

# The Nested Sensorium

## *Reconstructing Organismic Perception as a Layered Architecture from the Vacuum to Planetary Coherence*

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### Abstract

This paper proposes a layered architecture connecting physical structure, from vacuum fluctuation to organismic perception, in order to clarify a deceptively simple claim: organisms — human and non-human alike — register far more of their physical environment than reaches conscious awareness. We build the architecture bottom-up, level by level, and at each level identify the specific empirical correlate that anchors it: established physics where the layer concerns matter and field structure, and established sensory biology where the layer concerns perception. The framework is explicitly exploratory rather than confirmatory. Where the literature is settled (magnetoreception, electroreception, interoception, hemispheric lateralisation of attention), we say so plainly. Where it is contested (presentiment effects, planetary-scale coherence fields), we say that plainly too, and we keep the two categories visibly separate throughout, because conflating them is the most common — and most easily criticised — failure mode of this type of synthesis. The result is not a proof of a unified field theory of consciousness. It is a structured map of what is known, what is proposed, and where the boundary between the two currently sits — offered as a working document for readers who are themselves engaged in re-examining that boundary.

## 1. The Problem: A Narrower Sensorium Than the Evidence Warrants

The ordinary human assumption is that perception is bounded by the five classical senses, and that whatever those senses do not register, simply does not exist for the organism. This assumption is demonstrably false for animals, and is increasingly hard to defend for humans as well.

Animals navigate using magnetic fields they cannot consciously report. Sharks hunt using electrical fields too weak for any human instrument of the unaided body to register. Bats and dolphins build a three-dimensional model of space from echoes alone. None of this is speculative; it is textbook sensory physiology, and it establishes a simple, secure premise: the boundary of what an organism perceives is not the boundary of what reaches it physically. Information arrives constantly that is filtered out before — or instead of — becoming conscious experience.

The question this paper asks is whether that premise can be extended into a coherent architecture: a layered structure running from the physical vacuum upward through atomic, cellular, neural, and social organisation, in which each layer of organismic complexity correlates with a specific channel of perception, some of which are well documented and some of which remain at the research frontier.

## 2. Method: Building Upward, Layer by Layer

We proceed by construction rather than by argument from authority. Starting from the physical vacuum, we add one layer of organisation at a time — subatomic, atomic, molecular, cellular, tissue, neural, organismic, social, symbolic, and beyond — and at each step ask two questions: what new structural property appears at this layer, and what is the best-documented sensory or physical correlate of that property. The result, presented in full in Section 3, is a nineteen-layer holarchy in which each layer is nested inside the next: every higher layer is built from, and remains physically continuous with, the layers

beneath it. This is not a metaphorical nesting. A neuron is literally constructed from molecules that are literally constructed from atoms that are literally constructed from subatomic structure grounded in the vacuum. The continuity is physical, not poetic, and that continuity is the structural backbone of the architecture: it implies that no organism, at any layer, is ever physically disconnected from the layers beneath it — including the deepest one.

Two evidentiary registers are used throughout and are kept visually distinct:

- Established science — physics and biology with experimental consensus (e.g., magnetoreception in migratory birds, the ampullae of Lorenzini in sharks, interoceptive processing in the insula).
- Frontier research — programmes that are active, published, and methodologically serious, but not yet part of settled consensus (e.g., presentiment/anticipatory-activity studies, planetary-scale coherence research). These are flagged explicitly as contested wherever they appear, with their principal methodological critique stated alongside the finding.

This separation matters because the two registers carry different epistemic weight, and an architecture that blurs them collapses under the first serious reading. Every layer below states clearly which register it belongs to.

### 3. The Nineteen-Layer Architecture

Table 1 presents the full structure. Layers 0–9 (vacuum through symbolic cognition) rest predominantly on established physics and biology. Layers 10–19 (social through planetary) increasingly draw on frontier research, and are marked accordingly.

**Table 1. Layered architecture from vacuum to planetary coherence**

Layer	Name	What Newly Appears	Empirical Correlate
0	<b>The Vacuum</b>	Ground state with measurable fluctuation, not true emptiness	Casimir effect (established physics)
1	<b>Subatomic</b>	First symmetry-breaking; particles as distinguishable entities	Standard Model particle physics
2	<b>Atomic</b>	First stable configuration; the system 'holds' a state	Atomic structure and spectroscopy
3	<b>Molecular</b>	Information carried by form, independent of substrate	Enzyme–receptor specificity; DNA as structural memory
4	<b>Cellular</b>	First boundary: an inside and an outside; active homeostasis	Magnetotactic bacteria orient on geomagnetic field via magnetite chains (established)
5	<b>Tissue / Organ</b>	Specialisation and division of function within the organism	Interoception — insula-mediated sensing of internal bodily states (established)
6	<b>Nervous System</b>	Dedicated rapid signal transmission across distance	Electroreception (ampullae of Lorenzini); avian magnetoreception via cryptochrome (established)

7	<b>Whole Organism</b>	Coordinated behaviour of the entire organism in its environment	Long-distance migratory navigation by magnetic and celestial cues (established)
8	<b>Social / Collective</b>	Synchronisation between organisms	Behavioural synchrony in flocking, crowd entrainment (established)
9	<b>Symbolic / Linguistic</b>	Meaning decoupled from the immediate physical signal	Symbolic cognition, written and pictorial transmission across time (established)
10	<b>Hemispheric / Attentional</b>	Two competing modes of attending to reality within one brain	Hemispheric lateralisation of attention, McGilchrist (established neuropsychology, contested cultural thesis)
11	<b>Affective / Limbic</b>	Felt valence prior to conceptual labelling	Affect and interoceptive prediction (established, active research area)
12	<b>Cultural</b>	Transmission of practice across generations without genetic change	Ritual transmission (San trance, Aboriginal ceremony) — established anthropology
13	<b>Civilisational</b>	Institutionalisation of shared practice at urban scale	Indus Valley material record — established archaeology, interpretation contested
14	<b>Geophysical / Planetary Field</b>	Earth-scale physical fields organisms are embedded in	Geomagnetic field, Schumann resonances (established geophysics)
15	<b>Collective-Behavioural</b>	Population-scale correlation between physiology and environment	Correlations between geomagnetic activity and physiological rhythms (frontier, replication mixed)
16	<b>Anticipatory</b>	Physiological response preceding stimulus onset	Predictive anticipatory activity meta-analyses (frontier, contested — see §5)
17	<b>Non-local Informational</b>	Information correlation without apparent local transmission	Global Consciousness Project RNG correlations (frontier, strongly contested — see §5)
18	<b>Archetypal / Mythic</b>	Cross-cultural recurrence of patterned imagery	Entoptic phenomena in trance art across unconnected cultures (established neuro-anthropology)
19	<b>Planetary / Noetic</b>	Proposed coherence at the scale of the whole biosphere	Theoretical extension; no settled empirical correlate (explicitly speculative)

## 4. Reading the Architecture: Three Findings That Hold Up

### 4.1 The channel is never fully closed, even where it is not consciously used

The clearest, best-supported finding to come out of this construction concerns layer 6. Migratory birds detect the Earth's magnetic field using a cryptochrome protein and the radical-pair mechanism, and this is settled avian physiology.

What makes this directly relevant to humans is a specific finding: humans and other animals carry a dormant form of the same gene implicated in insect and butterfly magnetoreception, which raises the possibility that the channel exists in latent form even where it is not behaviourally expressed. Separately, human brain alpha rhythms have been shown to respond to fluctuating magnetic fields at an intensity comparable to the Earth's natural field — even in darkness, with no visual cue available — although this response is far weaker than vision or hearing and does not reach conscious perception.

This is the architecture's strongest empirical anchor: a documented case in which a physical signal (layer 1–2, electromagnetic field structure) is measurably registered at a neural level (layer 6) without ever reaching conscious report. It demonstrates, in a single well-controlled finding, exactly the gap the rest of this paper is built around — between what physically arrives and what is consciously known to have arrived.

### 4.2 The architecture is nested inward as well as upward

A single organism is not a node sitting atop the holarchy looking down at lower layers from a distance. It is constructed from them: tissue from cells, cells from molecules, molecules from atoms, atoms from subatomic structure rooted in the vacuum. This means the lower layers are not a historical origin that has since been left behind — they are the organism's continuously present substrate. A bacterium aligning on the geomagnetic field via a magnetite chain, with no nervous system at all, is responding to layer-1-type field structure directly at layer 4. The same physical coupling that operates wordlessly in a bacterium is still present, just heavily filtered, inside a human nervous system. Sentience does not have to invent a connection to the deeper layers; it inherits one, and the difference between organisms lies chiefly in how much of that inherited signal is allowed through to conscious processing, not in whether the connection exists.

### 4.3 Two genuinely different modes of attention coexist in one brain

McGilchrist's hemispheric research provides a documented, mainstream neuropsychological correlate for layer 10: the right hemisphere sustains broad, contextual, relational attention to the world as a living whole, while the left hemisphere narrows attention to isolate, fix, and manipulate discrete details. Both modes are real, distinct, and independently necessary; the claim is not that one hemisphere is superior, but that a civilisation — or an individual — that systematically privileges the narrow, manipulative mode of attention will become correspondingly blind to the broader, relational signals that the other layers in this architecture depend on.

This gives the paper's central practical claim — that more information arrives than is typically registered — a documented neurological mechanism for the filtering itself, separate from any claim about which signals are being filtered.

## 5. Where the Architecture Is Speculative, Stated Plainly

Layers 15 through 19 draw on research programmes that are real, published, and conducted by credentialed researchers, but that remain outside mainstream scientific consensus. Honesty about this is not a concession; it is what makes the rest of the architecture credible.

### *Predictive anticipatory activity (layer 16)*

Meta-analyses report a small but statistically detectable effect of physiological response preceding random stimulus presentation. The methodological literature on this body of work raises persistent concerns: optional stopping, multiple analytic paths, and publication bias toward positive results. Replication has been inconsistent. The effect, if real, is small; if an artefact of analytic flexibility, it would not be the first such case in psychology. This layer is presented as an open question, not a finding the architecture depends on.

### *Global-scale coherence research (layers 15 and 17)*

The Global Consciousness Project has operated a worldwide network of random-number generators since 1998, testing whether collective attention during major events produces statistically detectable deviation from chance. A 2023 successor effort, GCP 2.0, plans roughly four thousand devices to extend this work. The central interpretive claim — that this constitutes evidence of a literal non-local consciousness field linking humanity — goes well beyond what a statistical deviation in a random number generator can establish on its own; correlation in aggregate output during emotionally salient global events is consistent with several explanations, of which a unified consciousness field is the least parsimonious, not the most. This layer is included because it is part of the relevant literature the architecture must engage with — not because the architecture endorses its strongest interpretation.

### *The planetary / noetic layer (layer 19)*

No settled empirical correlate exists for this layer. It is included as the architecture's logical terminus — the layer the lower eighteen would point toward if the more speculative interpretations of layers 15–17 were eventually substantiated — and is labelled, deliberately, as theoretical extension rather than finding.

## **6. Convergent Discovery Versus Common Cognitive Architecture**

A recurring temptation in this kind of synthesis is to read structural similarity between distant traditions — San trance practice, Aboriginal Dreaming ceremony, Jain ascetic discipline — as evidence of a shared ancient origin or a shared contact with some single underlying field. The architecture developed here suggests a more conservative and, on balance, more defensible reading.

Lewis-Williams and Dowson's analysis of entoptic phenomena in Upper Palaeolithic art showed that the geometric patterns recurring across trance-derived rock art worldwide correspond to known phosphene and entoptic visual phenomena generated by the human nervous system itself under altered states — a shared neurological substrate, not a shared transmitted message.

Read against the layered architecture in Table 1, this is the more parsimonious explanation across layers 10, 11, and 18: every human nervous system shares the same hemispheric attentional architecture (layer 10) and the same capacity for archetypal, entoptic patterning under altered states (layer 18), because every human nervous system is built from the same layers 0 through 9. Convergence across unconnected cultures is then a prediction of shared underlying structure, not evidence of historical contact or of a literal external field reaching each tradition independently. This reframing keeps the genuinely interesting empirical finding — independent traditions arriving at structurally similar accounts of deep perception — while removing the much weaker claim that this requires either a transmission chain between them or a confirmed physical field connecting them. It also resolves a real tension in the source material: the

entoptic-phenomena explanation and the field-based explanation are not natural allies, and a defensible article should make clear that this paper treats the neurological-substrate reading as the better-supported one and the field-based reading as the speculative alternative, rather than presenting both as equally established.

## 7. Conclusion

Organisms register substantially more of their physical environment than reaches conscious experience. This claim does not require any contested physics; it is amply demonstrated by established sensory biology in animals and by documented, sub-threshold human responses such as the alpha-rhythm magnetic sensitivity discussed in Section 4.1. The layered architecture proposed here organises this fact into a structure running from the physical vacuum to proposed planetary-scale coherence, with each layer assigned its actual evidentiary status rather than a uniform one. The lower two-thirds of the structure (layers 0–9, and the documented portions of 10–14) rest on established physics and biology. The upper layers remain, honestly, a research frontier — interesting, worth tracking, and not yet a settled foundation for the stronger metaphysical claims sometimes built upon it.

The practical implication for both human and animal cognition is the one with which this paper began: the boundary of conscious perception is not the boundary of what physically arrives. That boundary is movable, has measurable physiological correlates, and differs across species, individuals, and cultural practices that train attention differently. Making that boundary visible — without overstating what lies beyond it — is the paper's central contribution.

## Annotated Reference List

**Schlebusch, C.M., et al. (2017). Southern African ancient genomes estimate modern human divergence to 350,000–260,000 years ago. *Science*, 358(6363), 652–655.**

*Genetic dating of the San lineage divergence. Used here only to establish the depth of the human lineage referenced in Section 6, not as evidence for any specific cosmological claim.*

**Clarkson, C., et al. (2017). Human occupation of northern Australia by 65,000 years ago. *Nature*, 547, 306–310.**

*Archaeological dating of early Aboriginal occupation at Madjedbebe. Establishes the independence-of-contact premise used in Section 6's convergence argument.*

**Lewis-Williams, D., & Dowson, T.A. (1988). The signs of all times: Entoptic phenomena in Upper Palaeolithic art. *Current Anthropology*, 29(2), 201–245.**

*The key source for the neurological-substrate explanation of cross-cultural trance-art convergence used in Section 6. This is the paper's preferred explanation over a field-based account, and is flagged as such.*

**Lewis-Williams, D. (2002). *The Mind in the Cave: Consciousness and the Origins of Art*. Thames & Hudson, London.**

*Extended treatment of San rock art and trance cognition, combining decades of fieldwork with cognitive neuroscience. Background for layers 12 and 18.*

McGilchrist, I. (2009). *The Master and His Emissary: The Divided Brain and the Making of the Western World*. Yale University Press.

*Source for layer 10. The neuropsychological description of two distinct hemispheric attention modes is well documented; McGilchrist's broader cultural-historical thesis (that Western civilisation has become pathologically left-hemisphere-dominant) is a more contested extension, and the two should not be cited with equal confidence.*

Wang, C.X., et al. (2019). Transduction of the geomagnetic field as evidenced from alpha-band activity in the human brain. *eNeuro*, 6(2).

*Source for the alpha-rhythm magnetic sensitivity finding in Section 4.1 — a documented, sub-threshold human response to geomagnetic-strength fields, central to this paper's strongest empirical claim.*

Wikipedia contributors. Magnetoreception. (Continuously updated; consulted 2026.)

*Used as a survey entry point for established magnetoreception mechanisms (cryptochrome radical-pair mechanism in birds; ampullae of Lorenzini in elasmobranch fish; magnetite chains in bacteria). Cross-checked against the primary literature it cites for layers 4, 6, and 7.*

Bischof, M. (2008). Synchronization and coherence as an organizing principle in the organism, social interaction, and consciousness. *NeuroQuantology*, 6(4).

*Theoretical background for layer 8 (social synchronisation). Frontier journal; treated as a hypothesis-generating source, not a settled finding.*

Nelson, R., et al. Global Consciousness Project (1998–present); successor initiative GCP 2.0 (HeartMath Institute, 2023–present).

*Primary source for layers 15 and 17. Included because it is part of the literature this architecture must engage with; its strongest interpretive claims (a literal non-local consciousness field) are explicitly treated in Section 5 as going beyond what the underlying statistical data can establish.*

Bem, D.J., et al. — meta-analyses of predictive anticipatory activity (various, 2014–2020).

*Source for layer 16. Discussed in Section 5 alongside its principal methodological critique (optional stopping, analytic flexibility, inconsistent replication). Included as an open question, not a load-bearing premise.*

Craig, A.D. (2002). How do you feel? Interoception: the sense of the physiological condition of the body. *Nature Reviews Neuroscience*, 3, 655–666.

***Foundational source for layer 5 (interoception). Establishes the insula's role in registering internal bodily states largely outside conscious awareness — directly supporting the paper's central premise at the human level.***

### **A note on sourcing**

This list deliberately separates established findings from frontier and contested research at the level of each individual entry, rather than relying on the reader to make that judgement unassisted. Where a single source contains both a well-supported finding and a more speculative interpretive claim (as with the Global Consciousness Project and McGilchrist's cultural thesis), the annotation says so explicitly. Readers who wish to pursue the frontier layers further should treat the methodological critiques cited alongside them as part of the required reading, not as an optional caveat.