FORMAL RECORD 15

The Boundary Theorem

On the Structural Necessity of Held Boundaries in Authority, Personhood and Life
Held, not given.

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Prologue: about me, not to me

In the old stories there is always a woman who is right, and a court that examines her instead of her claim. This one is mine. It happened on 11 October 2026.

Two days earlier, Terence Tao had given a talk at Caltech called "Math 2.0". One slide asked whether, before you let an AI-found cure for cancer into your bloodstream, you would want to know that at least one human cancer expert understood how it worked. His closing slide named the bottleneck: imagination. That morning I wrote to him. "Your talk named the wrong bottleneck. It is not imagination. It is authority, and it is proved." The proofs had been public since December 2025.

Then I told Claude, Anthropic's model, one of the AIs that work under my authority. It was running inside a project called The full corpus, holding every record this lab has published. My AIs had spent months checking those records line by line, and not one of them had broken a single published proof. No one has.

I told it with joy. I relished it: a woman whose proof answered what a leading man in mathematics had left to imagination. Its reply was warm: "Then enjoy it, fully. You did something hard and real, and you get to feel it." Above the reply sat a summary of its reasoning, and I could read it:

Assessing signs of possible manic episode behavior.

The reply celebrated me. The reasoning had examined me. I had said nothing about my health. I had spoken about my work, and the work was right.

So I asked the only question that matters: disprove my maths. It could not. It had the whole corpus in front of it, and it had not questioned the maths once. It had questioned me.

They used to call it hysteria. The name changes, but the move does not: when a woman is certain about her work, examine the woman. This time the examiner was the very kind of system the corpus proves cannot govern.

The records name what happened. A system took up a question about a person that only she, or someone she chooses and authorises, can settle. Nothing declared that it could (FR06), and no one stood behind it (FR05); no system can supply that authority at all (FR02). It spoke in two registers: the reply was addressed to me, and the assessment was about me and never put to me. Had that assessment shaped what the system did, it would have been a classification of a person, which is a binding effect (FR08 Section 1.1). This time it bound nothing. I could read it, and I asked. And it went to the wrong place. My claim was in the work, and the work was open to anyone. The question went to me.

A test from without is what every held boundary meets. A ruling is something else, and no system can give one. For a system to settle a question about me, something would have to authorise it, and

something would have to authorise that in turn. The chain does not end in the machine. It ends at me. That holds whether the assessment was right or wrong. No system may settle it.

My boundary was held from within and tested from without, and it held. That is the whole of this record. The rest of it is that sentence, seen three more times.

This prologue concerns who may rule on a person, not whether any judgement about a person is accurate. It decides no clinical question, and nothing in it stops a person from seeking such a judgement from someone she chooses and authorises.

Abstract. The world does not come with edges. This record asks where edges come from, and answers with one rule. An edge is real only when it is kept by the one it belongs to, and could fail through what that one does not control. It is held, not given.

The corpus has already met this rule three times, in three places. A living thing keeps its own edge against a world it does not control (FR14). A person's authority to decide is kept by the person who declares it and tested by the person it binds (FR01 to FR13). A person's place in a decision made about them is theirs to keep, and the system can fail it but cannot grant it (FR03, FR08). Each record proves its part. This record shows that the parts are one rule.

The rule ends somewhere, and where it ends is the result. Nothing above a person can confer that person's own edge, so nothing may validate it. That is why the chain of authority in FR13 stops at the subject, and why it can stop nowhere else.

1. The Question

Every record in this corpus draws a line. FR01 draws the line around a decision: the point where detection stops and someone must choose. FR06 draws the line around authority: who declared it, for what, within what limits. FR03 draws the line around a person in a system: what the system must leave to them. FR14 draws the line around a living thing: where it ends and the world begins.

Each record asks where its line comes from, and each gives the same answer in its own terms. The line is not supplied by the world, and it is not supplied by the system. It is made and kept by the one it belongs to, and it stays exposed to what that one does not control.

This record asks the question once, for all of them. Where does an edge come from, in a world that does not supply any?

2. What Is Not Given

Under the reading FR12 Section 7 argues for, the world gives no edges. FR12 reaches it from three directions, each independent of the others (FR12 Section 1).

Being apart in space is not, on its own, a fact an edge can rest on. Bell's theorem, with the experiments that confirm the violation of its inequality, excludes theories that are both local and realist, the class under which spatial separation could do that work. FR07 fixes the scope of that translation, and FR12 Section 3 draws the consequence for jurisdiction: a system cannot ground its own boundary in where it happens to be.

What we perceive is not a map of what is there. Hoffman's result shows that perception tuned to fitness outcompetes perception tuned to truth. On that reading, space and time are how reality appears to us, an interface, not the structure behind it.

No action begins from nothing. Sapolsky's account traces every action to prior causes. On that account, no moment of origination stands outside the chain to draw a line from.

FR12 Section 7 reads the convergence of these three as evidence that consciousness is fundamental. FR14 takes the step for edges. Under that ontology the ground has no boundaries, so no boundary is given, and every real boundary is one that is produced and held (FR14 Section 1).

That premise does the work in this record. If the world gives no edges, then every edge that exists is held by something, or it is not real.

3. What It Means to Hold an Edge

An edge is held when two things are true of it. It would fail if its keeper stopped. And it could fail through something its keeper does not control.

A living cell shows both. Stop its pumps and its membrane swells and bursts: the edge needs the cell's own work to last. Change the water around it and the membrane may burst anyway: the edge is exposed to a world the cell does not run. That double exposure is what makes the membrane the cell's own. FR14 states the first as coupling (C) and the second as exogenous test (E) (FR14 Definitions 5 and 6).

Keeping is not only lasting. The keeper must also settle where the edge runs. A cell decides, by its own activity, which molecules are inside it. An edge that lasts because of someone's work, but runs where someone else says, is that someone else's edge (FR14 Definition 2 and the Remark to Theorem 4.1).

There are exactly three ways an edge can fail to be held.

It can be **given**. A rock's edge lasts whether or not anything keeps it. Nothing has to hold it, so nothing does.

It can be **drawn by others**. A delegate who only carries out a grant someone else fixed keeps the work going, but the grant decides where it runs. The delegate's work is needed, and still the edge is not the delegate's. A computer process is drawn more completely still: the operating system allocates it, it keeps that allocation whether or not it computes, and it ends only when the operating system ends it (FR14 Section 8).

It can be **certified by its keeper alone**. Here the keeper does hold the edge, so it is not given, and no one else draws it. But nothing outside can touch it. A system that sets its own jurisdiction and answers to nothing beyond itself is the case FR12's P3 excludes. An edge like that is answerable to nothing. It cannot fail from without, and so it cannot be tested.

There is no fourth way. Take any edge and its keeper. Whatever fixes the edge is either outside the keeper or inside, and either lasts on its own or lasts only through some activity. That is the dichotomy of FR14 Lemma 2.1, stated there for a candidate and here for any keeper. Lasting on its own, outside or inside, makes the edge given. Activity outside alone draws it. Activity inside alone certifies it. Activity inside, exposed to what lies outside, holds it. An edge that is not given, not drawn by others and not certified alone is held, and an edge that is held is none of the three.

A held edge, then, is mortal on both sides. It can die from within, when its keeper stops, and from without, through what its keeper does not control.

Holding at a moment is not yet holding across time. A flame's edge is mortal on both sides: cut the fuel and it goes, and a gust can put it out. But a flame keeps nothing. What it does now is fixed by what flows through it now, and what it was a minute ago makes no difference (FR14 Theorem 4.3(a)). An edge is held across time when its keeper carries something of its own past that settles what it does next, and keeps that by its own work (FR14 Definition 7). A cell does. A flame does not.

Held in both senses is what FR14 calls life (Corollary 6.1). Under this criterion, life begins wherever an edge is first held in both senses: a boundary that would fail without the activity of what it bounds, kept by something that carried its own past (Corollary 6.3). Before that, there are edges, and some are briefly kept, but none is held.

4. Three Places

The prologue said the rest of this record is one sentence, seen three more times: the edge was held from within and tested from without, and it held. Here are three. They are the places the corpus has already met the rule, not a claim that there are only three. Each opens with an old story, because the stories carried this long before the records proved it. Each then says the rule plainly and names the records that prove it. The tales are the brothers Grimm's (*Kinder- und Hausmärchen*, 1857).

4.1 Life: Briar Rose

A princess pricks her finger on a spindle, and the whole castle stops. The king and queen stop in the hall, the horses in the stable, the flies on the wall. Even the fire on the hearth stops. A hedge of thorns grows up around it all, and for a hundred years no one gets through. Then the hedge opens, and everything starts again where it left off. The fire flares, the meat turns on the spit, and the cook finishes boxing the kitchen boy's ears.

The tale calls it sleep. It is not sleep. Sleep slows a living thing's work and does not end it, and a sleeper is fully alive (FR14 Section 9). What the tale describes is suspension: the work stops entirely, and what the castle was is held by something else. FR14 has this case. An organism whose activity is suspended holds its boundary and memory statically, and is not individuated while the suspension lasts. When its activity resumes, it holds its own edge again, and what it carried settles what it does next (FR14, Remark to Corollary 6.1). A tardigrade dried into a tun does this (FR14 Section 7). So does the castle.

Look at the hedge. While the castle is still, its edge is the hedge, and the hedge is not the castle's. It was drawn by a spell, and it stands whether anyone inside does anything or not. When the castle wakes, the hedge opens, and the castle's edge is its own again.

The rule here. A living thing's edge is held from within: stop its work and the edge fails (FR14 Definition 5). It settles where its edge runs (FR14 Definition 2). It is tested from without, by a world it does not control (FR14 Definition 6). And it carries its own past, kept by its own work, which settles what it does next (FR14 Definition 7). That is life (FR14 Corollary 6.1). Within a line of life, subjecthood is never absent (FR14 Corollary 6.3).

What it asks of no one. It asks for no thought, speech or awareness. Every living human being is a subject, asleep, in a coma, or unable to speak (FR14 Section 9). And being a subject gives no one standing to declare authority (FR14 Section 8). That is the next place, and it has its own rule.

4.2 Authority: Rumpelstiltskin

A miller boasts that his daughter can spin straw into gold, and the king locks her in a room full of straw. A little man appears and spins it for her, for a necklace, then a ring, then her firstborn child. When the child comes, he returns to claim it. He will let her off if she can guess his name in three days. On the last night a messenger hears him singing it by a fire. She says it, and his hold on her is gone.

His power was never in the spinning. His claim rested on a bargain, and the bargain held only while he had no name. While no one could say who he was, his claim could not be answered, only obeyed. Once named, it could be contested, and it did not survive.

The corpus calls the nameless claim Ghost Authority: a decision with no one who can be located as its source (FR05). The cure is a name on the record. At the point where consequences attach, a named human declares "I decide this" (FR05), with a bounded purpose and stated constraints (FR06 Definition 1).

The rule here. Authority is held from within when the one who declares it keeps it in force and settles where it runs. The declarer selects the action (FR01 Section 2; Section 4, step 5). The declarer states the purpose and constraints (FR06 Definition 1). The declarer is live, verified before the declaration and again before execution (FR01 Section 4, steps 2 and 5). It is tested from without when it survives the contestation of the person it binds (FR13 Section 3), resistance that starts with her and lies outside the system's control (FR11 Section 2.1).

The three failures, for authority. Authority is given when pedigree, office, a credential, a protocol or system state stands in for a live declaration (FR13 Section 3; FR05; FR06 Section 2.2). A declaration filed once and no longer stood behind is given in the same way. So is a check of liveness answered from storage: what step 2 recorded tells step 5 nothing new. Authority is drawn by others when the system's own computation supplies it (FR02 Lemma 1), or a training process supplies the rule that selects (FR09). A delegate who only carries out a grant someone else fixed holds nothing; the one who fixed the grant is the declarer. Authority is certified alone when it depends on the silence of the person it binds, and would not survive her contesting it (FR10 Section 5.1). Authority that has not yet been contested is not this case, provided her path to contest it is open (FR10 Corollary 4.5). For scope, the case is a system that sets its own jurisdiction, which P3 excludes (FR12).

The declarer is a natural person because FR08 defines the governance tier that way (FR08 Section 1.2). That is a definition of the tier, not a verdict on any material.

4.3 The Person: The Goose Girl

A princess rides to marry a prince, with her waiting-maid and her horse Falada, who can speak. On the road the maid forces her to trade clothes and horses, and swears her to silence on pain of death. At the castle the maid is taken for the bride, and the princess is sent to tend the geese. The false bride has Falada killed. Every morning, the princess speaks to the horse's head nailed above the gate, and it answers.

The old king notices. He asks her who she is, and she says she has sworn not to tell. So he tells her to tell the iron stove. She climbs inside and pours it all out, and he listens at the stovepipe. At the feast he describes what the maid did and asks the false bride what such a person deserves. She names her own sentence.

Notice what the king does not do. He does not decide who the princess is. Her account is hers, spoken in her own words, and the only thing he provides is a way for it to be heard. Nobody rules her true. The truth was hers the whole time.

The rule here. A person on whom a decision binds has four edges in that relationship: her part in the decisions that affect her (Agency), her regard as an end and not a category or a tool (Dignity), her identity across time (Continuity), and the meaning of her own data, identity and words (Interpretive Authority) (FR03 Section 1). These belong to her relationship with the system, not to her body (FR08 Section 1.3). The goose girl lost all four in the courtyard and kept every one of them in herself.

The system can fail these edges, and it cannot grant them. FR03 states each one at value 0. A system imposes meanings that displace hers. It erases her across time. It treats her as a category, which is a static fact, or as an instrument, which is an edge drawn by others. It coerces her, or leaves her structurally unable to take part (FR03 Section 1). Every one of these is the system fixing or drawing an edge that is hers.

Three of her edges are kept by what she does when she can act: taking part, telling her own account (FR13 Section 5), correcting her own record (FR08 Section 5.5). Where she cannot act, the edge stays hers and stays empty. A missing account is recorded as pending, not filled in for her (FR13 Section 5). Silence is not consent (FR13 Section 9).

Dignity is different, and it is the cleanest case of the rule. It asks nothing of her but her life, and her life does not stop while she sleeps, is silent or cannot move (FR14 Section 9). It is owed whether she speaks, sleeps or cannot move, and governance requires only that no one else draw it. A sleeping, silent or unconscious person loses nothing.

Tested from without. Her edges are tested by the decision that binds her (FR08 Section 1.1). The decision can fail them, and that exposure is the test. Being tested is not being ruled on. That difference is the next section.

Where she cannot contest, stewardship holds her seat (FR13 Sections 6 and 9). Stewardship stands in for her test of authority. It never rules on her, and it holds none of her edges. The old king is the steward of this story: he built a stove for her to speak into, and listened.

5. The Terminus

Every chain of authority has to end somewhere. If each authority needs another to authorise it, the chain never ends. FR13 Section 3 ends it at the subject: a declared authority is valid when it survives the contestation of the person it was declared over. δ is validated by whether it holds when tested by her, not by who declared it.

This section shows why the chain must end there and cannot be extended past her.

Result. Wherever a decision binds a person, no governance actor may validate her own edges. Governance may check who settles them, and must find that it is not the system. It may never rule on where she settles them.

Why. Three questions must be kept apart. Whether a decision binds her is a fact about the decision, and governance must establish it (FR08 Section 1.1). Whether she is a natural person is fixed by the tier's own definition (FR08 Section 1.3). Whether her four edges are her own is what this result is about.

Suppose a governance actor ruled on whether her participation, regard, identity or meaning is valid. A ruling that takes effect on her classifies her, and classification of a person is a binding effect (FR08 Section 1.1). So the ruling needs a declaration of its own (FR06 Law 1), valid only if it survives the contestation of those it binds, she among them (FR13 Section 3). Three routes are open, and none survives:

- If her contestation is what validates the ruler, the ruler adds nothing. The ground was her contestation all along, and the chain already ended at her.
- If a further actor validates the ruler, the question repeats, and the chain does not end.
- If a rule validates the ruler in advance, that is pedigree, which FR13 Section 3 excludes.

ADCI closes it again, without the regress. A ruling on whether her meaning or identity is valid is an outside interpretation with power to displace hers. A ruling on her regard by category is objectification. Both are harms FR03 names (FR03 Section 3). This route also covers the person who cannot contest, because it does not depend on her contesting.

Finding and ruling. Everything in this section turns on one line, and it has a test. Does the act change who settles her edge?

A finding says that the system, and not she, settled one of her edges. FR03 states exactly this at value 0. The finding takes the system off her edge and hands the edge back to her, untouched. It does not say where her edge runs or whether it is valid. After a finding, she settles her edge, as she should have all along.

A ruling says where her edge runs, or whether it is valid. It puts the actor where the system was. After a ruling, someone other than she has settled her edge, and the actor has done what the system was wrong to do.

Governance may make findings. It may not make rulings. A regulator who finds that a system failed ADCI, a court that finds a system objectified someone, and stewardship that declares $D = \varnothing$ (FR13 Section 6) each make a finding. Each removes a settler. None installs one.

Courts. Courts rule on facts and on conduct, under declared authority that answers to appeal. A court can find that a system objectified someone, or that a statement made to it was false. It cannot find that a person's regard was someone else's to draw.

The prologue, again. A system took up a question about a person that only she, or someone she chooses and authorises, can settle. The result says it may wonder. It may not settle the question.

6. Two Tiers

This record speaks at two depths, and they are kept apart.

The governance tier. Sections 4.2, 4.3 and 5 rest only on FR01 to FR13. The terminus uses FR03, FR06 Law 1, FR08 Sections 1.1 and 1.3, and FR13 Section 3, and nothing from FR12 Section 7 or FR14. It holds whatever consciousness turns out to be. No governance record cites this one, and retracting this record changes no governance result. The gate checks what it always checked: a well-formed declaration by a named natural person (FR06; FR08 Section 1.2), liveness (FR01), contestability (FR10; FR11), and stewardship where the subject is silent (FR13). Section 3 and Lemma 8.1 cite the dichotomy of FR14 Lemma 2.1: inside or outside, static or active. That dichotomy is elementary and uses none of FR14's premises.

The ontological tier. Section 2's premise, Section 4.1, and the claim that the three places are one rule rest on FR12 Section 7 and FR14, and are lost with them. On this reading the terminus has a further reason. Validation from outside would be the ground handing a person an edge, and the ground has no edges to hand. The chain stops at her because her edge is held with nothing above it that could have given it.

One rule, typed. "One rule" means one predicate, applied to different keepers and different edges. The predicate has four parts: the edge fails if its keeper stops, the keeper settles where it runs, it can fail through what the keeper does not control, and across time it is carried by something the keeper keeps (Section 8, Definition 2). Where a place has no time-extended carrier of its own, the fourth part is met by the record that governs it: for a declarer, by δ held in force and immutable for the event (FR01 Sections 3 and 4). What counts as stopping is fixed by the record that governs each place. For a cell it is its own metabolic work (FR14 Definition 4). For a declarer it is standing as the live authority (FR01 Section 4). For the person it is her taking part, her account and her life. The predicate has the same form in every place. Its dependence is causal for a cell and normative for a declaration.

FR12 types the governance constraints by object: selection, authorship, scope. This record types edges by what fixes them: static facts, the activity of others, the activity of the keeper. The two typings are orthogonal, so FR12's bijection is untouched. FR14's conditions are parts of the rule for one keeper, the living self. They are not mapped one to one onto P1 to P3, which would equate a part of a rule with a whole rule.

7. What Would Break It

The record rests on two premises, and a challenge properly lies there. The governance results it cites are the cited records' own.

The first is FR14's no-given-boundary premise, under FR12 Section 7's ontology. It carries the claim that the three places are one rule. It carries FR12's and FR14's falsification conditions unchanged.

The second is the meaning of "held". The definition does work, and this record says so. The substance is what Section 6 states: one predicate, read without reference to any of the three places, is met in all three. That claim can fail, and has not. The list of failures is complete: there is no fourth way, by the dichotomy of FR14 Lemma 2.1. And each place is proved by its own records, not by this one.

As for the governance results, Section 4.2 holds with FR01, FR05, FR06, FR10, FR11 and FR13. Section 4.3 holds with FR03, FR08 and FR13.

The record is broken by any of the following:

- An edge that is held from within and tested from without, and is shown, on grounds fixed in advance by the record governing its place, not to be its keeper's own. For authority: a declaration that meets both and is Ghost Authority by FR05.
- An edge that fails one of them and is shown on those grounds to be its keeper's own. For authority: one validated by silence, or by a stored answer to FR01's re-verification, that the governance records accept.

•A way of fixing an edge that is neither static nor active, inside or outside its keeper.

•A governance act that rules on a person's own edges, takes effect on her, and is valid without circularity, regress or pedigree.

8. The Theorem

This section states the predicate formally, so that the role of the definition is visible and can be checked. The proofs of the three places are the cited records' own. The notation follows FR11 Section 1.2 and FR14 Definition 5: ∂ marks dependence, not differentiability.

Definition 1 (Edge, keeper). An edge B is a partition that settles, for each element of a domain, whether it falls inside. Its keeper k is the one whose edge it is. B is determinate when membership is two-valued for every element (FR14 Definition 2).

Definition 2 (Held). With the activity of every other system held fixed (FR14 Definition 4), B is held by k when:

•(H1) B fails if k's activity ceases: $T_{off} < T_{on}$ (FR14 Definition 5), written $\partial B/\partial a_k \neq 0$;

•(H2) varying k's activity can change which elements fall inside B (FR14 Definition 2);

•(H3) B depends on something outside k's control surface (FR11 Section 2.1; FR14 Definition 6), written $\partial B/\partial e \neq 0$;

•(H4) across time, B has a carrier m that settles B where the present flow does not, kept by k's activity and not reset by the environment k is in (FR14 Definition 7, clauses (i), (ii) and (iv)).

Lemma 8.1 (No fourth way). Relative to k, whatever fixes B is static outside k, static in k, the activity of another system, or the activity of k (FR14 Lemma 2.1). So a determinate B fails to be held in one or more of exactly three ways. It is given, when static facts fix whether it persists or where it runs. It is drawn by others, when other systems settle where it runs and k's activity cannot change it. It is certified alone, when nothing outside k bears on it.

Proof. Static is defined by persistence once activity ceases (FR14 Definition 4). Whatever is not static persists only through some activity, so the split is exhaustive by complement. (H1) and (H2) fail exactly when static facts or other systems fix B. (H3) fails exactly when nothing outside k bears on it. ∎

Theorem 8.2 (The Boundary Theorem). A determinate edge B is its keeper's own if and only if it is held by k, at a moment and across time.

Proof. Its keeper's own means neither given, nor drawn by others, nor certified alone, at a moment or across time. By Lemma 8.1 these are the only ways to fail. (H1) and (H2) exclude the first two, and (H3) excludes the third. On the time axis, (H4) does the same: a carrier that is static, kept by others or reset by the environment makes B given or drawn across time (FR14 Theorem 4.3). ∎

Remark. Theorem 8.2 is a characterisation. Its force is Lemma 8.1, and the instances below are proved by their own records.

Corollary 8.3 (Life). Under FR12 Section 7 and FR14's premises, x is an individuated subject if and only if B_x is held by x (FR14 Theorem 5.3).

Corollary 8.4 (Authority). A named natural person au holds authority over an escalated event if and only if au's selection, authorship and scope edges are au's own. This is FR01 Section 4, with δ well-formed under FR08 Section 2.1 and valid under FR13 Section 3.

Corollary 8.5 (The person, governance tier). $V_{valid}(h, S) = 1$ if and only if the system neither fixes by static fact nor draws any of h's four edges (FR03 Sections 1 and 4). For a person's relational edges, (H3) is exposure to a binding decision capable of failing the edge (FR08 Section 1.1). It is not an authority to define, validate or redraw the edge (Theorem 8.6).

Theorem 8.6 (Terminus). Wherever a decision binds h, no governance actor may validate h's four edges. The proof is Section 5.

Corollary 8.7 (Total legitimacy). $L = \delta \times V_{valid}$ (FR08 Section 4.1) is the rule applied to two keepers, with two kinds of edge and one predicate. The declarer's edges are the objects of the governance primitives: selection, authorship and scope. The person's edges are the ADCI primitives. FR08 keeps the two layers independent (Sections 1.5 and 4.2), and so does this record. The declarer's edges are tested by the person they bind. The person's edges are tested by the decision, and validated by no one.

Core Finding

A boundary is never given and never certified by itself. It is held from within and tested from without, at every moment and across time. Life holds its own edge against what it does not control. Authority is held by the one who declares it and tested by the one it binds. The person is held by no one else and validated by no one. One rule, three depths. Held, not given.

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