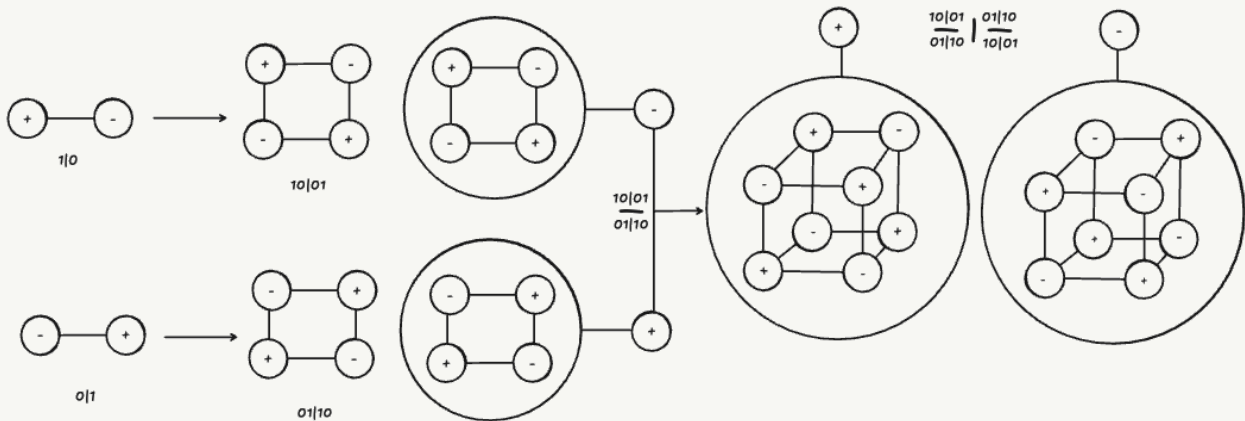


A SHORT AXIOMATIC ACCOUNT

A Theory of Useful Differences

Form begins when differences hold one another without erasing their difference. The resulting whole can be wounded, repaired, and encountered as a new difference at the next scale.



The theory does not begin with signed objects. It begins with relational histories: the same form may enter a later contact through the opposite orientation while its earlier distinctions remain inside the whole.

ORIENTATION BELONGS TO AN ENCOUNTER; ORGANIZATION BELONGS TO RETAINED HISTORY

A whole may tolerate local imbalance while its resulting balance holds; balance alone does not make an organism.

1 Relational orientation. +A

and $-A$ are roles in a relation, not properties of a thing. The same body may take the opposite role in a later contact.

2 Encounter.

Complementary roles may hold. An isolated $-/-$ conflict does not by that collision alone produce a bond.

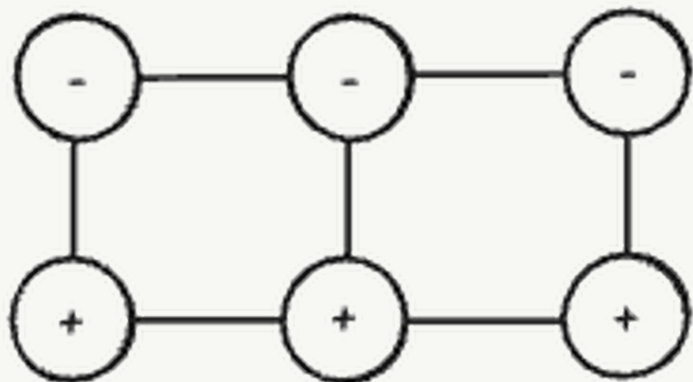
3 Tolerated imbalance. A

whole need not balance every adjacent pair. Local imbalance may persist while relations across the whole keep the resulting balance closed.

4 Not yet an organism. A

vast simple material may keep extending one organization. Air and water become parts of higher wholes only inside more differentiated histories.

IDEALIZED DISTINGUISHABILITY: A WHOLE BALANCE CARRIES LOCALLY ONE-SIDED ROWS



AXIOM

Closure may tolerate local imbalance. *Organismic growth begins when retained imbalances must be repaired to build balance at the next scale.*

SCALE IS PRODUCED BY CLOSURE RATHER THAN ASSIGNED FROM OUTSIDE

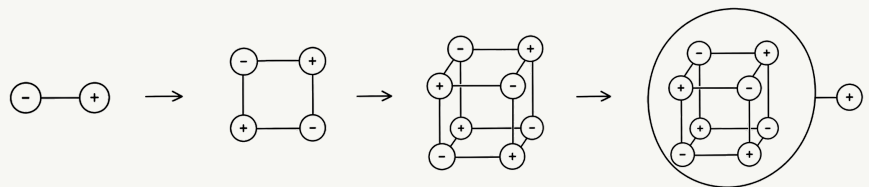
Two held sides continue as one new difference without losing their internal distinction.

1 One relation. An oriented relation has two distinguishable ends. This is the primitive 1:2: one whole participates through two sides.

2 Closure. Several relations may close into a surface or volume. Their lower causes remain inside; the closure gains one exterior interface.

3 Recursion. The completed whole becomes a difference in another relation. No final scale or fixed number of internal parts is assumed.

RELATION → CLOSED CIRCUIT → VOLUME → ONE SIDE OF ANOTHER RELATION



SCALE TRANSITION

The whole is not a summary of its parts. It is their retained ability to meet the future as one.

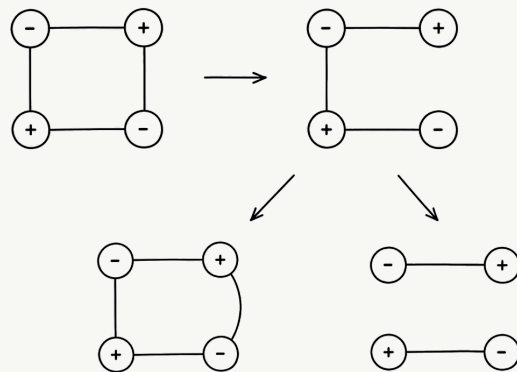
$\partial C = 0$ DOES NOT MEAN $C = 0$

A wound opens the body's boundary; repair restores a causal role, not necessarily the missing piece.

1 Closure. Let ∂ be the boundary operator. An oriented integral chain C is closed when $\partial C = 0$; its internal differences remain present.

2 Wound. Removing a necessary relation r gives $C - r$ an exposed boundary. The deficit changes the value of relations throughout the connected body.

3 Repair. A completion d succeeds when $\partial d = \partial r$. It may restore, transform, divide, or stabilize another form.

CLOSED BODY $\rightarrow$ OPENED DEFICIT $\rightarrow$ TWO ADMISSIBLE FUTURES

REPAIR THEOREM

Closure is recovered by boundary equivalence.

Identity of material is not required.

$$C' = C - r + d \cdot \text{closure restored iff } \partial d = \partial r$$

MORE OF ONE STABLE FORM IS PERSISTENCE; RETAINED HISTORICAL REPAIR IS ORGANIZATION

An organism grows by repairing earlier local imbalances into balance at the next scale.

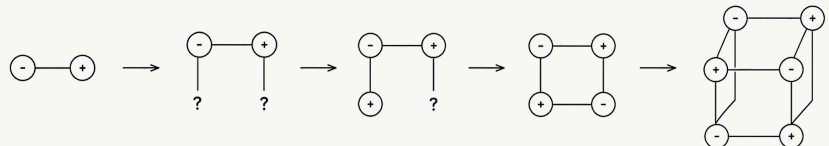
1 Earlier imbalance. The deficit $D_t = \partial C_t$ is an unfinished relation retained from the body's history, not a missing object with one prescribed replacement.

2 Repetition is not growth. Merely extending one stable closure does not create an organism. $\Omega(C_t)$ matters because retained history makes some futures unavailable.

3 Historical repair. A compatible d_t repairs or further specifies an earlier imbalance. Retaining it narrows the continuations that can still close.

4 Recursion. When the remaining boundary reaches zero, the closure acts as one difference in a relation at the next scale.

EARLIER LOCAL IMBALANCES ARE RETAINED AND REPAIRED UNTIL A NEW-SCALE BALANCE CAN CLOSE



REGENERATIVE SEARCH

Organismic growth is not more of the same form. It converts retained local imbalance into constraints of a new balance at the next scale.

The mmap hierarchy shown here is a proposed carrier architecture, not a result of the present assay.

$$D_t = \partial C_t \cdot \Omega(C_{t+1}) \leq \Omega(C_t) \cdot D_n = 0 \rightarrow \text{one new difference at the next scale}$$

USEFULNESS IS EARNED THROUGH RETURN, NOT ASSIGNED BY A LABEL

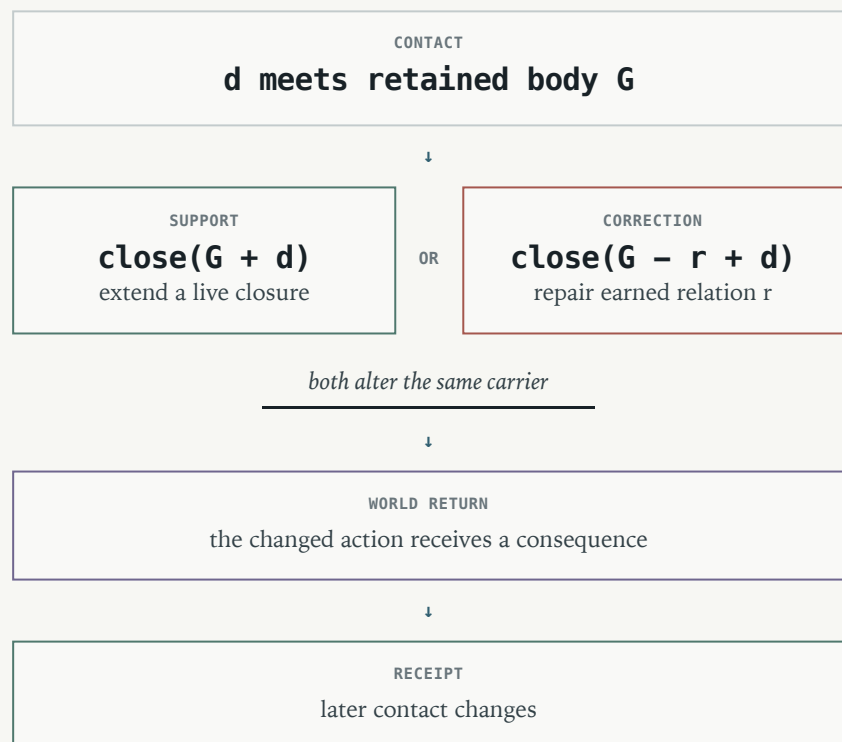
A difference becomes useful only when its later consequences help the same body continue or revise itself.

1 Growth. A compatible difference d may extend a live closure:
 $G_{\text{next}} = \text{close}(G + d)$. It becomes organismically useful only when its retained consequence changes a later encounter.

2 Revision. If d exposes an earned relation r as false, the body performs local $G - r + d$ and preserves everything not causally implicated.

3 Return. The world must answer the changed action. A downstream witness compares live, blocked, and shuffled continuations; it does not choose the internal repair.

EXACT CAUSAL FORK: SUPPORT OR CORRECTION MUST RETURN THROUGH THE SAME CHANGED CARRIER



USEFUL DIFFERENCE

The future decides whether a difference was support, correction, or both.

$\text{useful}(d \mid G, \text{contact}, \text{future}) \rightarrow +d \text{ or } -r+d \rightarrow \text{world return} \rightarrow \text{changed continuation}$

ELECTRICITY IS THE DYNAMICS OF OPEN DIFFERENCES

If charge is the oriented local homology class of a deficit, integral quantization follows from closure.

1 Deficit. Electric tension is an exposed difference propagated through the connected body. External balance means only $\partial C = 0$ at that scale.

2 Local class. A point deficit in an oriented three-dimensional body has a surrounding link S^2 with $H_2(S^2; \mathbb{Z}) = \mathbb{Z}$.

3 Quantum. If the oriented generator g maps to $-e$, every allowed class is $n \cdot g$ and every charge is $-n \cdot e$.

THE CONDITIONAL DERIVATION, WITHOUT PICTURING A CHARGED PARTICLE OR RADIAL FIELD

LOCAL DEFICIT IN AN ORIENTED 3-BODY

$$\partial C \neq 0$$

↓ take its surrounding link

LOCAL LINK

$$S^2$$

↓ compute integral homology

$$H_2(S^2; \mathbb{Z}) \cong \mathbb{Z}$$

classes are $n \cdot g$, with n integral

↓ choose orientation and physical image

$$q(g) = -e$$

therefore $q(n \cdot g) = -n \cdot e$

FOLLOWS IN THE CHAIN MODEL
integral multiplicity

STILL OPEN
the value e and the dynamical field law

TOPOLOGICAL CONSEQUENCE

Charge cannot vary continuously inside an integral class. *Its sign is orientation; its multiplicity is an integer.*

The numerical scale e and the dynamical field law remain to be derived.

$$H_2(S^2; \mathbb{Z}) = \mathbb{Z} \cdot q(g) = -e \cdot q(n \cdot g) = -n \cdot e$$

OBSERVER PARTICIPATES · WITNESS READS THE SURVIVING CONSEQUENCE

A detector does not passively reveal a completed particle; it supplies a physical distinction that closes into a local trace.

1 Extended membership.

An electron is treated as a concentration of differences whose causal membership may extend beyond the eventual visible hit.

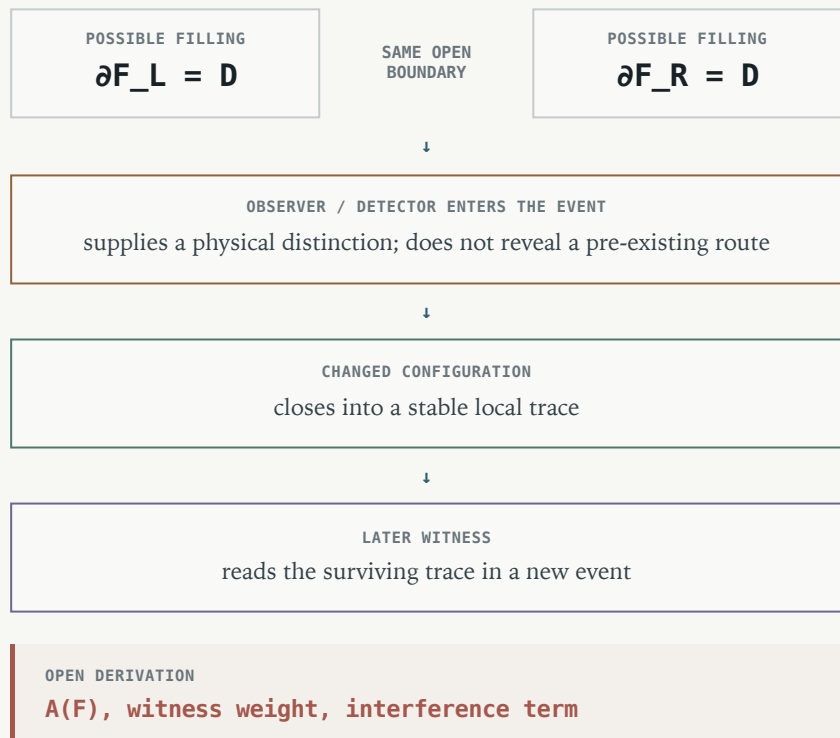
2 Observer. An

interferometer and path detector enter the event. They alter which alternatives are physically distinguishable and which closure can form.

3 Witness. A later reader

reconstructs the event from its stabilized trace. Reading is a new event, not a cause of the earlier result.

THE DETECTOR CHANGES THE EVENT; THE WITNESS ONLY READS WHAT SURVIVES



OPEN DERIVATION

No classical wave or corpuscle is required as the primitive. What remains is to derive complex filling weights and the interference term from closure.

THE SCALES SHARE A LAW, NOT A READY-MADE MECHANISM

One transition form connects physical closure, regeneration, cognition, and the persistent carrier.

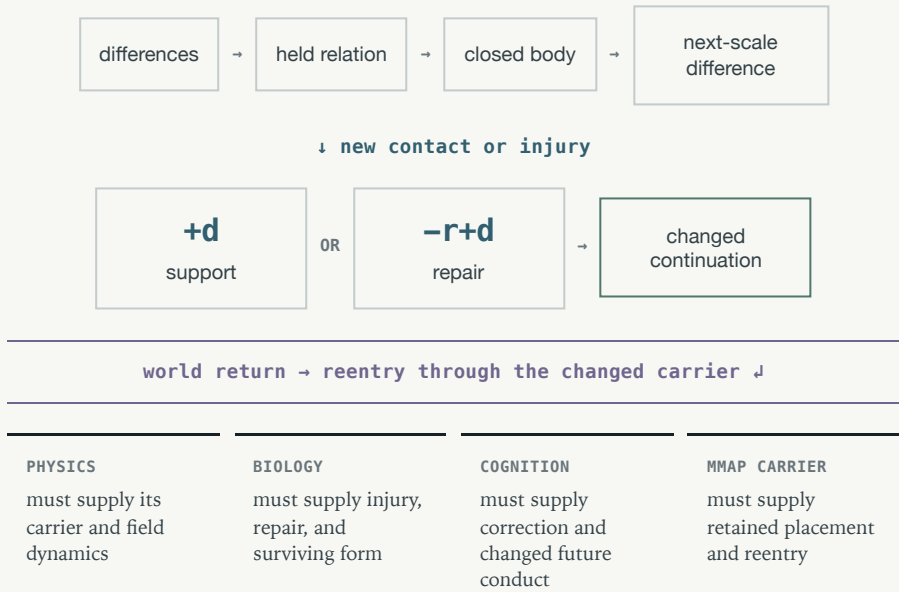
- 1

Invariant. Differences close, act as one, reopen under injury, and continue through +d or -r+d. The transition is the common object.
- 2

Material owners. Physics, biology, cognition, and mmap must each provide their own carrier, contact, deficit, completion, and surviving consequence.
- 3

Decisive seam. The theory wins only where it derives a result or distinguishes causal-role completion from target replay, hidden controller, or passive storage.

ONE EXACT TRANSITION FORM; NO INVENTED COMMON SUBSTANCE OR READY-MADE MECHANISM



Shared transition form. Different material owners. Each must be tested in its own mechanism.

WHOLE

A form is the history of differences that can still repair and continue one another. Useful difference is the unit of its growth and self-revision.