* material/behavioral strife is augmented/preempted by *internal* psychological-social strife (cognitive creativity). As such, the "unprecedented" caloric and biological expense of maintaining a cognitive brain might now be re-evaluated in terms of "material entropy **contra** *cognitive* entropy."

But competition between logical orders also arises. Beneath this "new strife" lie two factors: 1) some agents fail the psychological challenge of 3D and 4D logic and dismiss that failure by emphasizing more fundamental views; and 2) other agents question if the energetic cost of 3D and 4D entropic mimicry is needed. <u>Relational strife</u> (2D redux) thus cultivates *external self-regulation* by social-ably matching (*within* agent groups) logical processes to ever-more diverse demands and opportunities – *cultural collectives* now arise for agents. Amidst this growing strife, richer meta-perspectives are called for to support ever more abstract and complex study and debate. As such, prior 1D, 2D, and 3D latency is now willfully drawn upon to explore growing *relational roles*. Later states of relational logic point to the human potential movement of the 1960s, exemplified by Maslow's (1943) hierarchy of needs, Gestalt therapy, and so on.

From conceptual strife in 3D and 4D logic, 5D *fully sensate* reason emerges for some agents. 5D logic gives no priority to one role, but sees all strategies as useful. *Fully sensate logic* focuses on specific demands and opportunities, considering what is effective and efficient. This "studied context" affords relational meta-perspectives (meta-meta), aesthetic sensibility, and <u>effective *ambiguous ideation*</u>. The psychological task is now to fluidly grasp various patterns and roles (e.g., group theory) and to **re-create** or "play" those patterns and roles in novel ways – in effect, seeking to exploit any available universal facets. *Re-creative counter-actions* of 5D logic afford many new demands and opportunities, and cannot be fully named here. Still, as a maximal

process, 5D logic infers an evolutionary-empiric terminus for agents – where no greater entropic parsing/mimicry/granularity seems likely.

As a minimal role, 5D logic affords *internal self-regulation*: complex homeostasis of material, behavioral, and psychological roles. The "psychological autonomy" that *conscious* homeostasis affords was first noted as a naive Sacred Wound (2D material self-regulation), but now shows as a Necessary Unity of richly *differentiated* **and** *integrated* roles (Bateson, 1979). This multi-dimensional "thinking like nature" (sensate logic) has a willful dispassion toward specific roles, which then affords a *dispassionate play* and infers a "natural information science." Furthermore, the acute environmental sensitivity of 5D logic is shared by Taoist, shamanic, and other "sub-conscious habits." *Sensate logic* may thus carry a quality of intuitive/mystical/emotive "think-feeling," or cognitive ambiguity, apart from the more discrete and lucid (or divisive) cognition of earlier roles. This cognitive ambiguity, most notable as *curiosity*, is well placed to maximally/creatively exploit the exaptive latency of earlier "less-conscious" orders.

In more mature, well-integrated states, 5D logic drives a sense of "being in the zone" known to top athletes, artists, and the like – where agents are wholly given over to the "becoming-ness" immediately before them. Such highly-refined homeostatic roles are often celebrated. *High-performance players* are idealized and enlarged, as with a mythic Ulysses, Jesus, "founding fathers," Rockefeller, Einstein, Michael Jordan, etc. This sharply re-creative process presents an impossible challenge for some agents, while others are merely "haunted" by its subconscious effects, and yet others work arduously at focused sub-conscious access . . . but some agents shift fluidly, "animal-like," between conscious and sub-conscious realms.

This distinctly "altered state" of *play* is beyond-but-joined-with prior orders. As such, prior logic may iteratively cycle, for novel advances – a spectrum of complex, unfolding, re-creative roles. Early mythology names this endless recombination an Uroboros – a serpent-dragon eating its own tail (van Dijk, 2014). In Eastern philosophy, recreative destruction is called Yin-Yang and Shiva Nataraja. Creative destruction even appears in capitalism, with many informational cycles needed to create new market niches and product concepts, then prompting many needed product manufacturing and distribution (informational) cycles (Reinert and Reinert, 2006).

CONCLUSION

In the foregoing 1D ➔ 5D analysis, I assert that Earth's entropic unfolding affords, and thus demands, more entropic processes and processing. Agents then have the chance to "entropically match" that unfolding, or fail at the project. The diversity afforded by this scenario does not argue for one role being superior to another. Rather, it argues that agents that fluidly embrace diverse roles (5D) can benefit in dynamic environs. Inversely, stable environs call for greater specialization (1D). Diverse 1D ➔ 5D agency thus points to a variable empiric notion of "free will" for agents performing within a "bounded-yet-ambiguous" *solution space*.

Ironically, humanity's Anthropocene Epoch largely affords "stabilized environs," where human advances now come via "broad specialization" – a rather oxymoronic role, compared to prior "specialist *versus* generalist" norms. While this atypical twist enhances human survival, it also clouds our informational role. Further, this oxymoronic twist underlies a current "human ecology *versus* natural ecology" conundrum, and points to known hazards in our era. The forefront of this

challenge is typified by growing calls for cross-disciplinary perspectives, or more naturally integrated (5D) human logic/reasoning – a skill we have yet to amply demonstrate.

Still, in looking back, we can say little about the actual origins of a *reason-able continuum*. All ancestral environs and populations are long-gone, preventing a useful comparative study. A few material shards of uncertain heritage are all that remain to us for studying early psychological and behavioral roles and shifts. Thus, this topic will forever remain a speculative matter. At best, we consider our currently-observed behaviors and circumstances, and then attempt to fashion some plausible "backward-looking" narrative.

If this analysis answers some questions, it only hints at other onerous topics. It notes Chalmers's Hard Problem and a Symbol Grounding Problem, and then "flirts" with notions of *meaning* and *free will*. Also, an **inactive-passive-active-latent** *continuum* framed simply as "material entropy **contra** behavioral entropy" lacks precision. Next, the essay's psychological tone may bother some readers. Philosopher Collin McGinn (2012) points to that "psychological challenge" as an obdurate issue for humanity. Further to humanity's psychological hurdles, our current (likely) cyclic phase, that of shifting between 2D and 3D roles, seems especially difficult – managing our growing modern dilemmas. I address *some* of these issues in a separate technical essay: Psyche as an Informational Strategy – General Information Theory (Abundis, 2015).

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