# Concurrent Causation and the Radical Two-Sidedness of Reality

Stephen P. Smith

**Abstract**: This paper explores the limitations of classical and computational models of causation in explaining life's emergence and organization. Building on the work of Stuart Kauffman, Alicia Juarrero, and Montévil & Mossio, it proposes a novel framework: concurrent causation. Unlike linear or circular causation, concurrent causation suggests that parts and wholes influence each other simultaneously within a radically two-sided reality. It is proposed that bidirectional causality underlies biological homeostasis, development, and quantum processes such as time symmetry. The paper argues that acknowledging this hidden causal structure could reconcile paradoxes in biology and cosmology and necessitates a rethinking of scientific models and ontological assumptions. For example, Karl Ernst von Baer and Louis Bolk both pointed toward an evolutionary framework shaped by internal structuring principles, but these early pioneers could not justify their positions because causation was then limited to efficient causation. The present paper gives support for their views, and in fact offers a neo-vitalism with the recognition of concurrent causation.

## 1, Introduction

Stuart Kauffman, in *A World Beyond Physics: The Emergence and Evolution of Life*, presents the concept of autocatalytic sets forming a Kantian whole, where self-sustaining biochemical networks drive life's emergence. These sets, often modeled through computational simulations, illustrate how parts interact to generate an emergent whole. However, a deeper exploration of part-whole interactions reveals an essential challenge: the necessity of two-way causation. Circular causality—where parts influence the whole and the whole, in turn, shapes its parts—demands a reevaluation of traditional causal frameworks, particularly those limited to Aristotle's efficient causation.

Alicia Juarrero, in *Causality as Constraint*, advances the idea that emergent properties introduce constraints that channel causal relationships in ways that defy traditional mechanistic explanation. This perspective suggests that emergence entails new forms of causation that do not merely reduce to their constituent parts but impose organizing principles upon them. This theoretical refinement could rehabilitate efficient causation by emphasizing the importance of interconnectivity, potentially allowing for computational simulations to regain explanatory power. However, a truly comprehensive understanding of life necessitates additional factors beyond computational approaches.

Maël Montévil and Matteo Mossio, in *Biological Organization as Closure of Constraints*, argue that biological processes cannot be fully understood without considering metabolism, energy dissipation, time irreversibility, and homeostatic regulation. Their model requires constraints to be closed and interrelated in self-sustaining cycles that allow for autopoiesis and replication. While these considerations add depth to our

understanding of biological systems, they still operate within the paradigm of linear causation, even when applied to complex networks. This raises a fundamental issue: can life truly be simulated if causation itself is misunderstood?

## 2. Beyond Linear Causation: The Case for Concurrent Causation

While computational models assume a mapping of cause to effect through time, they fail to account for a deeper, underlying causal structure that simultaneously integrates bidirectional influence. The notion of circular causality, while useful, remains trapped within an apparent linear framework—one where each step follows from the previous in a traceable sequence. However, I propose a form of causation that transcends this framework: concurrent causation.

Concurrent causation entails that both directions of causality—parts affecting the whole and the whole affecting parts—are not merely in a feedback loop but are occurring simultaneously. This is not merely an illusion of sequence; rather, what appears as sequential causation is a veiled manifestation of a deeper, bidirectional process occurring at once. In this view, reality is fundamentally two-sided, wherein the visible, measurable universe is a projection of an underlying dual structure that remains concealed.

## 3. Implications of Two-Sided Reality and Warm-Body Quantum Mechanics

This two-sided ontology implies a novel interaction between causation and temporality, necessitating a reevaluation of warm-body quantum mechanics. Quantum mechanics has long entertained the idea of bidirectional time under certain conditions, such as CPT symmetry, where charge, parity, and time are simultaneously inverted. Concurrent causation suggests that this symmetry is not just an abstract mathematical concept but an active principle within life's organization.

When concurrent causation is engaged, bidirectional time emerges as a function of homeostatic balance. Each holon within a holarchy—following Arthur Koestler's conceptualization—operates under its own set of constraints and controls, where concurrent causation ensures dynamic equilibrium. In this framework, life processes are not just computationally driven sequences but structured through an intrinsic two-way interaction that classical computational models fail to capture.

## 4. Reconciling Classical and Concurrent Causation

While concurrent causation introduces a more complex framework, classical causation is not invalidated but rather refined. Classical causation, with its linear mappings, functions as a subset of a broader causal architecture. It serves as a demarcation within the observable universe, offering structure and predictability while concealing the deeper, bidirectional interactivity that binds reality together.

This understanding provides an explanation for several paradoxical observations in both cosmology and biology. Consider the fact that we look into the night sky and see ancient starlight, an act that seemingly contradicts the simultaneity implied by concurrent causation. However, under this model, the starlight we observe is the product of an interaction where bidirectional time plays a role in sustaining the visibility of the past within the present. The same principle applies to embryonic development, where ontogeny appears to recapitulate phylogeny in a fraction of the evolutionary timescale. It is proposed that developmental process, rather than being merely an accelerated microcosm of evolutionary history, unfolds through concurrent causation that integrates past and present dynamics seamlessly.

**5. The Birth of Neo-vitalism**

Karl Ernst von Baer (1792–1876), the founder of embryology, rejected Ernst Haeckel's notion that ontogeny recapitulates phylogeny—the idea that individual development mirrors evolutionary history. Haeckel's rigid framework failed to account for the divergent developmental pathways observed across vertebrates. Von Baer instead argued for a branching, differentiating process, where embryonic development reflects species-specific organization rather than a linear retelling of phylogenetic ancestry.

Yet, as Stephen Jay Gould later recognized, phylogeny is itself a collection of ontogenies—a deeper truth that keeps Haeckel's insight relevant in a revised form. Evolution is not merely shaped by selection acting on genetic mutations, but by inherent developmental patterns that are accelerated and retarded across lineages.

Louis Bolk (1866–1930) expanded von Baer's developmental vision through his theory of *fetalization*, suggesting that human evolution was driven by the retention of juvenile traits (neoteny). This challenges the simplistic view that selection alone drives species adaptation. Evolution, Bolk argued, follows internal developmental constraints—a perspective largely ignored by Gould and his contemporaries due to their strict adherence to genetic determinism.

Had Gould been willing to recognize a concurrent causative framework, he might have seen punctuated equilibrium differently—not as abrupt selection-driven change but as the natural acceleration of ontogenetic processes, governed by deeper structural forces.

The debate over vitalism is often distorted by historical biases that dismiss anything beyond efficient causation as mystical or supernatural. But vitalism does not require mysticism—it merely acknowledges an organizing principle beyond brute physical causation. If evolution is shaped by nested holonic structures, then these structures must operate according to universal forces beyond selection alone.

The possibility of an extrinsic gravitation that functions to balance the two-sided offers a potential underlying mechanism for concurrent causation. In a *two-sided ontology* where CPT symmetry links mirrored versions of space-time, biological unfolding would be influenced by forces beyond standard physics—perhaps even governed by the interplay

of an induced quantum gravity across holarchies. This fits the definition of a neo-vitalism by providing for a concurrent causation that is beyond narrowly defined considerations that limits all causation to efficient causation.

### 6. The Projection of Reality Through Mind

Finally, our cognitive limitations further suggest that reality is constrained by the mind's capacity to project outward what it can interpret. We experience time, causality, and agency within the limitations of our neurological structure, which favors linear, sequential processing. However, if the deeper structure of reality is two-sided and concurrent, then our perceptions merely filter this complexity into a comprehensible, one-directional flow. The notion of an undetectable ether connecting both sides of reality serves as a metaphor for this hidden structure, joining seemingly disparate events into a unified whole.

### 7. Conclusion

The nature of causation remains one of the most fundamental and unresolved questions in philosophy and science. While classical causation provides a workable framework for many physical phenomena, its limitations become evident in the study of life, where circular causality introduces new organizational constraints. However, even circular causality fails to fully capture the dynamics at play within complex biological systems.

By proposing concurrent causation, we challenge the assumption that causation must always follow a linear, sequential pathway. Instead, the interplay between parts and wholes occurs in a hidden bidirectional fashion, manifesting as apparent linearity but rooted in a deeper, two-sided structure. In this framework, neo-vitalism is possible. This model has profound implications not only for biology but also for cosmology, quantum mechanics, and our understanding of time itself.

Ultimately, if reality operates through a radically two-sided structure, then our current scientific and computational models may require fundamental revision. The true challenge lies in developing new conceptual tools to recognize and work within this concurrent framework. Whether through warm-body quantum mechanics, holarchic organization, or a deeper exploration of emergent causality, embracing a two-sided ontology could provide the missing link needed to reconcile life's complexity with the fabric of reality itself.

Acknowledgment: This essay was detonated by Chat GPT following my contextual framing of all connotations.