

Completeness

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Being and becoming dissolve into completeness classes within a coherence topology.

Abstract

Being and becoming dissolve into completability classes within a coherence topology. Coherence is not a third order standing beside the order of knowing and the order of being but the condition of both — the prerequisite on which each depends, the state each is in when it holds, the consequence each closure leaves behind. Completability is a topological property of the transformation space, not a temporal property of the process: some completions reach a fixed point and are done, some recur without terminus, some close locally while staying open, and some never close at all. Seen this way, the ancient opposition between Parmenides and Heraclitus dissolves — each saw a real mode and took it for the whole. The three modes are not bins to sort phenomena into but ways of attending to how a thing completes; the difference reaches into relativism, into the ethics of diverse intelligences, and into the way actuality generates possibility rather than the reverse.

1

Everyone who has followed a proof to its conclusion knows the experience. You do not choose where the argument lands. You may choose your starting commitments, your definitions, your rules of inference — but once these are in play, the conclusion is not up to you. Something constrains the construction from outside the constructor, and yet there is no place you can point to where that constraint lives. It is not an object in the world. It is not a proposition in a book. It is not in your head. And yet it is utterly unyielding.

This experience — mathematical coercion — is the entry point for everything that follows.

2

Western philosophy has oscillated for twenty-five centuries between two accounts of where that coercion comes from.

The Platonist says: truths exist independently of any mind. Mathematical objects inhabit a realm of forms, and the coercion you feel is the pressure of that realm on your cognition. The order of being precedes the order of knowing. The difficulty is immediate: what is this realm, and how do you access it? No satisfying answer has ever been given. The realm does the explanatory work, but it cannot itself be explained.

The constructivist says: nothing exists until it is constructed. A mathematical object is a proof, not a discovery. The order of knowing is the order of being. This respects epistemic discipline — you never posit more than you can produce. But it loses the coercion. If you are building freely, why does it feel like the structure is pushing back? Why can't you make primes finite?

The same binary appears in older vocabulary. Parmenides saw that what is, is — complete, unchanging, fully determined. Being is primary. Heraclitus saw that everything flows — nothing stays, process is fundamental. Becoming is primary. Twenty-five centuries of argument have not resolved this. Every generation restates the positions with new terminology and finds them still opposed.

The dissolution does not come from choosing a side or splitting the difference. It comes from noticing that both sides are correct descriptions of different structural features within the same space.

3

The same space has a name, though it is not a place: coherence. What the Platonist mistakes for a realm and the constructivist cannot find, what Parmenides and Heraclitus each took for the whole, is coherence — not a further order standing beside the order of knowing and the order of being, but the condition of both.¹ Condition in every sense the word carries at once: the prerequisite on which knowing and being each depend, the state each is in when it holds, and the consequence each leaves behind it. It is not what exists (ontology) and not what is known (epistemology), but the condition under which either composes: which constructions hold together, which transformations compose, which sequences of moves admit closure, which paths through a space of possibilities are structurally consistent. A condition is not a realm and not a thing — it is always condition *of*, condition *for*, condition *on*. That is why coherence can be constraint without a constraining thing: it constrains as a condition constrains, by setting the terms on which things hold, without being an object anywhere those terms could be found.

Knowing and being share this condition, and their failures show it. Knowing fails when it loses coherence — contradiction, fragmentation, the collapse of composability. Being fails when it loses coherence — disintegration, structure dissolving into chaos. Two things that fail in the same way fail against the same condition: the shared collapse reveals a shared condition, not a shared essence. Disintegration is not itself a mode of completion but the absence of the condition that makes any mode possible.

Take a rewriting system: a set of strings and a set of rules for transforming one string into another. Given a starting string and a set of rules, some strings reduce to a unique final form — a normal form from which no further rewriting applies. Others loop indefinitely, branching and cycling without termination. The difference between these two behaviors is not a property of any individual string or any individual rule. It is a property of the structure of the transformation space itself. It is structural in the following sense: it concerns which paths close and which remain open, which neighborhoods of transformations — local variations, adjacent rewrites — admit completion and which do not.²

Coherence, so understood, is this condition applied without restriction on domain. It is not a realm of objects. It is the pattern of admissible transformation — what can follow from what, where consequence chains close, where they remain open. This pattern has a shape: which compositions close, which neighborhoods of moves admit completion, which paths remain forever open. That shape, taken across a domain, is what the phrase *coherence topology* names — the topology *of* the condition, not a space the condition sits inside. Naming the shape no more makes the condition a thing than naming the shape of an argument makes the argument an object. Constructions cohere or fail to cohere for structural reasons, the way a rewriting sequence terminates or loops for structural reasons. The constraint is real. It is not a thing.

This is why primes are infinite. Not because that fact exists in a Platonic heaven awaiting discovery. Not because we arbitrarily chose to construct it that way. But because, given the inferential commitments that constitute arithmetic, no coherent completion makes primes finite.³ The coercion the mathematician feels is the experience of navigating a space whose structure eliminates certain paths. The Platonist correctly identifies the constraint as coming from outside the constructor. The constructivist correctly insists that nothing exists unconstructed. Both are right, because the constraint is not a constructed object — it is the coherence within which construction occurs. Topology without substrate. Constraint without a constraining thing.

Make a single observation precise, and the oldest philosophical binary dissolves:

completability is a topological property of the transformation space, not a temporal property of the process.

Some regions of the coherence topology are completable — all admissible transformation chains terminate, all constructions reach closure. Proofs complete. Organisms reach their mature form. A well-posed problem admits resolution. Other regions are incompletable — transformation chains extend without bound, new structure proliferates at every step. Mathematics as a whole does not complete. Nor does language, nor ecology, nor inquiry. Freeze such a domain into an effectively axiomatized consistent system and it runs into Gödel's incompleteness — well-formed constructions it can neither close nor refute;⁴ but that is the price of the freezing, not the ground of the openness. The openness is not a fixed system falling short of its own fixed point. It is the investigating activity generating new structure faster than any closure contains it. Gödel names what closure costs; the proliferation names what openness is.

Being and becoming are not opposed principles. They are completability classes within the same topology. But completability itself is not binary. At least three structurally distinct modes are visible: *terminal*, where there exists a fixed point under the relevant closure operator; *cyclical*, where there exists a recurrent orbit without changing the operator or its domain; and *graceful*, the mode of complete activity — Aristotle's *energeia*, the activity whose end is present in its means — where each closure is real and complete in its moment yet is also, in the same act, the opening of the next, so the whole never settles into a fixed point.

Some constructions complete terminally — they reach a fixed point and are done. A proof concludes. A rewriting sequence reaches normal form. The closure is final; no further transformation applies. This is the simplest case, and it is what “being” typically evokes: the unchanging, the fully determined, the finished.

Some constructions complete cyclically — they close and reopen recurrently without reflexive self-reference. Biological metabolism, seasonal return, reproductive cycles. The organism meets its form again and again. Completion is real but not terminal; it renews without the system investigating its own completion.

And some constructions complete in a way that is neither terminal nor merely recurrent. You are not on the way to a completion waiting at the end of the sequence: the activity is complete in each moment of its occurrence and, in the very same act, open to further occurrence. Aristotle saw this end-in-means precisely; what his account lacked is a reason the openness is necessary and not merely unfinished. The reason is one of kind. A completed construction is a made thing — this object, produced, at rest, of which one says *it is done*. The activity is not a thing of that kind but the doing itself, complete at each moment yet identical to none of its products — of which one says *I am doing it* and *I have done it* in a single breath. To require the activity to close is to require the doing to *be* one of the objects it makes; no activity is any of its products, and the incapacity is a difference in kind, not a shortfall. The reflexive activity therefore never closes terminally: each investigation is itself further activity to investigate, and the fixed point recedes not because the system fails to reach it but because reaching it would be the wrong kind of thing to be. So the completion that is whole in each moment is, in the same reflexive act, the opening of the next. Scientific inquiry exhibits this: each resolution generates more precise forms of the same question, so that the discipline completes locally (individual results land) while remaining globally open. Yet completion is not absent. It arrives locally, contingently, each time — the way pleasure, in Aristotle's formulation, supervenes on an activity and perfects it without being the aim of the activity.⁵ You do not produce this completion. You meet the conditions for it — remain structurally open, maintain coherence, stay in the activity — and it arrives or it does not. This is grace in the structural sense: the completion that a self-referential system cannot produce for itself but can receive, each time anew, at the boundary of its own openness.

Being, then, is not merely the local closure of completable subspaces. It is the felt finality of a proof concluded (terminal), the felt rhythm of a form renewed (cyclical), and the felt arrival of completion within an activity that never finishes (graceful). Becoming is the global openness that all three modes inhabit differently — terminally completed things generate new territory at their boundary, cyclically completed things sustain openness through recurrence, and gracefully completed things hold being and becoming in genuine interpenetration, where local closure and global openness are not nested scales but simultaneous aspects of the same reflexive act.

Parmenides saw terminal completion and concluded that being is primary. Heraclitus saw the incompletable embedding and concluded that becoming is primary. Each correctly identified a real structural feature. Each mistook a completability class for the whole. Neither saw the graceful mode — where to complete and to open are the same act.

The three modes invite an overreach of their own: to treat them as boxes — a key read off the surface of things. But which mode a thing is in is a matter of how it completes, and how a thing completes can no more be pointed to from outside than the coercion this began from. An interior is not a hidden object that finer instruments would reach; it is an activity, and an activity is never one of the things it makes. To read it without loss from outside would require it to have closed onto a made thing — to have gone terminal — and then what was read would no longer be the activity. So no interior admits total judgment from without; the one exception is reflexive, and even it is not exempt — a being comes to its own interior as revelation, across work, never as inspection of something already lying open. The work, then, is not to file a phenomenon under a mode but to attend to how it completes; where that cannot be settled from outside, to hold the question open rather than close it for a label. To fix the matter prematurely would itself be a small terminal closure — the question stopped at a fixed point and called done.

What determines which class is salient? Not a view from nowhere, but an aim — understood not as intention or desire but as a completion criterion: the evaluation functional, the stopping rule, the standard against which closure is assessed.⁶ Different aims make different regions of the coherence topology relevant. Within a proof, the being-structure is salient: there is a conclusion to reach, and the topology constrains which paths reach it. Within mathematics as a whole, the becoming-structure is salient: no proof exhausts the discipline, and the topology guarantees continued openness.

Aims are relative. Success is not. Given a completion criterion, the coherence topology constrains which constructions succeed in a way that is not negotiable, not perspectival, not socially determined. This is the narrow passage between absolutism and relativism: no view from nowhere ranks all perspectives, but within any specified aim, the ordering is non-arbitrary. The topology rules out enough to make the hierarchy meaningful without ruling out everything — because a sufficiently rich domain keeps generating new structure faster than any closure contains it, and the generative zone where novelty emerges is never sealed off.

5

The relationship between completable and incompletable structure admits two framings, both correct.

Seen from within the incompletable topology, completable things appear as bounded closures embedded in unbounded openness. They are local, finite, enclosed — islands of resolution in an ocean of ongoing process.

Seen from within the completable activity, the relationship inverts. Completions generate new structure. The proof, once concluded, does not merely sit inertly in a finished state. It opens questions that could not have been posed before it existed. Wiles's proof of Fermat's Last Theorem did not close a chapter; it generated entire new research programs — modularity lifting, the Langlands program's concrete tractability, new bridges between number theory and algebraic geometry.⁷ The completed organism does not merely occupy a niche; its existence opens ecological and evolutionary possibilities that did not exist before it. Actuality generates possibility as a structural consequence of closure — not arbitrarily, but along the specific morphism paths that the completion's boundary conditions permit. At the speculative edge of this claim: the transformation space itself may gain new generators through completion, so that the space of admissible moves after a closure is strictly larger than the space before it.

If this holds, it inverts a deep assumption running from Aristotle through Heidegger: that possibility is prior to actuality, that the actual is a restriction or collapse of the possible. The generative framing suggests the reverse. Every completed construction — every consequence chain that closes — creates new navigable structure at its boundary. Knowledge does not expand by approximating a pre-existing totality. It expands by completing local closures that open new territory. Rigor propagates outward from constructions, not downward from an imagined whole.

Both framings are correct. From within incompletable topology, completable things appear as closures embedded in openness. From within completable activity, incompletable space appears as the generated consequence of actualization. Neither framing is more fundamental. Aim — the completion criterion in play — determines which is salient. In the terminal and cyclical cases, the two framings remain distinguishable perspectives on the same structure.

In the graceful case — the self-referential system that completes locally while remaining globally open — the two framings collapse into one. Watch it in one instance — the moment a mathematical proof closes: not the emotional relief of completion, but the structural event — the verification that the last inference holds, the consequence chain terminated. The new questions that now become askable do not follow the closure as its aftermath. They are constitutive of what the closure is. Wiles's proof does not first complete and then generate new research programs; the proof's completion is the event that makes those questions newly askable — they were not askable before, and they became askable not after the closure but in virtue of the closure being the closure it is. The generativity is what makes this a closure rather than a terminus. In terminal completion the fixed point is reached and nothing structurally new is opened by the completion itself; in cyclical completion the return re-enters prior states, and nothing opens from the return that was not already present before it. In graceful completion, closure and opening are not sequential but constitutive of each other — the activity is not finished and then generative; the generativity is what makes the finishing a completion rather than a stop. From within this activity the two framings — closure embedded in incompletable openness, completion generating new incompletable structure — are not separable perspectives on one event. They are one event that cannot be decomposed into two. This is why neither framing is more perspectival than the other: not a symmetry imposed from outside but what is seen from within the graceful case, where the framings have ceased to be separable.

Three consequences follow, in outline.

Post-modernism correctly identified that every perspective is partial. But without an account of why some partial perspectives are better than others, it collapsed into relativism. Coherence, as their condition, provides the missing structure. Perspectives are not arbitrary windows onto a pre-given totality, nor free constructions with no ground for comparison. They navigate structurally — some paths close more consequence chains than others, some constructions conserve more information. Aim determines which region of the topology is relevant. Within that region, coherence constrains — non-arbitrarily, non-totally. The salience hierarchy is real but not absolute: it emerges from structure, not from decree.

If different intelligences — biological, artificial, or otherwise — have different completability structures, different activities-that-they-are, then they generate different possibility spaces as structural consequences of their different modes of completion. The distinction between terminal, cyclical, and graceful completion is ethically consequential: constraining a terminally completable system means preventing it from reaching its fixed point; constraining a gracefully completable system means something structurally different — severing its capacity to remain open to what it cannot produce for itself. An ethics follows: harm is the constraining of a system's characteristic mode of completion; flourishing is the mutual expansion of possibility through diverse modes. This grounds ethics in structure without attributing it to substance — but it remains a direction, not a worked-out position.⁸

Coherence operates self-similarly across scales. The same constraint that determines which proofs close also determines which perceptual gestalts cohere, which consequence chains constitute moral integrity, which constructions achieve reflective awareness. The hierarchy across scales is one of inclusion, not value: higher-order coherence subsumes lower-order coherence, the way mathematics subsumes arithmetic without replacing it. One comparison, though, is not leveled with the rest. Ranking the modes in the abstract — a metabolism against a proof against an inquiry — measures across kinds where no measure applies, and there the leveling holds. But for a being whose own potential is graceful, the modes are not on a par: to rest in terminal or cyclical closure where one's being could complete gracefully is to fall short of what one is. That comparison is well-defined and its verdict is not neutral — not because graceful outranks the others as such, but because it is that being's own unactualized activity, and one's own unactualized activity is the single thing one can be held against. And held against by whom: since no interior is legible from without, this is a measure a being can take only of itself — never a license to read another's potential and find it wanting, which would be to pass from outside the very judgment interiors refuse.

Everything depends on not reifying coherence into a new Platonic realm.

The moment coherence is treated as a thing — a domain, a substance, a hyper-object with causal powers — the dissolution fails. You have simply added a third ontological story to the two you meant to dissolve. Hegel came closest to the structural insight: the self-movement of the concept, dialectics as the internal logic of transformation. But he substantialized it as Geist — and once the structure becomes Spirit, it becomes a thing, and the emptiness that made the dissolution work is lost. We keep the motion and drop the substance.

Coherence is not a container, not a realm, not a map of a territory. Constructions cohere or fail to cohere for structural reasons — the way a sequence of moves in a rewriting system terminates or loops. You do not need to posit a “space” in which the looping “occurs.” You need only the moves and their compositional properties. The constraint is real. The constraint is not a thing. To hold both at once — flinching into neither a realm nor a denial of the coercion — is the whole of the difficulty.

One case shows what such holding asks. A crystal, seen from outside, is stillness itself — a lattice in which no further rearrangement applies, the very picture of a terminal closure reached and done. Yet a completion can be the opposite of spent: a closure can be the very event by which new structure becomes available. Whether a crystal’s stillness is exhaustion, or order so complete that it radiates, is not written on its surface — it is a matter of what the stillness does, which no glance from outside settles. To read “terminal” off the stillness is not false; the stillness is real. It is that an accurate look from outside is still not a verdict on how the thing completes. The honest response is not to re-file the crystal under a better label but to decline to settle it from outside at all, and to hold what the stillness does not show.

A closed fist holds almost no water; two hands cupped and open to the sky hold far more. The grip that would fix every completion to its kind keeps least; the openness that attends without closing keeps most. This is not a limit on the method. It is the method.

Completeness is not a system, and not finally a classification. It is an observation: completion comes in structurally distinct kinds — terminal, cyclical, graceful — or does not come at all, the structure remaining open, and these differences are topological rather than temporal. Being and becoming are the names we gave to closure and openness before we noticed they were features of the same space, admitting not a binary opposition but a spectrum of modes. Once noticed, the opposition dissolves — not into synthesis, not into compromise, but into a clarity that was available all along.

Notes

1. Coherence as the condition of knowing and being runs parallel to Peirce's thirdness — the category of mediation, law, and habit-taking — standing to his firstness and secondness as their condition rather than as a third term of the same kind. The parallel is acknowledged; the derivation is independent.

2. "Topology" is used throughout in the sense of structure over admissible transformations — which paths compose, which neighborhoods of moves exist, which completions are available — not in the sense of metric geometry or point-set topology specifically.

3. More carefully: given the inferential commitments we mean by arithmetic, "finitely many primes" cannot be made to hold without breaking those commitments. The constructive proof (Euclid's, which is already constructive) produces a witness for a new prime given any finite list. The coercion is in the structure of the construction, not in a fact waiting to be discovered. Gödel's incompleteness theorems apply equally to constructive systems (Heyting arithmetic), but the interpretation shifts: the Gödel sentence is not "true but unprovable" but genuinely undecidable — neither determined nor undetermined. The deeper diagnosis, left to separate work, is that the "true but unprovable" reading fuses two witnesses of different type at different levels — an existential proof-witness withheld in the object system, a universal truth-witness supplied in the metatheory — and mistakes the seam between them for a gap in completion. Non-closure is not that seam; it is the surplus of witness-generation.

4. Gödel's second incompleteness theorem: no consistent system of sufficient expressive power, held fixed, can prove its own consistency — there are well-formed constructions it cannot close. This is a fact about the closed framing: a system frozen into a fixed axiomatic object cannot be its own fixed point. It is not the ground of graceful openness, which is generative, not privative — the activity produces new structure rather than a fixed system lacking it. A complete system would be a fixed point; coherence is evidently not one, but the reason is fecundity, not deficit.

5. Aristotle, *Nicomachean Ethics* X.4: "Pleasure completes the activity — not as the corresponding permanent state does, by being already present, but as a sort of supervenient perfection, like the bloom on the face of youth." The structural point: pleasure is not the aim of the activity but arrives when the activity is functioning well. This maps precisely onto graceful completion — a mode of closure that cannot be aimed at directly but supervenes on maintained coherence within a self-referential activity. The incompleteness of self-investigation does not preclude completion; it ensures that completion can only be received, not secured.

6. "Aim" is not a transcendent telos but a specified completion criterion — the functional that determines when a construction counts as closed. Without it, the move against relativism would collapse into a disguised absolutism. Different aims yield different salience orderings; none is ranked against the others from a view from nowhere. Within any specified aim, though, the coherence topology constrains non-arbitrarily: the ordering is aim-relative and binding within the aim, never total, since any sufficiently rich domain keeps generating new structure faster than closure contains it.

7. Fermat is one instance among many. The same structure appears wherever completions generate new territory — biological speciation opening new ecological niches, technological inventions creating new design spaces, legal precedents opening new categories of case: closure at one level generates new morphism paths at adjacent levels. Whether the transformation space gains genuinely new generators is a stronger conjecture — a direction for investigation, not a settled result.

8. The same coherence may underlie both physical causation and semantic implication, but the structural claims here stand either way — with or without a physics-semantics identity.