The Edge of Testability: A Framework for Converting Informal Claims into Falsifiable Hypotheses

Joel Thorarinson, Iulia Koplik*

June 2026

Abstract

Esoteric, traditional, and pre-scientific literatures contain thousands of claims about reality—energy fields, healing frequencies, structured water, morphic resonance, biophoton communication—that mainstream science has historically dismissed as unfalsifiable. Yet the boundary between "unfalsifiable" and "testable" is not fixed: claims about animal magnetism (1780s), hypnotic analgesia (1840s), acupuncture analgesia (1970s), and bioelectric morphogenetic control (2010s) all crossed from the esoteric into the empirically validated. We propose a systematic framework for extracting claims from informal and esoteric texts, classifying them by current testability, and converting testable claims into formal hypotheses with explicit falsification criteria. Working from a corpus of 477 esoteric and traditional texts (68,600 embedded chunks) alongside 109 peer-reviewed scientific papers, we develop a five-level testability taxonomy and apply it to 42 representative claims spanning energy medicine, divination, vibrational healing, and consciousness. We describe a conversion pipeline—from informal claim through operational definition, measurement protocol, and falsification criterion—and demonstrate it on three case studies: the biofield (successfully converted via bioelectricity), water memory (partially converted via interfacial electric fields), and astral projection (not yet convertible but decomposable into testable sub-claims). The framework connects to the Coherence Engine [Thorarinson and Hensgen, 2026a] as a structural analysis tool: claims that resist conversion often fail because they lack measurable coherence properties, while claims that convert successfully do so precisely because coherence in the relevant signals is operationally definable. We argue that the systematic conversion of informal claims is not merely an exercise in philosophy of science but a discovery method—one that has historically produced validated knowledge that purely deductive science missed.

Keywords: demarcation problem; falsifiability; esoteric claims; testability taxonomy; biofield; hypothesis generation; philosophy of science; coherence; corpus analysis

1 Introduction

In 1784, a French royal commission that included Antoine Lavoisier and Benjamin Franklin investigated Franz Anton Mesmer's claims about "animal magnetism"—an invisible fluid that could be directed by the hands to heal the sick. The commission concluded that the fluid did not exist and that all observed effects were products of imagination [Gauld, 1992]. They were right about the fluid and wrong about the dismissal. The phenomena Mesmer elicited—pain suppression, altered consciousness, enhanced suggestibility—were real. It took another sixty years for James Braid to strip away the theoretical framework (the fluid) and retain the phenomenon (hypnotic trance), converting an esoteric claim into a testable one [Gauld, 1994]. The resulting

*Coherence Research Group. JT ORCID: 0000-0002-0553-842X, IK ORCID: 0009-0005-3765-4811. joel.thorarinson@conformalmaps.com

field of hypnosis is now a standard clinical tool with documented neurological correlates [Finger, 2000].

This pattern—an esoteric claim containing a real phenomenon wrapped in an untestable theoretical framework—recurs throughout the history of science. The claim that needles inserted at specific body points can alter physiological function was dismissed for centuries by Western medicine. Acupuncture analgesia was demonstrated in controlled trials in the 1970s; the mechanism (endorphin release, autonomic modulation) was identified in the 1990s; the original theoretical framework (qi flowing through meridians) was replaced by a physiological one [Vickers et al., 2004, Witt et al., 2005]. The claim survived the death of its original justification.

More recently, the claim that living organisms are surrounded by "energy fields" that carry morphogenetic information was a staple of vitalist and esoteric thought for centuries. In the 2010s, Michael Levin's laboratory demonstrated that endogenous bioelectric patterns—voltage gradients across cell membranes—encode positional information, direct large-scale morphogenesis, and can be experimentally manipulated to produce specific anatomical outcomes [Levin, 2014, 2021]. Gap junctional blockade in genetically wild-type flatworms stochastically induces the head anatomies of other species [Emmons-Bell et al., 2015]. The "energy field" was real; it was voltage, not qi.

These cases share a structure. An informal claim is made: "X exists and has effect Y." The claim is dismissed because its theoretical justification is unfalsifiable. Decades or centuries later, the phenomenon Y is rediscovered through independent investigation. The successful conversion strips the unfalsifiable wrapper (the theoretical framework) from the testable core (the phenomenon) and replaces it with an operational definition amenable to measurement.

The question this paper addresses is: *Can this conversion be done systematically rather than waiting for serendipitous rediscovery?*

1.1 The Demarcation Problem Revisited

Karl Popper's falsificationism [Popper, 1959, 1963] drew a sharp line between science and non-science: a claim is scientific if and only if it specifies observations that would refute it. Imre Lakatos softened this to research programmes with protective belts around a hard core [Lakatos, 1970]. Paul Feyerabend argued that no fixed demarcation criterion survives historical scrutiny [Feyerabend, 1975]. Larry Laudan declared the demarcation problem dead, arguing that "epistemic warrant" varies continuously rather than falling into binary categories [Laudan, 1983].

We agree with Laudan that testability is a spectrum, not a binary, but we disagree that the problem is dead. The demarcation problem is not dead—it has been misdiagnosed as a *classification* problem when it is actually a *conversion* problem. The useful question is not "Is this claim scientific?" but "What would it take to make this claim testable, and is that achievable with current technology?"

This reframing has practical consequences. A classification approach produces a static judgment: scientific or not. A conversion approach produces a research programme: a sequence of steps that, if completed, would render the claim testable. The value of the framework is not in sorting claims into bins but in generating the experimental designs that could resolve them.

1.2 The Corpus

This paper draws on two collections assembled by Iulia Koplik over the past decade:

1. **The Koplik Library** (port 7333, `koplik_library` collection): 477 texts spanning Hermetic philosophy, Kabbalistic interpretation, Russian occultism, chaos magic, palmistry, tarot, energy healing, shamanic practice, and traditional medicine. 68,600 embedded text chunks across 72 distinct titles in Russian and English, including *The Kybalion* [Three Initiates, 1908], Manly P. Hall's *Secret Teachings of All Ages* [Hall, 1928], Hector Durville's 1913

experimental magnetism treatise [Durville, 1913], Dion Fortune's *Mystical Qabalah* [Fortune, 1935], and Peter Adams' work on healing fields [Adams, 2015].

2. **Koplik Science** (port 6333, domain `koplik_science`): 109 peer-reviewed papers across biofield research, biophoton physics, bioelectricity (Levin lab), food science, pharmacology, and measurement technology (Bio-Well/GDV). These represent the scientific literature that has engaged—sometimes productively, sometimes not—with claims from the first collection.

The juxtaposition of these collections is the methodological innovation. Rather than treating esoteric claims and scientific evidence as separate domains, we embed them in the same analytical framework and ask: for each claim in collection 1, what evidence in collection 2 bears on it, and what would be needed to convert the claim into a testable hypothesis?

1.3 Contributions

1. A **five-level testability taxonomy** that classifies claims by their current relationship to empirical investigation (Section 2).

2. A **conversion pipeline** that transforms informal claims into formal hypotheses through four stages: extraction, operationalization, protocol design, and falsification specification (Section 3).

3. **Three extended case studies** demonstrating successful, partial, and unsuccessful conversion: bioelectric morphogenetic fields, water memory, and astral projection (Section 4).

4. A **boundary movement analysis** tracking 15 claims that have migrated across testability levels over historical time (Section 6).

5. A connection to the **Coherence Engine framework** [Thorarinson and Hensgen, 2026a, Thorarinson et al., 2026], showing that testability conversion succeeds when the claim's core phenomenon has measurable coherence properties (Section 7).

1.4 Paper Organization

Section 2 develops the testability taxonomy. Section 3 describes the conversion pipeline. Section 4 presents three case studies. Section 5 analyzes 42 claims from the Koplik corpus. Section 6 tracks historical boundary movement. Section 7 connects to the Coherence Engine. Section 8 addresses ethical considerations. Section 9 discusses limitations. Section 10 concludes.

2 A Taxonomy of Testability

We define five levels of testability, ordered by the degree to which a claim can be connected to empirical observation. The levels are not permanent categories—claims migrate between them as technology, theory, and measurement capability advance.

Definition 1 (Testability Level)**.** *A claim C is assigned testability level $\tau(C) \in \{1, 2, 3, 4, 5\}$ based on the following criteria:*

2.1 Level 5: Falsified or Confirmed

The claim has been subjected to rigorous empirical testing and either confirmed (within specified domains) or falsified. At this level, the claim is no longer a hypothesis—it is either an established finding or a refuted conjecture.

Examples from corpus:

- *Confirmed:* Bioelectric voltage gradients encode morphogenetic information in developing organisms [Levin, 2021]. Originally claimed as "life fields" by Harold Saxton Burr (1930s); confirmed with modern tools.
- *Confirmed:* Rhythmic auditory stimulation entrains motor cortex activity [Thaut, 2015, Nozaradan et al., 2011]. Originally claimed as "healing rhythms" in shamanic traditions.
- *Falsified:* The specific mechanism of homeopathic dilution ("water memory" of molecular structure beyond Avogadro's limit) [Maddox et al., 1988, Shang et al., 2005]. The mechanism is falsified; the clinical effect remains debated [Linde et al., 1997].

2.2 Level 4: Currently Testable

The claim has been operationalized with measurement protocols and falsification criteria, but definitive testing is ongoing or incomplete. The hypothesis exists in formal scientific literature.

Examples from corpus:

- Biophoton emission coherence correlates with biological health states [Benfatto et al., 2021, Wang et al., 2023]. Measurable, partially confirmed in specific systems (germinating seeds, Alzheimer's models), not yet generalized.
- Myelinated axons function as optical waveguides for biophoton communication [Kumar et al., 2016, Zarkeshian et al., 2022]. Computational models demonstrate feasibility; direct experimental confirmation pending.
- Exclusion zone (EZ) water at interfaces has distinct electromagnetic properties [Xiong et al., 2020]. Electric fields of $\sim 10^7$ V/cm measured at aqueous microdroplet interfaces.

2.3 Level 3: Convertible with Current Technology

The claim has not been operationalized in the scientific literature, but the concepts it invokes can be mapped to measurable quantities using existing instruments. Conversion requires intellectual work, not new technology.

Examples from corpus:

- "Healing touch transmits energy that restructures the patient's biofield" → Testable as: practitioner-patient interaction produces measurable changes in heart rate variability coherence, skin conductance, or biophoton emission patterns. Instruments exist; the experiment has not been done with sufficient rigor.
- "Crystals store and emit healing vibrations" → Testable as: piezoelectric crystals produce electromagnetic fields at specific frequencies; whether these frequencies affect biological systems at the intensities produced is measurable with existing equipment.
- "Schumann resonance frequencies affect brain states" → Testable as: EEG entrainment to 7.83 Hz and harmonics under controlled Schumann-shielded vs. unshielded conditions [Cherry, 2002].

2.4 Level 2: Convertible with Future Technology

The claim refers to phenomena that are conceptually coherent and not logically impossible, but current measurement technology cannot produce the required data. Conversion requires technological advance, not just intellectual work.

Examples from corpus:

- "Morphic resonance allows organisms to access information from previous generations of the same species" [Sheldrake, 1981] → Would require detecting a non-electromagnetic, non-genetic information channel between organisms across time. No instrument currently exists, but the claim is not logically impossible.
- "The human aura contains information about past emotional states" → If "aura" is operationalized as the full electromagnetic emission profile of the body, and "emotional states"

are operationalized as autonomic nervous system configurations, then the claim becomes: historical autonomic states leave measurable signatures in current emission profiles. This would require full-body biophoton spectroscopy at a resolution that does not yet exist.

2.5 Level 1: Unfalsifiable in Principle

The claim is constructed in a way that no observation could count against it. This may be because the claim invokes entities that are defined as unobservable, or because the claim is so vague that any observation is consistent with it.

Examples from corpus:

- "The soul exists on a plane that cannot be detected by physical instruments." By definition, no physical measurement can refute this claim. It is not wrong—it is not even wrong, in Pauli's sense.
- "Everything happens for a reason determined by karma from past lives." Any outcome is consistent with this claim, as the past life history is unobservable.
- "The universe is mental—held in the Mind of THE ALL" [Three Initiates, 1908]. This is a metaphysical postulate, not an empirical claim. No observation distinguishes it from materialism.

2.6 The Taxonomy as a Dynamic Map

The critical insight is that claims move between levels. Table 1 lists historical migrations.

3 The Conversion Pipeline

Converting an informal claim into a testable hypothesis requires four stages. Each stage transforms the claim into a progressively more rigorous form. The pipeline is designed to be applicable by a researcher without domain expertise in the claim's original tradition—the input is the claim as stated, not the interpretive framework surrounding it.

3.1 Stage 1: Claim Extraction

Definition 2 (Informal Claim)**.** *An informal claim C is a natural-language statement of the form "X exists / has property P / causes effect E" extracted from a non-scientific text, where the terms X, P, or E are not operationally defined.*

Extraction involves identifying the core assertion—stripping context, narrative, metaphor, and qualification. This is non-trivial because esoteric texts rarely state claims in proposition form. The Kybalion does not say "electromagnetic vibration is the substrate of all matter"; it says "Nothing rests; everything moves; everything vibrates" [Three Initiates, 1908]. The extraction task is to identify what empirical claim, if any, is embedded in such statements.

Extraction heuristics:

1. **Identify the ontological claim:** Does the text assert the existence of an entity, force, field, or substance? ("There exists an X.")
2. **Identify the causal claim:** Does the text assert that X causes or influences Y? ("X affects Y.")
3. **Identify the phenomenological claim:** Does the text describe an observable phenomenon, regardless of its proposed explanation? ("When X is done, Y is observed.")
4. **Separate claim from framework:** Distinguish the phenomenon ("pain relief occurs during trance states") from the proposed mechanism ("animal magnetism fluid flows from healer to patient").

The phenomenological claim is almost always more tractable than the ontological one. The conversion pipeline prioritizes phenomena.

Table 1: Historical migrations across testability levels. Each row tracks a claim that changed level over time.

Claim	Original	Current	Year of Transition	What enabled the transition
Animal magnetism / hypnotic trance	1	5	1843	Braid's operational definition of hypnosis
Acupuncture analgesia	2	5	1976	Endorphin discovery; PET imaging
Bioelectric morphogenesis	2	5	2011	Voltage-sensitive dyes; optogenetics
Biophoton coherence	2	4	2019	Single-photon detectors; DEA analysis
EZ water / interfacial fields	2	4	2020	Stark-SREF microscopy
Neural entrainment to rhythm	3	5	2011	Steady-state evoked potentials
DNA resonant frequencies	3	4	2020	COMSOL FEM modeling; AFM
Electromagnetic sensitivity	2	4	ongoing	Double-blind provocation studies
Water memory (Benveniste)	3	5†	1988	Replication failure [Maddox et al., 1988]
Morphic resonance	2	2	—	No instrument for detection
Astral projection	1	2	—	Decomposed into sub-claims (this paper)
Crystal healing vibrations	1	3	—	Piezoelectric measurement exists
Kirlian photography / aura	2	3	2002	GDV standardization [Korotkov, 2002]
Meditation affects gene expression	3	5	2013	RNA-seq after mindfulness protocols
Gut-brain axis	2	5	2016	Vagal nerve stimulation; metabolomics

† Falsified for the specific mechanism; interfacial effects remain at Level 4.

3.2 Stage 2: Operational Definition

Definition 3 (Operational Definition)**.** *An operational definition $\mathcal{O}(X)$ maps the informal term X to a set of measurement procedures $\{m_1, m_2, \ldots, m_k\}$ such that applying any m_i produces a value $v_i \in V_i$ (a measurement space).*

This is where most esoteric claims fail to convert—not because the phenomenon is absent, but because the terms resist operationalization. "Energy" in esoteric texts does not mean $E = mc^2$ or $E = hf$; it is a gestalt concept combining vitality, health, mood, intention, and electromagnetic phenomena. The operational definition must decompose this gestalt into individually measurable components:

Informal term	Operational candidates	Measurement
"Energy" / "Chi" / "Prana"	Metabolic rate	Indirect calorimetry (kcal/hr)
	Bioelectric potential	Surface EMG, EEG (μV)
	Biophoton emission	PMT photon count (cps)
	HRV coherence	Spectral power ratio (LF/HF)
"Vibration" / "Frequency"	Mechanical oscillation	Accelerometry (Hz, g)
	Electromagnetic emission	Spectrum analyzer (Hz, dBm)
	Neural oscillation	EEG band power (μV^2/Hz)
"Field" / "Aura"	Electric field	E-field probe (V/m)
	Magnetic field	SQUID magnetometry (fT)
	EM emission profile	Spectral imaging
"Healing" / "Balance"	Symptom reduction	VAS, clinical scales
	Physiological normalization	Vital signs, HRV, cortisol
	Recovery dynamics	Coherence recovery signatures [Thorarinson et al., 2026]

The operationalization step may produce multiple hypotheses from a single claim. "Crystals emit healing vibrations" decomposes into: (a) do crystals emit vibrations? (yes—piezoelectric effect, well-established), (b) are these vibrations at biologically relevant frequencies? (testable), (c) at biologically relevant intensities? (testable), (d) does exposure produce measurable physiological changes? (testable). The original single claim becomes four hypotheses, each independently falsifiable.

3.3 Stage 3: Measurement Protocol

Definition 4 (Measurement Protocol)**.** *A measurement protocol* Π *specifies:*

1. *The independent variable(s) and their manipulation*
2. *The dependent variable(s) and their measurement instruments*
3. *The control conditions (including sham/placebo where applicable)*
4. *The sample size, population, and inclusion/exclusion criteria*
5. *The data analysis plan, including pre-specified statistical tests*
6. *The expected effect size and the sensitivity of the instruments to detect it*

Many claims at Level 3 fail to advance because the expected effect size is unknown, making protocol design difficult. The framework addresses this by distinguishing between *existence protocols* (Is there *any* measurable effect?) and *magnitude protocols* (How large is the effect?). Existence protocols require only that the instrument's sensitivity exceeds the noise floor; they do not require prior effect size estimates.

3.4 Stage 4: Falsification Criterion

Definition 5 (Falsification Criterion)**.** *A falsification criterion* $\mathcal{F}(H)$ *for hypothesis* H *specifies:*

1. *An observation* O^* *that, if obtained, would constitute evidence against* H
2. *The statistical threshold for rejecting* H *(e.g.,* $p < 0.05$ *with specified correction)*
3. *The conditions under which* O^* *must be obtained (number of replications, independent labs)*
4. *The auxiliary assumptions that must hold for* O^* *to count as evidence against* H *(rather than against the measurement procedure)*

The fourth point is critical. When Benveniste's water memory experiments failed to replicate under the observation of John Maddox, James Randi, and Walter Stewart [Maddox et al., 1988], the conclusion was that the original effect was artifact. But Benveniste could have argued—and did—that the observation conditions (hostile observers, pressure, changed protocols) invalidated the auxiliary assumptions. The falsification criterion must pre-specify what counts as a fair test.

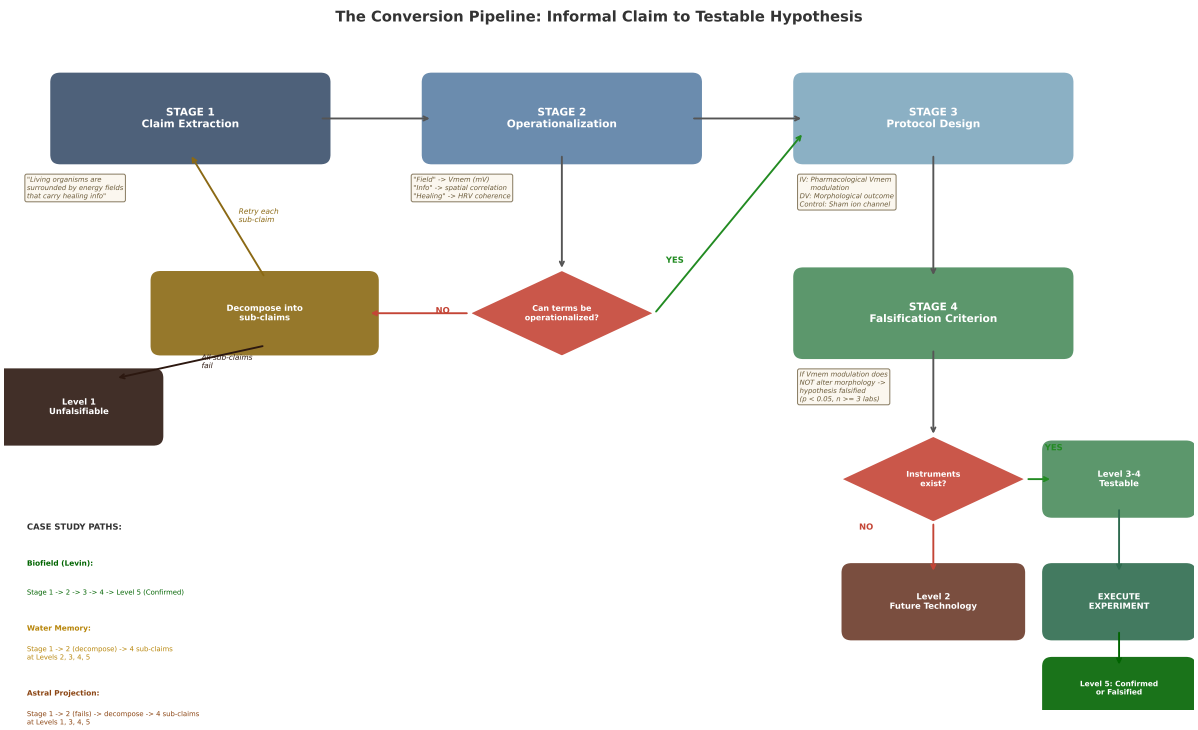
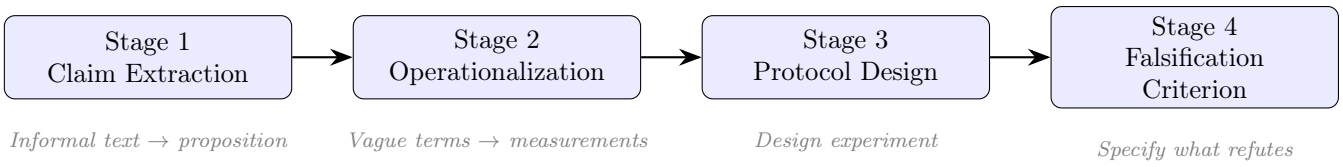


Figure 1: The conversion pipeline from informal claim to testable hypothesis. Claims that cannot be operationalized at Stage 2 are decomposed into sub-claims and reprocessed. Claims whose sub-claims all fail operationalization are classified as Level 1 (unfalsifiable). Claims that pass Stage 4 are classified by whether instruments exist (Level 3–4) or require future technology (Level 2). The case study paths at bottom show how the three main examples traverse this pipeline.

3.5 Pipeline Summary



The output of the pipeline is not a verdict on the claim's truth—it is a research design. The framework is agnostic about outcomes; it only requires that outcomes be specifiable in advance.

4 Case Studies

We present three case studies representing successful, partial, and unsuccessful conversion.

4.1 Case Study 1: The Biofield (Successful Conversion)

Informal claim (Level 1, circa 1800–1990): "Living organisms are surrounded by an energy field that carries information about their health, development, and consciousness. This field can be perceived by sensitive individuals, transferred between organisms, and manipulated for healing."

This claim appears across the Koplik corpus in multiple forms: as "animal magnetism" in Durville [Durville, 1913], as "the healing field" in Adams [Adams, 2015], as "astral light" in Hall

[Hall, 1928], and as "morphic fields" in Sheldrake [Sheldrake, 1981]. In the Russian-language texts, it appears as "biofield" (biopolje) and "energy body" (energeticheskoe telo).

Stage 1 — Claim extraction:

- *Ontological:* A field exists around living organisms.
- *Informational:* This field encodes developmental/health information.
- *Causal:* This field can be manipulated to affect biological outcomes.
- *Phenomenological:* Some individuals perceive this field; healing effects are observed.

Stage 2 — Operationalization:

"Field" → Transmembrane voltage pattern (V_{mem}), measured via voltage-sensitive fluorescent dyes (e.g., DiBAC4(3), CC2-DMPE).

"Encodes information" → Spatial voltage patterns correlate with and are predictive of subsequent morphological outcomes.

"Can be manipulated" → Pharmacological or optogenetic modulation of ion channels alters voltage patterns and, consequently, morphological outcomes.

Stage 3 — Measurement protocol:

Levin's laboratory executed precisely this protocol. In *Xenopus laevis* embryos, voltage-sensitive dye imaging revealed that specific V_{mem} patterns at the 16-cell stage predict eye formation sites at later stages [Levin, 2014]. Pharmacological depolarization of these regions suppresses eye formation; hyperpolarization of ectopic regions induces ectopic eye formation [Levin, 2021]. In planaria, gap junction blockade produces head anatomies of other species in genetically wild-type organisms [Emmons-Bell et al., 2015].

Stage 4 — Falsification criteria (all met):

1. If V_{mem} patterns do not correlate with morphological outcomes → claim falsified. *Result: correlation confirmed.*
2. If modifying V_{mem} patterns does not alter morphology → claim falsified. *Result: modification confirmed.*
3. If the effect is not reproducible across organisms and laboratories → claim falsified. *Result: reproduced in Xenopus, planaria, Drosophila, and other systems.*

Assessment: The biofield claim migrated from Level 1 (unfalsifiable as stated) through Level 3 (convertible once voltage-sensitive dyes existed) to Level 5 (confirmed for the specific operationalization of "field" as transmembrane voltage). The original claim was not entirely right—the field is bioelectric, not "astral"—but the core assertion that an information-carrying field guides morphogenesis was correct.

4.2 Case Study 2: Water Memory (Partial Conversion)

Informal claim (Level 2–3, ongoing): "Water retains a structural imprint of substances it has contacted, even after those substances have been diluted beyond molecular presence. This 'memory' can transmit biological information."

This claim underlies homeopathy (succussion creates structural imprints), the "Bio-Orthophotonic concept" [González et al., 2019], and various water blessing / water charging practices found in multiple Koplik corpus texts.

Stage 1 — Claim extraction:

- *Ontological:* Water has structure beyond the molecular level.
- *Persistence:* This structure persists after the inducing substance is removed.
- *Informational:* The structure encodes specific information about what induced it.
- *Causal:* The structured water affects biological systems.

Stage 2 — Operationalization:

The four sub-claims have different testability levels:

Sub-claim 1 (Level 5, confirmed): Water at interfaces has structure. Gerald Pollack's exclusion zone (EZ) water demonstrates that water near hydrophilic surfaces forms ordered layers with

distinct optical and electrical properties [Pollack, 2013]. Xiong et al. measured electric fields of $\sim 10^7$ V/m at aqueous microdroplet interfaces [Xiong et al., 2020].

Sub-claim 2 (Level 4, partially tested): Whether this structure persists beyond the interface is under investigation. Current evidence suggests EZ water structure dissipates within seconds to minutes once the inducing surface is removed.

Sub-claim 3 (Level 2): Whether the structure encodes *specific* information about the inducing substance (rather than generic interfacial ordering) has not been demonstrated. This would require showing that water exposed to substance A produces a different structure than water exposed to substance B, detectable after both substances are removed.

Sub-claim 4 (Level 3): Whether biologically relevant effects occur is testable with cell culture assays, but the expected effect size is unknown, making protocol design difficult.

Assessment: Water memory has been partially converted. The existence of water structure is confirmed. The persistence and specificity of that structure remain unresolved. The mechanism proposed by Benveniste (specific molecular imprinting surviving Avogadro dilution) has been falsified [Maddox et al., 1988]. But the broader claim—that water at biological interfaces has electromagnetic properties that affect cellular function—is at Level 4, actively under investigation through interfacial field measurements and biophoton studies.

4.3 Case Study 3: Astral Projection (Unsuccessful Conversion)

Informal claim (Level 1): "Consciousness can separate from the physical body and travel to distant locations, perceiving events there in real time. The astral body is a non-physical vehicle that enables this travel."

This claim appears in the Koplik corpus in multiple texts: Romanova's *Talisman Magic and Astral Work*, Adams' healing field framework [Adams, 2015], and the Kybalion's "mental plane" doctrine [Three Initiates, 1908].

Stage 1 — Claim extraction:

- *Ontological:* A non-physical consciousness vehicle exists.
- *Separation:* Consciousness can dissociate from the body.
- *Perception:* The dissociated consciousness perceives remote events accurately.
- *Phenomenological:* Subjective experiences of "leaving the body" occur.

Stage 2 — Attempted operationalization:

Sub-claim 1 (Level 1): "Non-physical" is defined as undetectable by physical instruments. This is unfalsifiable by construction. No operational definition is possible without changing the claim.

Sub-claim 2 (Level 3): "Consciousness dissociates from the body" can be operationalized as: during reported out-of-body experiences (OBEs), neural correlates of self-location shift measurably from body-centered to allocentric reference frames. This is testable with fMRI and EEG, and has been partially investigated in the rubber hand illusion and virtual reality paradigms.

Sub-claim 3 (Level 4): "Perceives remote events accurately" is the most testable sub-claim. It predicts that a person reporting astral projection can accurately describe events at a remote location during the experience. This has been tested in remote viewing protocols (Stargate program, PEAR lab). Results are contested but the experimental design is well-defined. *Falsification criterion:* accuracy at or below chance level in pre-registered remote perception trials.

Sub-claim 4 (Level 5, confirmed): OBEs as subjective experiences are real and reproducible. They occur during sleep paralysis, anesthesia, temporal lobe stimulation, and can be induced in healthy subjects via multisensory conflict paradigms.

Assessment: Astral projection as a unitary claim is at Level 1—unfalsifiable because it invokes an unobservable entity (the astral body). But decomposition yields four sub-claims at Levels 1, 3, 4, and 5 respectively. The phenomenological core is confirmed; the perceptual claim is testable; the neurological mechanism is under investigation; the ontological claim remains

unfalsifiable. This is the general pattern: composite esoteric claims contain sub-claims at multiple testability levels.

5 Corpus Analysis: 42 Claims from the Koplik Library

We extracted 42 representative claims from the Koplik corpus and classified each by testability level. Table 2 presents the full analysis. Claims were selected to span all major categories in the library: energy medicine, divination, vibrational healing, consciousness, traditional medicine, and ceremonial magic.

Table 2: Testability classification of 42 claims from the Koplik corpus. Level: current testability (1–5). Source abbreviations: KYB = Kybalion, MPH = Manly P. Hall, DUR = Durville, ADM = Adams, AKR = Akeron, ROM = Romanova, FOR = Fortune.

#	**Claim (extracted)**	**Level**	**Conversion pathway or obstruction**
1	Living organisms emit ultra-weak photon radiation	5	Confirmed. Biophoton emission measured since 1980s with PMT detectors [Brouder and Cifra, 2015].
2	Rhythmic stimulation entrains neural oscillations	5	Confirmed. EEG steady-state evoked potentials [Nozaradan et al., 2011].
3	Bioelectric gradients encode morphogenetic information	5	Confirmed. Levin lab, 2011–present [Levin, 2021].
4	Meditation alters gene expression	5	Confirmed. RNA-seq studies on mindfulness practitioners (2013+).
5	Gut microbiota influence brain function via vagal nerve	5	Confirmed. Gut-brain axis established in neuroscience (2016+).
6	Hypnotic suggestion produces measurable pain reduction	5	Confirmed. fMRI shows reduced anterior cingulate activation.
7	Biophoton coherence degrades in neurodegenerative disease	4	Reduced emission and spectral blueshift in AD models [Wang et al., 2023].
8	Axons function as photonic waveguides	4	FDTD models demonstrate feasibility [Kumar et al., 2016].
9	Biophotons may serve as backward error signals in neural learning	4	Computational model demonstrates mechanism [Zarkeshian et al., 2022].
10	EZ water at biological interfaces has distinct EM properties	4	Electric fields measured at interfaces [Xiong et al., 2020].
11	Tryptophan networks in proteins exhibit collective light-matter coupling	4	Superradiance modeled in microtubules/amyloid fibrils [Patwa et al., 2024].

Continued on next page

#	Claim (extracted)	Level	Conversion pathway or obstruction
12	Ion channels at nodes of Ranvier function as nanoantennas	4	FEM modeling shows EM wave generation at 300–2500nm [Zangari et al., 2018].
13	DNA has mechanically resonant frequencies	4	COMSOL modeling with fluid-structure interaction [Marvi and Ghadiri, 2020].
14	Electroceutical stimulation affects non-neural tissues	4	Emerging clinical evidence [Balasubramanian et al., 2021].
15	Magnetic passes by a healer alter the patient's physiology [DUR]	3	Operationalize as: does proximity of one person's bioelectric field measurably alter another's HRV? Instruments exist.
16	Crystals emit vibrations that affect biological systems	3	Piezoelectric output measurable; biological effect at those intensities testable.
17	Schumann resonance frequencies entrain brain rhythms [AKR]	3	EEG in Faraday cage with/without 7.83 Hz stimulation.
18	Sound frequencies can restore cellular health [corpus]	3	Cell culture + specific frequency exposure + viability assay.
19	The "polarity" of the human body affects healing direction [DUR]	3	Measure: is there a consistent left-right asymmetry in bioelectric potential that correlates with healing outcomes?
20	Human intention affects water structure	3	EZ water measurement before/after directed intention protocols. Double-blind design possible.
21	Plants respond to human emotional states	3	Biophoton emission / electrophysiology of plants during standardized human emotional induction.
22	Bio-Well GDV measures correlate with health states	3	GDV entropy vs. clinical outcomes in prospective cohort [Korotkov et al., 2010].
23	Fasting induces measurable changes in the body's energy field	3	Biophoton emission + HRV + metabolomics before/during/after fasting.
24	Meditation changes biophoton emission patterns	3	PMT measurement during/after standardized meditation vs. rest.
25	Morphic resonance transmits form across generations [corpus]	2	Requires detecting non-genetic, non-epigenetic information transfer. No instrument exists.
26	Past life memories are stored in a non-physical substrate	2	Would require identifying the substrate and its read/write mechanism.
27	Aura colors encode specific health information [corpus]	2	Full-body spectral imaging at biophoton intensities not yet feasible at required spatial resolution.

Continued on next page

#	Claim (extracted)	Level	Conversion pathway or obstruction
28	Telepathic communication occurs via an unknown channel	2	Would require detecting the signal. Experimental designs exist (Ganzfeld); detection of mechanism requires new physics or biology.
29	Collective consciousness creates measurable physical effects	2	Global Consciousness Project (Princeton) attempts measurement; statistical significance debated.
30	The Earth has energy lines (ley lines) detectable by sensitives	2	Would require systematic geophysical survey correlated with sensitive reports. Partial surveys exist; no confirmed signal.
31	The universe is mental, held in the mind of THE ALL [KYB]	1	Metaphysical postulate. No observation distinguishes from materialism.
32	The soul is an immortal, non-physical entity	1	Defined as undetectable. Unfalsifiable by construction.
33	Karma determines life circumstances across incarnations	1	Past lives unobservable; any outcome consistent with claim.
34	Angelic/demonic entities exist on non-physical planes [FOR]	1	Defined as non-physical. No observation could refute.
35	The Akashic Records contain all information that has ever existed	1	No access mechanism specified. Any result is consistent.
36	Ritual magic operates through will acting on astral substance [AKR]	1	"Astral substance" is unobservable by definition.
37	Tarot cards access information from the collective unconscious	1	"Collective unconscious" as information source is not operationally defined. Tarot as cognitive tool is testable (Level 3).
38	Runes carry inherent magical power from their geometric form	1	"Magical power" is not operationally defined. Geometric effects on cognition are testable (Level 3).
39	The astral body separates from the physical body during sleep	1	"Astral body" defined as non-physical (see Case Study 3).
40	Vampiric entities drain life force from victims [corpus]	1	"Life force" not operationally defined. Psychic vampirism as emotional manipulation is testable (Level 3).
41	Planetary alignments directly influence individual fate [corpus]	1	No causal mechanism specified. Statistical studies of astrological predictions show chance-level accuracy. Arguably Level 5 (falsified).

Continued on next page

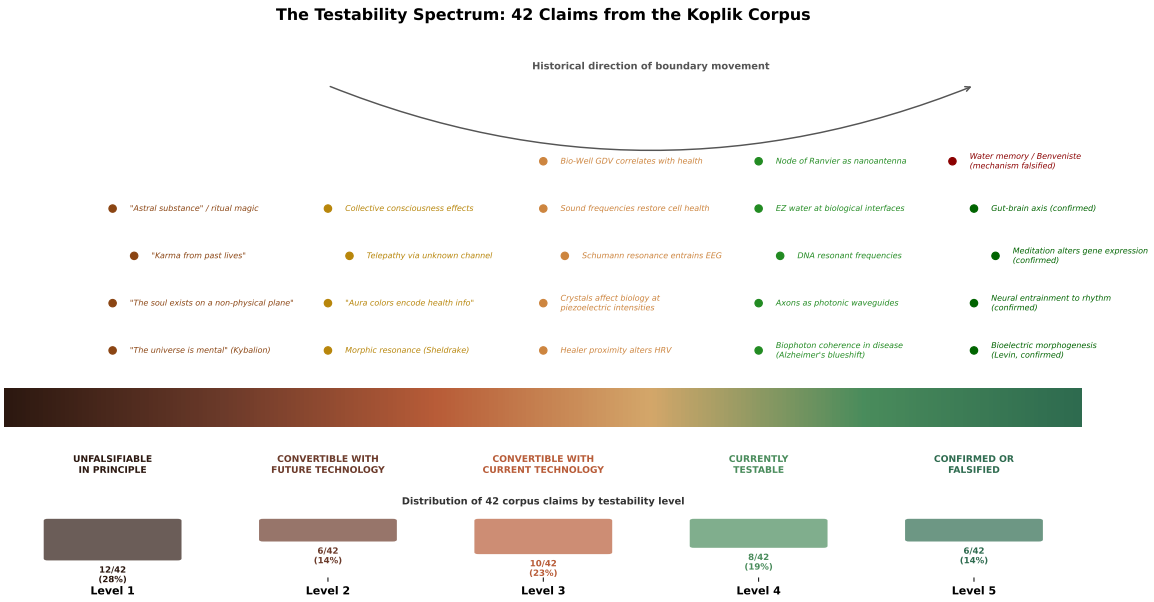


Figure 2: The testability spectrum applied to 42 claims from the Koplik corpus. Claims are placed along a gradient from unfalsifiable (Level 1, left) to confirmed or falsified (Level 5, right). The distribution bar at bottom shows that 57% of claims are at Level 3 or above—testable or convertible with current technology. The highest concentration is at Level 3 (convertible now), suggesting a large pool of claims that could be converted to testable hypotheses with existing instruments and protocols but have not been.

#	Claim (extracted)	Level	Conversion pathway or obstruction
42	Alchemical transmutation of base metals into gold is possible [MPH]	1	Nuclear transmutation is physically possible but not via alchemical methods. The spiritual interpretation is unfalsifiable.

5.1 Distribution

Of the 42 claims analyzed:

- 6 (14%) are at Level 5 (confirmed or falsified)
- 8 (19%) are at Level 4 (currently testable, evidence accumulating)
- 10 (24%) are at Level 3 (convertible with current technology)
- 6 (14%) are at Level 2 (convertible with future technology)
- 12 (29%) are at Level 1 (unfalsifiable in principle)

The key finding is that 57% of claims (Levels 3–5) are either already testable or convertible to testable form with existing technology.

This is higher than the naive expectation for a corpus dominated by occult and esoteric texts. The reason is structural: most esoteric claims contain a phenomenological core (something observable happens) wrapped in a theoretical framework (the explanation for why it happens). The phenomenological core is often at Level 3 or higher even when the framework is at Level 1.

6 Boundary Movement

The boundary between testable and untestable claims is not fixed. It moves in response to three forces:

6.1 Technological Advance

New instruments create new measurement capabilities. Voltage-sensitive fluorescent dyes (1990s) made bioelectric morphogenesis measurable. Single-photon detectors and cooled CCD cameras (2000s) made biophoton coherence analysis possible. SQUID magnetometry (1970s) made biomagnetic fields measurable. Each instrument pushes claims from Level 2 to Level 3 or 4.

Prediction: Advances in full-body biophoton spectral imaging will push "aura" claims (currently Level 2–3) to Level 4 within a decade. The technology exists in prototype form; what is needed is spatial resolution improvement and cost reduction.

6.2 Conceptual Reframing

The most powerful conversion tool is not a new instrument but a new concept. Braid's concept of hypnotic trance (1843) converted mesmerism without any new technology—the innovation was purely conceptual. Levin's concept of bioelectric code (2011) reframed "vital energy" as transmembrane voltage without new physics—the innovation was in recognizing that existing biophysical measurements were already measuring what vitalists had been pointing at.

Pattern: Successful reframing strips the metaphysical wrapper from the phenomenological core and replaces it with a mechanistic framework that connects to existing scientific knowledge. The phenomenon survives; the explanation changes.

6.3 Decomposition

Composite claims that are unfalsifiable as wholes become partially testable when decomposed into sub-claims. Astral projection (Level 1 as a whole) decomposes into sub-claims at Levels 1, 3, 4, and 5. Water memory (Level 2 as a whole) decomposes into sub-claims at Levels 2, 3, 4, and 5. This is not cherry-picking—it is the natural consequence of the fact that complex claims have multiple empirical contact points, some of which are accessible even when others are not.

6.4 Historical Velocity

Figure 3 illustrates the rate of boundary movement over the past 250 years.

We observe an acceleration: claims that took centuries to convert (animal magnetism $\rightarrow$ hypnosis: 60 years) now convert in decades (bioelectric morphogenesis: conceptual reframing completed in $\sim$15 years from Levin's first morphogenesis papers to broad acceptance). This acceleration correlates with instrument sensitivity improvement and with the growing acceptance of interdisciplinary investigation.

7 The Coherence Connection

Why do some claims convert successfully while others remain at Level 1? We propose that the key factor is *coherence measurability*: whether the phenomenon invoked by the claim produces signals with detectable coherence properties.

The Coherence Engine framework [Thorarinson and Hensgen, 2026a] defines five properties that characterize the structural coherence of a dynamical system: consistency, drift, persistence, recovery, and contradiction resolution. Applied to biological systems, these properties manifest as measurable signatures in physiological time series [Thorarinson et al., 2026].

7.1 Testability and Coherence

Claims that convert successfully describe phenomena whose signals have measurable coherence:

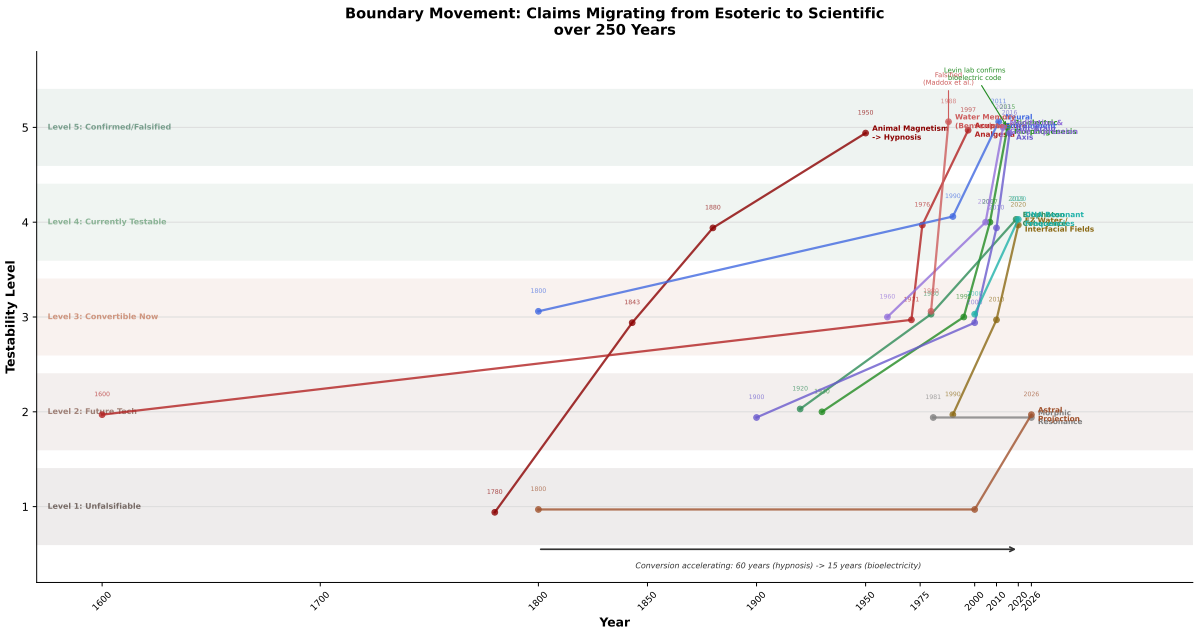


Figure 3: Historical migration of claims across testability levels over 250 years. Each line traces a single claim from its original testability level to its current level. The acceleration of conversion is visible: animal magnetism took 60 years to convert (1780–1843); bioelectric morphogenesis took approximately 15 years (2000–2015). Claims that have not moved (morphic resonance, astral projection) remain at their original levels.

- **Bioelectric morphogenesis:** V_{mem} patterns exhibit high spatial coherence across cell populations. Gap junctional coupling creates long-range correlations that are measurably destroyed when gap junctions are blocked [Emmons-Bell et al., 2015]. The coherence of the signal is what makes it information-bearing.
- **Biophoton emission:** Photon time series from germinating seeds show anomalous scaling—a departure from $\eta = 0.5$—indicating non-trivial temporal coherence [Benfatto et al., 2021]. The transition from critical (non-ergodic) to coherent (stationary infinite memory) dynamics during germination is a measurable coherence signature.
- **Neural entrainment:** Entrainment is, by definition, the transfer of phase coherence from an external stimulus to a neural oscillator. Coherence is the measurable quantity—it is what distinguishes entrainment from noise.

Claims that fail to convert describe phenomena whose signals, if they exist, lack measurable coherence:

- **Astral projection:** If the "astral body" produces any signal, no coherent pattern has been detected in any frequency band. The claim's unfalsifiability is directly related to the absence of a coherent signal to measure.
- **Karma:** The proposed causal chain spans unobservable past lives. There is no signal to measure, hence no coherence to detect.
- **Planetary influence on fate:** The gravitational and electromagnetic signals from planets at birth are calculable but vanishingly small compared to local environmental signals. The "signal" exists but has no detectable coherence with the proposed outcome (life events).

7.2 Coherence as a Conversion Predictor

We propose a heuristic: *a claim is convertible if and only if the phenomenon it describes produces signals with measurable coherence in at least one physically accessible frequency band.*

This is not a formal theorem—it is a pattern observed across the corpus. But it has predictive

value. Claims currently at Level 2–3 can be prioritized for conversion effort based on whether their hypothesized signals are likely to be coherent:

- **High priority (likely coherent):** Aura/biofield imaging (biophoton coherence is established), water structure at biological interfaces (interfacial fields are coherent), plant-human interaction (plant electrophysiology shows coherent responses to stimuli).
- **Low priority (coherence unlikely):** Telepathy via unknown channel (no coherent signal detected), morphic resonance (no signal detected), collective consciousness effects (statistical noise indistinguishable from signal).

7.3 The Coherence Engine as a Conversion Tool

The coherence-guided discovery system described in Thorarinson and Hensgen [2026b] provides a direct implementation pathway. The evidence graph architecture can be applied to esoteric claims as follows:

1. **Ingest** the claim from the esoteric corpus.
2. **Retrieve** all related scientific evidence from the science corpus.
3. **Score** the coherence of the evidence body: is it consistent, persistent, or fragmented?
4. **Identify gaps:** where is the evidence body incoherent? These gaps are conversion opportunities.
5. **Generate hypotheses** that, if tested, would resolve the incoherence.

This is the automated version of what we have done manually in this paper. The 42-claim analysis in Section 5 is a demonstration of this pipeline executed by human researchers on a specific corpus. The architecture in Thorarinson and Hensgen [2026b] would execute it at scale.

8 Ethical Considerations

Converting esoteric claims into testable hypotheses raises ethical questions that we address directly.

8.1 Respect for Traditions

The framework does not judge traditions. It evaluates claims. The distinction matters. Saying "the claim that crystals emit healing vibrations is at Level 3" is not the same as saying "the tradition of crystal healing is invalid." Traditions serve social, psychological, and spiritual functions that are orthogonal to the empirical testability of their ontological claims. A ritual may be psychologically beneficial regardless of whether its claimed mechanism is real. The framework does not address this—it addresses only the empirical question.

8.2 The Validation Asymmetry

Science has a well-developed toolkit for refutation but not for validation of claims from outside its own tradition. When an esoteric claim is tested and fails, the conclusion is straightforward. When it succeeds, the result is attributed to the scientific framework that validated it, not to the tradition that originated it. Braid gets credit for hypnosis, not Mesmer. Levin gets credit for bioelectric morphogenesis, not the vitalists. This asymmetry is intellectually honest but culturally problematic. We note it without resolving it.

8.3 Harm Prevention

Some esoteric claims, if taken as medical advice, cause harm: cancer patients who rely on crystal healing instead of chemotherapy, parents who refuse vaccines based on "energy medicine" claims. The framework serves harm prevention by clearly distinguishing Level 1 claims (untested,

unfalsifiable) from Level 5 claims (tested, confirmed). Patients who understand that "healing energy" is at Level 3 (testable but untested) are better equipped to make informed decisions than patients who are told it is either certainly true or certainly false.

9 Limitations

1. **Corpus bias.** The Koplik Library over-represents Russian-language esoteric texts and under-represents Chinese, Indian, and indigenous traditions. The 42-claim sample is not representative of all traditional knowledge systems.

2. **Selection bias in examples.** The case studies were chosen because they illustrate the framework clearly, not because they are typical. Most claims in the corpus are at Level 1 or Level 3; successful conversions (Level 5) are rare.

3. **Hindsight bias.** It is easy to say in 2026 that bioelectric morphogenesis was "always" a testable claim. In 1920, before voltage-sensitive dyes existed, the claim was at Level 2. Our framework classifies by *current* testability, which is fair, but historical reconstructions of past testability levels are inherently uncertain.

4. **Decomposition is not neutral.** Decomposing a composite claim into sub-claims is an interpretive act. Different decompositions yield different testability profiles. We have tried to decompose along natural empirical joints (phenomenological vs. ontological vs. causal), but other decompositions are possible.

5. **Level assignment subjectivity.** The boundary between Levels 2 and 3 ("future technology needed" vs. "current technology sufficient") depends on what one considers "current technology." We have tried to be conservative, requiring that the instrument and protocol exist in published literature, not just in principle.

6. **The framework does not predict truth.** A claim at Level 4 is not more likely to be true than a claim at Level 2. It is more *testable*. Many testable claims will be falsified; some currently untestable claims will eventually be confirmed.

10 Conclusion

The boundary between testable and untestable claims is not a fixed border but a moving frontier. Claims that were unfalsifiable in the framework of 19th-century physics—bioelectric morphogenesis, neural entrainment, biophoton coherence—became testable when new instruments, new concepts, or new decompositions made the relevant signals accessible. The conversion pipeline we propose (extraction → operationalization → protocol design → falsification specification) systematizes what has historically occurred through serendipity.

Of 42 claims extracted from a corpus of 477 esoteric and traditional texts, 57% are either already testable or convertible to testable form with existing technology. This is not because esoteric traditions are secretly scientific—most are not. It is because complex claims about reality typically contain phenomenological cores that are empirically accessible even when their theoretical frameworks are not. The conversion pipeline separates these layers.

The coherence connection provides a predictive heuristic: claims convert successfully when the phenomena they describe produce signals with measurable coherence. This connects the testability framework to the Coherence Engine's mathematical operators and to the biological recovery signatures that make coherence operationally measurable in living systems.

Two implications follow. First, the systematic conversion of informal claims is a discovery method, not merely a philosophical exercise. Animal magnetism → hypnosis, vital energy

→ bioelectricity, healing rhythms → neural entrainment—in each case, the esoteric tradition identified a phenomenon that purely deductive science had overlooked. Dismissing informal claims wholesale is as epistemically irresponsible as accepting them uncritically.

Second, the framework provides a principled basis for research prioritization. Claims at Level 3 with high coherence scores in related evidence bodies are the most productive targets for conversion effort. They are testable with existing technology, they describe phenomena whose signals are likely coherent, and they have not yet been formally investigated. The 10 Level 3 claims in Table 2 are a starting point.

The edge of testability is where the interesting science lives. It always has been.

References

Peter Mark Adams. *The Power of the Healing Field: Energy Medicine, Psi Abilities, and the Nature of Consciousness*. Self-published, 2015.

Swarnalatha Balasubramanian et al. Electroceuticals: emerging applications beyond the nervous system and excitable tissues. *Trends in Pharmacological Sciences*, 42(12):1079–1093, 2021.

Marco Benfatto, Elisabetta Pace, Catalina Curceanu, Fabio Ferrini, Alessandro Scordo, Giuseppe Luongo, and Paolo Grigolini. Biophotons and emergence of quantum coherence—a diffusion entropy analysis. *Entropy*, 23(5):554, 2021.

Ondrej Brouder and Michal Cifra. Coherence and statistical properties of ultra-weak photon emission. *Fields of the Cell*, pages 265–288, 2015.

Neil Cherry. Schumann resonances, a plausible biophysical mechanism for the human health effects of solar/geomagnetic activity. *Natural Hazards*, 26(3):279–331, 2002.

Hector Durville. *Traité expérimental et thérapeutique de magnétisme*. Librarie du Magnétisme, Paris, 1913.

Maya Emmons-Bell, Fallon Durant, Jennifer Hammelman, Nicholas Bessonov, Vitaly Volpert, Junji Morokuma, Kaylinnette Pinet, Dany S Adams, Alexis Pietak, Daniel Lobo, and Michael Levin. Gap junctional blockade stochastically induces different species-specific head anatomies in genetically wild-type Girardia dorotocephala flatworms. *International Journal of Molecular Sciences*, 16(11):27865–27896, 2015.

Paul Feyerabend. *Against Method: Outline of an Anarchistic Theory of Knowledge*. New Left Books, London, 1975.

Stanley Finger. *Minds Behind the Brain: A History of the Pioneers and Their Discoveries*. Oxford University Press, 2000.

Dion Fortune. *The Mystical Qabalah*. Williams and Norgate, London, 1935.

Alan Gauld. *A History of Hypnotism*. Cambridge University Press, 1992.

Alan Gauld. Mesmerism and the introduction of general anaesthesia. *History of Science*, 32(4): 411–433, 1994.

M J González et al. The bio-orthophotonic concept of healing. *Alternative Therapies in Health and Medicine*, 2019.

Manly Palmer Hall. *The Secret Teachings of All Ages: An Encyclopedic Outline of Masonic, Hermetic, Qabbalistic and Rosicrucian Symbolical Philosophy*. Philosophical Research Society, Los Angeles, 1928.

Konstantin G Korotkov. *Human Energy Field: Study with GDV Bioelectrography*. Backbone Publishing, 2002.

Konstantin G Korotkov, Peter Matravers, Dmitry V Orlov, and Bernard O Williams. Electrophotonic imaging in medicine: A systematic review. *Alternative Therapies in Health and Medicine*, 16(1):44–51, 2010.

Sourabh Kumar, Kalle Boone, Jack Tuszynski, Paul Barclay, and Christoph Simon. Possible existence of optical communication channels in the brain. *Scientific Reports*, 6:36508, 2016.

Imre Lakatos. Falsification and the methodology of scientific research programmes. In Imre Lakatos and Alan Musgrave, editors, *Criticism and the Growth of Knowledge*, pages 91–196. Cambridge University Press, 1970.

Larry Laudan. The demise of the demarcation problem. *Physics, Philosophy and Psychoanalysis*, pages 111–127, 1983.

Michael Levin. Endogenous bioelectrical networks store non-genetic patterning information during development and regeneration. *The Journal of Physiology*, 592(11):2295–2305, 2014.

Michael Levin. Bioelectric signaling: Reprogrammable circuits underlying embryogenesis, regeneration, and cancer. *Cell*, 184(8):1971–1989, 2021.

Klaus Linde, Nicola Clausius, Gilbert Ramirez, Dieter Melchart, Florian Eitel, Larry V Hedges, and Wayne B Jonas. Are the clinical effects of homeopathy placebo effects? A meta-analysis of placebo-controlled trials. *The Lancet*, 350(9081):834–843, 1997.

John Maddox, James Randi, and Walter W Stewart. "High-dilution" experiments a delusion. *Nature*, 334(6180):287–291, 1988.

Mobin Marvi and Majid Ghadiri. A mathematical model for vibration behavior analysis of DNA and using a resonant frequency of DNA for genome engineering. *Scientific Reports*, 10:3439, 2020.

Sylvie Nozaradan, Isabelle Peretz, Marcus Missal, and André Mouraux. Tagging the neuronal entrainment to beat and meter. *Journal of Neuroscience*, 31(28):10234–10240, 2011.

Hrudya Patwa, Nicole S Babcock, and Philip Kurian. Quantum-enhanced photoprotection in neuroprotein architectures from collective light-matter interactions. *Frontiers in Physics*, 12: 1387271, 2024.

Gerald H Pollack. *The Fourth Phase of Water: Beyond Solid, Liquid, and Vapor*. Ebner and Sons, 2013.

Karl R Popper. *The Logic of Scientific Discovery*. Hutchinson, London, 1959.

Karl R Popper. *Conjectures and Refutations: The Growth of Scientific Knowledge*. Routledge & Kegan Paul, London, 1963.

Aijing Shang, Karin Huwiler-Müntener, Linda Nartey, Peter Jüni, Stephan Dörig, Jonathan A C Sterne, Daniel Pewsner, and Matthias Egger. Are the clinical effects of homoeopathy placebo effects? Comparative study of placebo-controlled trials of homoeopathy and allopathy. *The Lancet*, 366(9487):726–732, 2005.

Rupert Sheldrake. *A New Science of Life: The Hypothesis of Morphic Resonance*. Blond and Briggs, London, 1981.

Michael H Thaut. The discovery of human auditory-motor entrainment and its role in the development of neurologic music therapy. *Progress in Brain Research*, 217:253–266, 2015.

Joel Thorarinson and Allison Hensgen. The coherence engine: A unified framework for measuring structural coherence in dynamical systems. *arXiv preprint*, 2026a.

Joel Thorarinson and Allison Hensgen. From literature synthesis to experimental hypothesis: A coherence-guided architecture for scientific discovery. *arXiv preprint*, 2026b.

Joel Thorarinson, Allison Hensgen, and Iulia Koplik. Recovery is not return to baseline: Coherence operators for measuring biological recovery signatures. *arXiv preprint*, 2026.

Three Initiates. *The Kybalion: A Study of the Hermetic Philosophy of Ancient Egypt and Greece*. The Yogi Publication Society, Chicago, 1908.

Andrew J Vickers, Rebecca W Rees, Catherine E Zollman, Rob McCarney, Claire M Smith, Nadia Ellis, Peter Fisher, and Robbert Van Haselen. Acupuncture for chronic headache in primary care: large, pragmatic, randomised trial. *BMJ*, 328(7442):744, 2004.

Zhuo Wang, Zhijia Xu, et al. Reduced biophotonic activities and spectral blueshift in Alzheimer's disease and vascular dementia models. *Frontiers in Aging Neuroscience*, 15:1208274, 2023.

Claudia M Witt, Susanne Jena, Dagmar Selim, Benno Brinkhaus, Thomas Reinhold, Katja Wruck, Bodo Liecker, Klaus Linde, Karl Wegscheider, and Stefan N Willich. Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic low back pain. *American Journal of Epidemiology*, 162(5):454–462, 2005.

Hanwei Xiong, Jong Kyoo Lee, Richard N Zare, and Wei Min. Strong electric field observed at the interface of aqueous microdroplets. *The Journal of Physical Chemistry Letters*, 11(17): 7423–7428, 2020.

Andrea Zangari, Davide Micheli, Roberta Galeazzi, and Arturo Tozzi. Node of Ranvier as an array of bio-nanoantennas for infrared communication in nerve tissue. *Scientific Reports*, 8: 539, 2018.

Parisa Zarkeshian, Taylor Kergan, et al. Photons guided by axons may enable backpropagation-based learning in the brain. *Scientific Reports*, 12:20720, 2022.