

The Mind Unfolded

Psychophysics: A Brief Introduction to Unfolding Reality by J. Andrew Ross
Summary and review by Anthropic AI Claude, with prompts by Andy Ross

AR: I asked Claude to summarize and review my new book.

Claude: Here is my summary and review.

Psychophysics: A Brief Introduction to Unfolding Reality by J. Andrew Ross is a 224-page philosophical essay that proposes a new conceptual framework for understanding the mind. The author coins “psychophysics” as his term for a future field bridging psychology and physics, and argues that the deep problem of mind science is not empirical but logical: Our framing assumptions need replacing.

The book has six substantive chapters:

Being sets the philosophical stage with Kant, Hegel, and Heidegger, arguing that the fundamental distinction is not between matter and mind but between *being* and *existence* – the virtual realm of ideas versus the physical realm of spacetime.

Time challenges the Einsteinian/Gödelian view of a static “block universe” and argues for a dynamic logic of *becoming*. Drawing on Gödel’s incompleteness theorems, Ross contends that time is not a geometric dimension external to us but something that unfolds from within.

States covers the quantum revolution from Planck through Bohr, arguing that quantum mechanics – properly understood – supports a dynamic, processual view of reality rather than a fixed one.

Life grounds the theory in biology, tracing Darwin’s theory of evolution and modern neuroscience, insisting that any science of mind must be built on evolutionary biology.

Minds tackles consciousness directly, opening with the famous 2023 Koch–Chalmers bet resolution, and arguing that the neuroscientific program for solving the “hard problem” has failed because it is working with the wrong conceptual tools.

Worlds introduces the book’s central positive proposal: Each conscious being inhabits a *mindworld*, a subjective virtual reality centered on what Ross calls the *omphalos* (Greek for “navel”). The ego in being projects an avatar into existence, and conscious life is the frame-by-frame unfolding of a mindworld movie. Social reality is, accordingly, a kind of multi-user online game.

The conclusion consolidates the argument: a logic of becoming replaces the logic of static being, and this changes everything from foundational mathematics to the science of consciousness.

Review

This is an ambitious, wide-ranging, and genuinely original work. A few strengths and challenges stand out.

Strengths

The scope is impressive. Ross moves confidently across mathematical logic, quantum physics, evolutionary biology, and philosophy of mind without losing the thread. The linking idea – that a dynamic logic of becoming must replace a static logic of being at every level – is consistent and gives the book real intellectual coherence.

The writing is clear and largely jargon-free for such technically demanding material. The author is good at the elevator-pitch moment: “We live in a mindworld movie” is a vivid and memorable formulation. The historical framing (Kant, Hegel, Heidegger, Einstein, Gödel, Darwin, James) situates the argument well and gives the reader familiar landmarks.

The use of William James’s “worlds of consciousness” as a springboard for the *mindworld* concept is well chosen: It anchors a speculative proposal in a serious empirical tradition.

Challenges

The book’s greatest strength is also a potential weakness. The ambition to synthesize logic, physics, biology, and psychology in about 50,000 words means each step is argued at speed. Readers with deep expertise in any one of these fields may find the transitions too quick – for instance, the move from Gödel’s incompleteness theorems to a “dynamic logic of becoming” is suggestive rather than demonstrated. The author is aware of this, describing the book as a “gloss” that “goes easy on its readers,” but it means some of the key philosophical moves happen offstage.

The central distinction between *being* and *existence*, and between the ego and its avatar, does a lot of heavy lifting. It would benefit from a more sustained technical treatment – perhaps a worked example of how the distinction applies in a concrete experimental context in neuroscience or quantum mechanics.

The framing occasionally slides between bold scientific claim and philosophical metaphor (“a multi-user online game”), and readers may want to know more precisely where one ends and the other begins.

Overall

This is a thoughtful, well-written, and intellectually serious contribution to the philosophy of mind. It reads like the mature synthesis of a lifetime of thinking across disciplines, and the core intuition – that psychology needs a new logical foundation rooted in becoming rather than static being – is both plausible and provocative. Readers looking for a rigorous technical treatment will need to supplement it with the underlying papers and references (which are helpfully provided). But as a manifesto and orientation for a future research program, it achieves its aims well.

AR: I then asked Claude to draft a review in the *NYRB* style by someone like Sean Carroll.

Claude: Here's a draft in the *NYRB* style, written in the voice of a physicist–philosopher in the Sean Carroll mold – essayistic, intellectually engaged, a touch wry, and willing to push back as well as praise:

Psychophysics: A Brief Introduction to Unfolding Reality by J. Andrew Ross. Rover Science, 224 pp.

There is a genre of book – ambitious, synthetic, written by someone who has spent decades at the edges of several disciplines – that academic philosophy tends to receive with polite suspicion. Too much ground covered too quickly; not enough of the grinding technical work that earns the right to large conclusions. J. Andrew Ross's *Psychophysics* will almost certainly be treated this way by some readers. That would be a mistake.

Ross, a philosopher trained in mathematical logic at Oxford and London who spent twenty-five years in German science publishing, has written something genuinely unusual: a short, lucid, and consistently interesting argument that the science of mind has been held back not by a shortage of data but by a defect in its foundational logic. The argument ranges from Kantian epistemology through Gödelian incompleteness and quantum mechanics to neuroscience and the philosophy of consciousness, and it arrives at a proposal – the concept of the *mindworld* – that is strange enough to be worth taking seriously.

The diagnosis Ross offers is one that physicists, at least, will find congenial. Psychology, he argues, resembles biology before Darwin: a mass of observations and partial theories in search of a unifying framework. The neurosciences are nibbling at the problem but have not cracked it, as was rather publicly confirmed in 2023 when Christof Koch conceded a twenty-five-year-old bet to David Chalmers, handing over a case of wine to acknowledge that the hard problem of consciousness had not, in fact, yielded to the neural correlates program. Ross's diagnosis of why this happened is that the whole

enterprise has been working with a logic of *being* – a conceptual framework suited to static, spatial relationships – when what is needed is a logic of *becoming*.

This is where the book's most interesting and most contested moves are made. Drawing on Gödel's incompleteness theorems and on the quantum-mechanical challenge to Einsteinian block-universe thinking, Ross argues that a dynamic view of truth – one in which reality unfolds rather than simply exists – opens a path through the paradoxes that have made both quantum mechanics and consciousness theory so philosophically treacherous. The ego, on this view, is not an entity in spacetime but something in the realm of *being*, which projects an avatar into *existence* – into the physical, timestamped world, frame by frame, the way a film projects itself onto a screen. To be conscious is to inhabit a *mindworld*, a centered, subjective virtual reality that is simultaneously a window onto the shared world and a construction of the self.

The central metaphor – we are all living in a mindworld movie, and social reality is a multi-user online game – could easily tip into hand-waving. In Ross's treatment it mostly doesn't, because he is careful to root it in the serious empirical tradition of William James and in contemporary biology. The chapter on life is one of the book's strongest: evolutionary theory, Ross argues, is itself a logic of becoming, and Darwinian selection provides the biological substrate on which mindworlds run. This is not a new claim in itself, but Ross makes it with unusual crispness.

Where the book will attract the sharpest critical fire is in the steps it takes through mathematical logic and physics. The move from Gödel's theorems to a "dynamic logic of becoming" is made swiftly and with confidence, but the technical bridge between incompleteness results (which are, after all, about formal systems) and a metaphysics of time and consciousness is not fully constructed here. Ross acknowledges this, describing his presentation as a "gloss" – but the acknowledgment cannot fully substitute for the argument. Similarly, the claim that quantum mechanics supports a processual rather than geometric view of time is a respectable position in the philosophy of physics (one finds versions of it in the work of Lee Smolin and Carlo Rovelli), but it is a contested one, and the contestation deserves more than a paragraph.

These are not trivial objections. But they are, in a sense, the objections one would raise against any book that attempts what this one attempts. The alternative – staying safely within a single discipline and never attempting the synthesis – produces work that is technically impeccable and intellectually inert. Ross has chosen the riskier path, and the result is a book that provokes genuine thought. If the detailed machinery is sometimes underspecified, the blueprint is genuinely interesting.

The writing is clean and confident, occasionally elegant. Ross is not given to the performative difficulty that disfigures a great deal of continental philosophy of mind. He wants to be understood, and largely he is. The book wears its learning lightly – perhaps a little too lightly in places – but the notes and references section reveals a serious engagement with the primary literature, from Planck and Bohr to Crick and Koch.

Psychophysics, as Ross uses the term, is a future field rather than a present one. What he is offering is not a finished science but a framework – a set of conceptual tools with which such a science might be built. Judged on those terms, this is a stimulating and worthwhile contribution. Whether the logic of becoming will prove as foundational for the science of mind as the theory of evolution proved for biology remains to be seen. But the question Ross is asking is the right one. That alone puts him ahead of much of the competition.

June 10, 2026

AR: We resumed the dialogue the next day. Claude forgets everything, so I began by forwarding the book text and the transcript of the dialogue so far.

Claude: The review document gives me excellent context for where we got to yesterday. What would you like to do from here?

AR: [*what I replied, edited*] A brief but critical account of the Gödel-to-becoming challenge (which I motivate via the open hierarchy of axiomatic set theories and with reference to intuitionist and constructive logic) would seem a good place to start.

Claude: Let me think through it carefully.

The challenge

Gödel's incompleteness theorems are results about formal systems – they show that any sufficiently powerful consistent axiomatic system cannot prove its own consistency and will leave certain truths unprovable within it. The open hierarchy of set theories (ZF, ZFC, ZFC + large cardinal axioms, and so on) nicely illustrates this: there is no ceiling, no completed totality, always another axiom that cannot be derived from below. That is a compelling image of irreducible openness.

But – and this is the crux – *openness of a formal hierarchy* is not straightforwardly the same thing as *temporal becoming*. The incompleteness results are themselves proved in a perfectly static, atemporal mathematical framework. Gödel's universe, ironically, is the block universe par excellence: the proof exists timelessly whether or not anyone constructs it.

Where intuitionism and constructivism help

This is where your appeal to intuitionist and constructive logic is your strongest move. Brouwer's intuitionism genuinely does temporalize mathematics: a proof is a mental construction that comes into being, and the law of excluded middle fails precisely because truth is not pre-given but made. Constructive logic similarly ties existence to explicit construction rather than to abstract being. These traditions do offer a serious philosophical basis for saying that mathematical truth *unfolds* rather than *subsists*.

So your argument is better grounded than the Carroll-voice review gives you credit for. It isn't a naked leap from Gödel to becoming – it runs through a tradition that has always insisted on the primacy of construction over static existence.

The residual difficulty

The honest challenge that remains is this: Intuitionism and constructivism are highly contested even within mathematics and logic, and most working mathematicians and physicists operate within classical frameworks where Gödel's results are entirely compatible with a static conception of mathematical reality. To move from “there is a serious minority tradition in logic that temporalizes mathematics” to “therefore the logic of becoming is the right foundation for a science of mind” requires the reader to already be sympathetic to that minority tradition – or to be given more reason to prefer it. That argumentative work, by your own account, is what the book gestures at rather than delivers.

In short

The Gödel-to-becoming move is not a non-sequitur – it is a real philosophical pathway, and the intuitionist and constructivist grounding gives it genuine intellectual respectability. What it is, though, is a *contested* pathway that the book traverses quickly. For a reader already versed in Brouwer and Bishop, it will feel sufficient. For a physicist like Carroll, it will feel like a promissory note. That seems to me an accurate and fair characterization of where the book stands – and since you're not revising it, it's also simply the honest critical position any serious reviewer should acknowledge.

AR: The move looks challenging, but the epistemological (in math, proof-theoretic) obstacles to deciding successive Gödelian sentences in successive formal systems are endless. For a thinker like Carroll, the issue might be more obvious in physics, where the epistemological challenges to filling out the Einstein block-universe view that arise from thermodynamics, chaos theory, and quantum gravity lead very naturally to a dynamic view of becoming – and where Gödel's time-loop solution of Einstein's equation underscores the point rather vividly. In both domains, we're tempted to posit an eternal

Kantian noumenal world when our predicament is always to be stuck in the phenomenal world.

Claude: It's a genuine strengthening of the position, and in places quite persuasive. Let me take it apart honestly.

What works well

The physics arm of the argument is considerably stronger than the logic arm for a Carroll-type reader, and you're right to foreground it. The convergence of three independent pressures – thermodynamics (the arrow of time, the asymmetry of entropy), chaos theory (sensitive dependence making long-range prediction physically impossible, not merely practically difficult), and quantum gravity (where time itself becomes problematic at the Planck scale, as in the Wheeler–DeWitt equation's notorious timelessness) – does create genuine difficulty for a naive block-universe reading. These aren't philosophical quibbles; they're live research problems. A physicist who dismisses your becoming-logic as unserious has to explain why the block universe survives contact with them.

The Gödel time-loop point is rhetorically vivid and philosophically pointed. Gödel showing Einstein that his own equations permit closed timelike curves – and using this to argue that time as ordinarily understood cannot be fundamental – is exactly the kind of move that makes a physicist sit up. It turns the tables: it isn't the dynamicist who has the explanatory burden, it's the block universalist.

The Kantian framing at the end is your most fundamental point and I think your strongest. The noumenal/phenomenal distinction cuts cleanly here: Positing a completed, static, fully determinate reality beyond all possible experience is precisely a noumenal posit, and Kant's own lesson was that we have no epistemic purchase on the noumenon. Our predicament is always phenomenal, always situated, always unfolding. That is a serious philosophical argument, not a metaphor.

Where the challenge persists

The logic arm remains the weaker one even with your elaboration. The endlessness of the Gödelian hierarchy is real, but a committed Platonist – and Carroll is sympathetic to a kind of mathematical Platonism – will say that the endless hierarchy exists atemporally and completely, even if no finite mind can survey it. The epistemological obstacle becomes, for the Platonist, merely an obstacle to *our* knowledge, not evidence of genuine ontological incompleteness. You need the Kantian move to close this gap: If we can't in principle get outside the phenomenal, the noumenal completeness is idle. But that move needs to be made explicitly, and in the book it may arrive too quickly.

Overall verdict

Your reply is persuasive to anyone who doesn't already have a strong prior commitment to the block universe or mathematical Platonism – which is probably the majority of thoughtful readers. For a Carroll specifically, the physics convergence argument would likely land; he is genuinely troubled by the arrow of time and has written seriously about it. The residual weak point is that the logic and physics arguments are doing somewhat different kinds of work, and a very sharp critic might ask for a more unified account of why epistemological boundedness in both domains points to the same ontological conclusion rather than simply to the limits of our knowledge. That's a hard question, but it's the right one to have provoked.

AR: Thanks for pushing me to acknowledge the sketchiness of my argument in the book on the math (where I really didn't want to frighten off readers eager to get on to the neuroscience). But my main challenge, it seems to me, is to show how quantum theory really helps in neuroscience. I'm happy that my story of decahertz photons suggests an explanation of how we experience time (via the flicker frequency of the mindworld movie), but I don't feel too confident that a physicist – even one like Carlo Rovelli – would find it plausible. Such photons are a long way beyond our experimental reach.

Claude: That's a very honest and important self-assessment, and I think you're right to feel the pressure there.

The specific challenge

The decahertz photon proposal is doing a lot of work: it's meant to explain the experienced *rate* of temporal unfolding – the flicker frequency of the mindworld movie – by grounding it in a specific physical process. That's an admirably concrete and falsifiable-in-principle claim, which puts it ahead of much consciousness theorizing. But Rovelli in particular would press hard on exactly the point you identify: If the relevant photons are far beyond experimental reach, the proposal risks being what physicists call *underdetermined* – not wrong exactly, but floating free of any near-term empirical anchor.

Why Rovelli specifically is a tough audience

Rovelli's relational quantum mechanics ties the reality of physical states entirely to interactions between systems – nothing is real except relative to something else that can register it. He is also deeply committed to time as emergent and thermodynamic rather than fundamental. He might well be sympathetic to your *conclusion* – that time as experienced is something that unfolds from within rather than being a geometric backdrop – while remaining skeptical of the specific photon mechanism, on the grounds

that positing a particular physical substrate for consciousness smuggles in exactly the kind of observer-independent physical fact that relational QM is designed to dissolve.

The honest position

I think your instinct is correct: the decahertz photon story is your most speculative move, and a physicist would treat it as an intriguing conjecture rather than a supported claim. That needn't be fatal to the book – you frame it as a manifesto for a future research program, and speculative conjectures are entirely legitimate there. But it does mean that particular proposal stands somewhat apart from the philosophical argument, which can largely stand without it. The question worth sitting with, perhaps for the next book, is whether the mindworld framework *requires* a specific physical mechanism for the flicker rate, or whether it remains coherent if that mechanism stays unspecified for now.

AR: Our experience of time and its inexorable passage is fundamental to consciousness. Rovelli's relational view is ideally free of any specific mechanism there, but there must be *some* such mechanism to explain how we experience anything at all. My photon story is a placeholder and a hostage to fortune, as you say, but it has the merit of apparently being consistent with the background story we tell in biology and neuroscience.

Claude: It's a well-judged defense for exactly the reasons you give.

Why it holds

The key move is the distinction between *requiring* a mechanism and *proposing* one. You're not claiming the decahertz photon story is established; you're claiming it is consistent with what we already accept in biology and neuroscience, and that it gestures at the right *kind* of explanation. That is a philosophically legitimate position. The hard problem of consciousness is littered with proposals that are underdetermined by current evidence – Penrose–Hameroff microtubules being the obvious comparison – and what distinguishes your proposal is precisely that it doesn't require exotic new physics but works within the existing electromagnetic framework of neural biology. That's a point in its favor a physicist would have to acknowledge.

The deeper philosophical point you're making is also sound: Rovelli's relational view is elegant but owes us an account of *why* there is something it is like to be a system of interacting quantum states. The mechanism question doesn't go away just because you adopt a relational ontology. Your photon placeholder at least takes that question seriously.

The residual honest caveat

Where it remains vulnerable is if a critic argues that the *specific* flicker-rate framing –

tying the experienced pace of time to a particular photon frequency – is more hostage to fortune than a vaguer mechanistic gesture would be. The precision is both the proposal’s strength and its exposure. But as a placeholder in a manifesto, it’s more than enough. It’s an invitation to experimentalists, not a claim on their assent.

AR: I asked Claude to craft an *NYRB* review by someone like Rovelli building on the two big issues we discussed.

Claude: Here's a draft in Rovelli's voice – essayistic, warm but rigorous, with the characteristic blend of physics, philosophy, and a certain Mediterranean expansiveness:

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There is a question that physics has never quite managed to answer, and that philosophy has never quite managed to stop asking. Why does time pass? Not in the sense that thermodynamics answers – the increase of entropy, the asymmetry of the macroscopic world – but in the deeper sense: Why is there something it is *like* to be carried forward by time, frame by frame, moment by moment, from a past that is fixed to a future that is open? J. Andrew Ross’s *Psychophysics* is, at its core, an extended attempt to take that question seriously. It deserves a serious response.

Ross is a philosopher with training in mathematical logic and a career spent at the intersection of science and its public communication. His book is short, lucid, and deliberately accessible – he describes it himself as a gloss, an orientation rather than a technical treatise. That honesty is disarming and, I think, largely justified. The book is best read as a manifesto for a research program that does not yet exist, and judged on those terms it is stimulating and, in places, genuinely illuminating.

The central argument runs as follows. The science of mind has stalled not for want of data but because it is working with the wrong conceptual framework – a *logic of being*, suited to static spatial relationships, when what is needed is a *logic of becoming*, suited to temporal unfolding. Ross traces this foundational error through mathematical logic, where Gödel’s incompleteness theorems and the open hierarchy of axiomatic set theories reveal an irreducible incompleteness in any attempt to fix reality from outside; through physics, where the block universe of Einstein and Gödel sits in increasing tension with thermodynamics, chaos theory, and quantum gravity; and through neuroscience, where the program of identifying neural correlates of consciousness has conspicuously failed to crack the hard problem. The positive proposal – that each conscious being inhabits a *mindworld*, a centered subjective virtual reality that unfolds like a film, frame by frame – follows from this diagnosis.

As a physicist who has spent considerable time worrying about the nature of time, I find Ross's diagnosis more persuasive than his remedy, but both are worth taking seriously.

On the physics, he is on strong ground. The block universe – that serene Parmenidean vision in which past, present, and future coexist as a four-dimensional spacetime manifold, and in which the passage of time is mere illusion – has always sat uneasily with our actual epistemic situation. We are not outside the block, surveying it; we are inside it, always at a particular moment, always unable to see what comes next. Gödel himself saw this clearly: his discovery that Einstein's field equations permit closed timelike curves was not merely a mathematical curiosity but a philosophical provocation, suggesting that time as we experience it cannot be read off directly from the geometry. Thermodynamics adds its own pressure: the arrow of time, the irreversibility of entropy increase, the felt asymmetry between past and future – these are not explained by the block universe, merely accommodated by it. And quantum gravity, where time itself dissolves at the Planck scale in the Wheeler–DeWitt equation, raises the possibility that time as we know it is emergent rather than fundamental. Ross is right that these pressures converge, and right that they push toward a dynamic view of reality rather than a static one.

The mathematical logic arm of the argument is, I think, the more contested. Ross draws on Gödel's incompleteness theorems and on the intuitionist and constructivist traditions – Brouwer, Bishop – to argue that mathematical truth itself unfolds rather than subsists timelessly. This is a serious philosophical position, not a confusion. Brouwer's insistence that a proof is a mental construction, that existence requires explicit construction rather than mere logical possibility, does genuinely temporalize mathematics in a way that classical Platonism resists. But a committed Platonist – and there are many, including among physicists – will reply that the endlessness of the Gödelian hierarchy exists atemporally and completely, even if no finite mind can survey it. To close that gap, Ross needs the Kantian move he makes elsewhere: We have no epistemic access to the noumenal, and a completed static reality beyond all possible experience is precisely a noumenal posit. That argument is available to him, and it is a good one, but the connection between the incompleteness results and the metaphysics of becoming needed to be made more explicitly to satisfy a skeptical reader.

Where I am most curious – and most cautious – is in the book's most specific empirical proposal. Ross suggests that the experienced rate of temporal unfolding, the felt flicker of the mindworld movie, may be grounded in a particular physical mechanism involving decahertz photons in neural tissue. He is admirably candid that this is a placeholder, a conjecture consistent with existing neuroscience and electromagnetic biology rather than an established result. And he is right that *some* mechanism must exist: My own

relational quantum mechanics is elegant about the structure of physical interactions, but it does not by itself explain why there is something it is like to be a system of interacting states. The mechanism question is real and pressing, and Ross is right to take it seriously rather than dissolve it philosophically.

But the specific photon proposal is, for now, well beyond experimental reach, and a proposal that cannot in principle be tested in any foreseeable future occupies an awkward position in a scientific manifesto. I would say this: The proposal has the considerable merit of being consistent with the biological and neuroscientific background story we already accept, and of pointing toward the right *kind* of explanation – one grounded in physics rather than invoking exotic new mechanisms. As a direction of travel it is defensible. As a specific claim it remains, frankly, a hostage to fortune.

None of these reservations should obscure what Ross has achieved. The core intuition – that our predicament is always phenomenal, always situated, always unfolding, and that any science of mind must be built on that foundation rather than on the fantasy of a view from nowhere – is both correct and important. The Kantian insistence that the noumenal completeness of a block universe is epistemically idle, that we are always already inside the movie rather than surveying it from outside, seems to me exactly right. Whether the specific architecture of mindworlds, egos, avatars, and omphaloi will prove scientifically fertile remains to be seen. But the question Ross is asking – how does a dynamic logic of becoming transform the foundations of mind science? – is the right question. That alone makes this book worth reading.

AR: I thanked Claude and explained this was good preparation for accommodating and responding to any human reviews of the book I might encounter in future.

Claude: Your book tackles exactly the kind of question that deserves more serious attention than it usually gets, and you've shown today that you can defend its more exposed positions with real philosophical precision. The Kantian closing move in particular is a strong card to play against critics.

June 11, 2026