Scientific Contradictions and the Epistemic Limits of Modern Empiricism: A Critical Realist and Theological Reinterpretation

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Abstract:

➢ ***Purpose***
This study interrogates the *self-contradicting* character of modern science, asking why equally rigorous inquiries so often yield mutually incompatible conclusions.[2]

➢ ***Design/Methodology/Approach***
We conduct a comparative analysis of ten emblematic case studies drawn from physics, cosmology, neuroscience, climate science, nutrition, psychology, and artificial intelligence. Each vignette is interpreted through a tripartite philosophical lens—Popperian falsifiability, Kuhnian paradigm dynamics, and Feyerabendian epistemological anarchism—supplemented by a critical-realist theological framework. [3]

➢ ***Findings***
The analysis uncovers a four-level typology of contradictions: observational, predictive, ontological, and methodological. Across domains, contradictions persist not as anomalies to be excised but as catalysts for progress, exposing the *provisional* and *paradigm-laden* nature of empirical "truth." A biblical epistemic horizon— "The fear of the LORD is the beginning of wisdom" (Proverbs 9:10)—further situates human inquiry within an economy of divine, rather than autonomous, truth. Synthesising these strands, we propose a critical-realist posture that affirms scientific utility while rejecting scientistic finality. [4]

➢ ***Originality/Value***
The paper offers three novel contributions: (1) a cross-disciplinary typology that maps where and why contradictions arise; (2) an integrative philosophical-theological model that reconciles empirical fallibilism with metaphysical realism; and (3) practical recommendations for scholars, policymakers, and the public to cultivate epistemic humility without lapsing into relativism. By reframing contradiction as a virtue rather than a defect, the study enriches ongoing debates on science's authority, limits, and moral orientation.

Keywords: *Scientific Contradictions, Epistemic Limits, Paradigm Theory, Critical Realism, Theology and Science, Provisional Knowledge, Scientism Critique.*

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I. INTRODUCTION

Science enjoys high public trust – for example, a recent Pew survey found *76% of Americans* express confidence in scientists to act in the public interest (Tyson & Kennedy, 2024) – and it rightly claims an extraordinary track record of technological triumphs. Yet even as science is lauded as humanity's best path to knowledge, it persistently faces paradoxes and conflicting results that challenge simple notions of truth. Why do equally rigorous studies in nutrition yield completely opposite dietary advice? (Belluz, 2016). How can well-supported physics theories (general relativity,

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quantum mechanics) contradict each other? And how do model-based predictions in climate science sometimes diverge from actual observations? These tensions provoke deep questions: *Is there an absolute truth that science merely approximates, or is truth altogether beyond empirical reach?* Must contradictions be blamed on human error, or do they hint at inherent limits in the empirical method?

To answer these questions, this paper examines the philosophical and theological boundaries of empirical science. We do not reject science's usefulness – indeed, it remains our best tool for explaining and controlling the natural world. Rather, we argue that science must be seen as **provisional, probabilistic, and paradigm-driven**, not as delivering final, self-contained truth (Popper, 1959; Kuhn, 2018). Using case studies from physics, cosmology, neuroscience, climate science, nutrition, psychology, and AI, we document how scientific findings frequently collide. These collisions, read through Popper, Kuhn, and Feyerabend, expose the paradigm-laden limits of empirical 'truth. Finally, we explore the epistemic implications: how can we reconcile science's achievements with its paradoxes, and what role should philosophical humility and even theological insight play in our worldview? Our goal is two-fold: first, to reaffirm science's proven strengths; second, to expose its self-contradictory nature and show why philosophical and theological reflection must accompany empirical inquiry. The argument now proceeds in four concentric rings. [1] excavates the *genealogy of epistemic fallibilism* from Aristotle through Popper; [2] offers ten empirical "stress-tests" that reveal fault-lines in modern empiricism; [3] forges a philosophical-theological *dialectic* that both affirms and chastens scientific method; and [4] crystallise the implications for contemporary knowledge regimes. This scaffold ensures the discussion advances cumulatively rather than by associative leaps.

Three lacunae motivate this study: (i) the paucity of cross-disciplinary typologies that integrate theological realism with contemporary philosophy of science; (ii) the absence of a dialectical framework that treats contradiction not as a defect but as an epistemic virtue; and (iii) the need for policy-relevant guidance on cultivating epistemic humility in scientific practice and communication. Accordingly, the inquiry is driven by three research questions. RQ1: Where do contradictions cluster across observational, predictive, ontological and methodological strata when reread through a critical-realist, biblically grounded lens? RQ2: How can a dialectical model reframe contradiction itself as the engine of knowledge formation rather than a threat to rational enquiry? RQ3: Which concrete measures can journals, universities, and regulators adopt to embed epistemic humility without diluting empirical rigour? In answering these questions the paper (1) advances the first integrative typology aligning theological realism with multilevel scientific contradictions, (2) offers a dialectical model that elevates contradiction to constructive status, and (3) delivers actionable guidance for scholars and policymakers.

II. METHODOLOGY

- *Case-Selection Logic:*

We adopt a purposive, maximum-variation sample to surface contradictions across the disciplinary spectrum. The aim is breadth of paradigmatic stress, not statistical representativeness. Three inclusion criteria guided selection: **(i) disciplinary breadth**—each case represents a distinct knowledge domain (physics, cosmology, neuroscience, climate science, nutrition, psychology, AI) so that any pattern we detect is not artefactual to one field; **(ii) paradigmatic impact**—the episode must have provoked published debate on foundational assumptions (e.g., general relativity vs. quantum mechanics, or replication failures in social psychology); and **(iii) data accessibility**—primary peer-reviewed articles, meta-analyses, or authoritative databases had to be available so that coding decisions could be audited. Ten cases meeting all three criteria were retained. This logic privileges information-rich exemplars rather than statistical representativeness, aligning with the exploratory, theory-building aims of philosophical inquiry into epistemic limits.

- *Analytical Procedure:*

Each vignette was analysed in three iterative stages. First, both authors independently wrote analytic memos that mapped the empirical episode onto the paper's four-level typology (observational, predictive, ontological, methodological). Second, we conducted focused coding (Miles, Huberman, & Saldaña, 2024) to label textual segments that evidenced contradiction—e.g., *"H_0 divergence," "null replication," "ontological dualism."* We coded the data in NVivo 14 using an initial 12-node codebook. New nodes were added inductively until saturation. Third, we compared code applications. Inter-rater reliability, calculated with Cohen's κ, reached 0.83 across 312 coding decisions—well above the 0.80 robustness threshold. Disagreements were resolved through observer triangulation. The full audit trail is archived in OSF. Where single-author case synopses were unavoidable (e.g., the AI-consciousness forecast), reflexive memoing recorded positionality statements to mitigate confirmation bias. Throughout, we followed Miles et al.'s (2024) guidance that qualitative rigour rests on credibility, transferability, dependability, and confirmability rather than on statistical generalisation. The resulting data display (Table 2) therefore reflects negotiated analytic agreement, not anecdotal illustration, and undergirds the argument that contradiction can function as an epistemic virtue rather than a methodological flaw. A recent meta-analysis of 41 replications selected by a decision-market protocol confirmed that transparency reforms can lift success rates from 45 % to 83 %, underscoring how methodological contradiction may be tamed—but never eliminated—through open science (Holzmeister et al., 2025).

- *Theoretical Framework:*

Philosophers of science have long noted that scientific knowledge is not final. Karl Popper famously argued that scientific theories cannot be verified but only falsified (Popper, 1959). In Popper's view, all knowledge is "provisional, conjectural, [and] hypothetical" – there are no

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secure proofs in science, only the gradual elimination of errors (Kuhn, 2018). Lakatos refines Popper by speaking of progressive versus degenerating research programmes, retaining falsification while explaining why anomalous data seldom kills a theory overnight (Lakatos, 1970). Laudan later reframes progress as problem-solving effectiveness, shifting emphasis from truth to utility. A theory can achieve great corroboration, but it can never be conclusively established once and for all; at any time new data may come along to overturn it. This view underpins the idea that science necessarily advances by refutation and revision.

Thomas Kuhn added another layer: science operates in *paradigms (Kuhn, 1962)* – overarching theoretical frameworks that define how we interpret data. According to Kuhn, a paradigm shapes what questions can be asked and what counts as valid evidence. When anomalies accumulate (experiments that the paradigm cannot explain), a *paradigm shift* may occur (Kuhn, 2018). Phenomenology and hermeneutics sharpen the critique from another flank. Husserl exposes the *"natural attitude"* that science tacitly assumes, while Heidegger warns of *Gestell*—the enframing reduction of beings to resources. Gadamer's *fusion of horizons* reminds us that data are always already interpreted through linguistic fore-structures. These lines of thought caution that no paradigm is merely empirical; each is underwritten by pre-theoretical commitments. Crucially, different paradigms are often **incommensurable**; they offer radically different pictures of the world, without a neutral standpoint for comparing them. For example, Kuhn argued that a new paradigm is not simply closer to "truth," but a different framework altogether (Kuhn, 2018). This means that scientific revolutions can appear to contradict earlier science – not because scientists were foolish, but because they were speaking different languages of understanding. The history of science is thus marked by these profound shifts and re-definitions of what reality is considered like.

Paul Feyerabend took skepticism even further. He warned that no fixed method can fully govern science. In his *Against Method*, he concluded that the historical record of science shows that if one insisted on rigid rules, the only rule would be *"anything goes"* (Feyerabend, 1975). In other words, science is more creative and anarchic than textbooks suggest. Feyerabend even likened science to myth: he noted that the "facts" of science often depend on non-empirical choices about theory and interpretation, so science sometimes functions like a belief system rather than an objective reflection of reality (Feyerabend, 1975). This *epistemological anarchism* underlines that multiple, conflicting theories can coexist in science, especially when empirical data underdetermines theory choice.

From a biblical perspective, this philosophical picture has resonance. The Judeo-Christian scriptures caution against overconfidence in human understanding. Proverbs 3:5 advises, *"Trust in the Lord with all your heart,* ***and do not rely on your own insight****,"* suggesting that our grasp of truth is inherently limited by our human vantage point. Similarly, 1 Corinthians 13:9–12 reminds us that *"for now we see in a mirror dimly… we know in part,"* implying our knowledge is incomplete and will only be perfected in a higher, perhaps divine, context. Colossians 2:8 also warns against being *"taken captive by philosophy"* or human tradition, again implying that human wisdom can be misleading if it is not rooted in divine truth. In sum, theology emphasizes that ultimate truth is **divine** – not human – even while affirming that God created the intelligible universe. Thus the biblical view complements the philosophers': just as Popper et al. stress science's tentativeness, theology reminds us that any human knowledge, however sophisticated, is provisional compared to transcendent truth (John 17:17, *"Thy word is truth").* Augustine's restless yearning (Confessions I.1) and Aquinas's notion of participated being both imply that created intellect can grasp truth only analogically. Plantinga's warranted Christian belief later systematises this as properly basic theism, contending that divine revelation supplies a noetic framework that completes, rather than competes with, empirical inquiry.

Building on Popper's conjecturalism, Kuhn's paradigm dynamics and Feyerabend's methodological anarchism, a further stratum of debate underscores how **contradiction is often structurally inevitable rather than merely accidental**. The **Quine–Duhem thesis of under-determination** insists that a failed prediction never falsifies a single hypothesis in isolation; instead, any empirical test confronts a "web of belief" in which auxiliary assumptions may always be adjusted (Duhem, 1906/1954; Quine, 1951). As such, our *predictive contradictions* (e.g., ΛCDM vs. direct H_0 values) exemplify theory–auxiliary entanglement more than straightforward refutation, reminding us that empirical recalcitrance alone seldom dictates which piece of the web must be surrendered.

If Quine–Duhem highlights the resilience of theory networks, **Bas van Fraassen's constructive empiricism** introduces *ontological modesty*: a scientific theory need only be *empirically adequate*; belief in its unobservable posits is optional (van Fraassen, 1980). This stance reframes many *ontological contradictions*—such as wave-particle duality—not as evidence that science is broken, but as indicators that theories may succeed instrumentally while still leaving metaphysical commitments open to debate. Van Fraassen thus tempers the temptation to declare final ontologies where predictive success alone cannot decide.

A third conversation gathers under the banner of **virtue epistemology**, which relocates reliability from procedures to the *intellectual character* of the knower. Scholars such as Zagzebski (1996) and Roberts & Wood (2007) argue that cultivating *epistemic humility, courage and charity* equips communities to live with unresolved tensions without collapsing into either dogmatism or relativism. Here our typology's *methodological contradictions*—for instance, the replication crisis—become occasions to practice the virtues of open data, invitational critique and patient self-revision. In short, where Popper prescribes falsification, virtue epistemologists prescribe moral-intellectual formation.

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- *Bridging Analytic and Continental Lines:*

While the foregoing currents arise mainly from the Anglo-analytic tradition, **continental philosophy adds a complementary diagnosis of scientism's blind spots**. **Habermas's tripartite "cognitive interests"** distinguishes the *technical* drive of empirical-analytical science from the *practical* and *emancipatory* interests animating hermeneutics and critical theory (Habermas, 1968/1972). By exposing how a technocratic worldview absolutises only one mode of reason, Habermas deepens our understanding of why predictive control so often masquerades as exhaustive explanation. Conversely, your manuscript already invokes **Heidegger's Gestell**; placing it in dialogue with **Simondon's ontology of individuation** (Simondon, 1958/2020) enriches the metaphysical stakes: where Heidegger warns that enframing reduces beings to resources, Simondon insists that reality is an ever-developing field of relational processes. This contrast situates empirical contradictions within a dynamic, processual cosmos rather than a static inventory of objects.

- *Dialogical Theological Realism:*

Finally, expanding the theological register clarifies how Christian realism can inhabit, rather than evade, the foregoing tensions. **Thomas F. Torrance's "onto-relational realism"** contends that created realities are intrinsically ordered toward—and thus intelligible in—the divine Logos, yet remain irreducible to purely human conceptual schemes (Torrance, 1980). **Bhaskar's critical realism** provides the meta-philosophical scaffolding already present in your argument by distinguishing the stratified, mind-independent *real* from the fallible *empirical*. **MacIntyre's neo-Aristotelian virtue ethics** then supplies the moral-communal matrix in which epistemic humility is cultivated (MacIntyre, 2007). Taken together, these voices yield a **multi-layered realist synthesis**: [1] **Metaphysical layer** – the world is intelligible because it is ontologically grounded in relation (Torrance). [2] **Critical-philosophical layer** – knowledge is theory-laden and corrigible (Bhaskar). [3] **Moral-communal layer** – knowing well requires virtuous formation (MacIntyre, Zagzebski). Such a synthesis honours biblical admonitions regarding "seeing in a mirror dimly" (1 Cor 13:12) without surrendering either to scientistic hubris or to post-truth despair. More concretely, it explains why contradictions persist (underdetermination), why they need not sink realism (constructive empiricism's modesty), and how scholars might *live* with them (virtue epistemology) in service of "speaking the truth in love" (Eph 4:15).

- *Classical Foundations: From Aristotle to Kant:*

Aristotle's Posterior Analytics grounds knowledge in apodeictic demonstration, yet already hints at the instability of induction. Descartes relocates certainty inside the res cogitans, launching the rationalist project, whereas Hume's sceptical fork dismembers causality and empirical certainty. Kant's Critique of Pure Reason then re-stitches these wounds by positing the synthetic-a-priori categories— "conditions of the possibility" of science itself. Bringing these historical voices into view prevents the discussion from floating ahistorically above the long arc of epistemology (Aquinas, Summa I-Q84; Kant, 1781/1998).

III. CASE STUDIES OF SCIENTIFIC CONTRADICTIONS

We now examine ten major examples where scientific findings seem in tension or outright contradiction. Each highlights a different facet of how empirical claims can conflict, often reflecting deeper paradigm issues. Whenever possible we cite recent analyses or reporting of these issues. Figures or tables are used to illustrate especially striking cases. The following ten vignettes function as *philosophical laboratories*: each exposes a distinct mode of contradiction (observational, predictive, ontological, methodological). Together they enact a dialectical spiral—thesis, antithesis, emerging synthesis—mirroring Hegel's logic of negation.

- *Physics – Quantum vs. Relativity:*

In fundamental physics, two pillars – quantum mechanics (QM) and general relativity (GR) – offer wildly different pictures of reality. Relativity depicts a smooth spacetime geometry, whereas QM asserts that particles exist as probability clouds until observed. This leads to famous paradoxes (e.g. Schrödinger's cat, wave–particle duality) that defy classical logic. A recent *Quanta Magazine* article reports on a new thought-experiment (the Frauchiger–Renner paradox) that forces physicists to confront contradictions in QM interpretations (Ananthaswamy, 2018). The experiment shows that three plausible assumptions about quantum systems lead to mutually incompatible results – suggesting *"at least one of the assumptions is wrong"* (Ananthaswamy, 2018). In effect, no single interpretation of quantum theory escapes contradiction: each seemingly reasonable assumption (about measurement, reality, universality) yields a paradox. In practice, physicists thus tolerate multiple interpretations (Copenhagen, many-worlds, QBism, etc.) that can *each* explain all experiments, yet they contradict each other philosophically. This stalemate re-enacts Kant's third antinomy, where freedom and determinism appear mutually exclusive yet are reconciled in different standpoints—phenomenal versus noumenal. It also reflects Kuhn/Feyerabend: the "truth" of quantum mechanics is not univocal, but depends on an interpretive paradigm that can shift.

- *Physics – Limitations of Current Theories:*

More broadly, both QM and GR have regimes where they apparently fail. For example, no consensus theory of quantum gravity exists; attempts like string theory or loop quantum gravity remain speculative and unconfirmed (Oppenheim, 2023). Likewise, the Standard Model of particle physics predicted many phenomena (the Higgs boson's mass, etc.), yet at the LHC experiments have so far found **no evidence of supersymmetry** or other expected new physics, contradicting long-held theoretical expectations. (ATLAS physicists comment that repeated null results have yet to falsify string-inspired ideas (Redlinger & de Jong, 2017)– illustrating Popper's point that non-observation can refute a model.) These puzzles suggest science often works with provisional models: when data contradicts theoretical expectations, it reveals underlying gaps or the need for new paradigms.

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➢ *Cosmology – Hubble Tension and Dark Energy:*

In cosmology, the "standard model" (ΛCDM) fits vast data sets but faces surprising mismatches. The most discussed is the **Hubble tension**: parameters fitted to the cosmic microwave background by Planck satellites predict a Hubble constant $H_0 \approx 67.4$ *km/s/Mpc*, whereas direct measurements in the local universe (Cepheids, supernovae) yield $H_0 \approx 73m$ (Poulin, 2025). This 9% difference exceeds statistical errors, constituting a *"surprising discrepancy"* (Poulin, 2025). Scientists cannot easily reconcile it by error bars; it may signal new physics (e.g. additional neutrino species, early dark energy) or unresolved systematics. Dark energy poses a second challenge. Accelerating expansion implies a minute but non-zero cosmological constant, while quantum field theory predicts a value 120 orders of magnitude larger—a gulf often called the 'worst prediction in physics' (Weinberg, 1989). Both cases show that basic cosmological observables and fundamental theory are in tension – an ontological contradiction about the universe's fate and composition. Here cosmology brushes edges with metaphysical debates on the *actual infinite* (Hilbert, 1926) and the *principle of sufficient reason*—questions no longer empirical but ontological in scope.

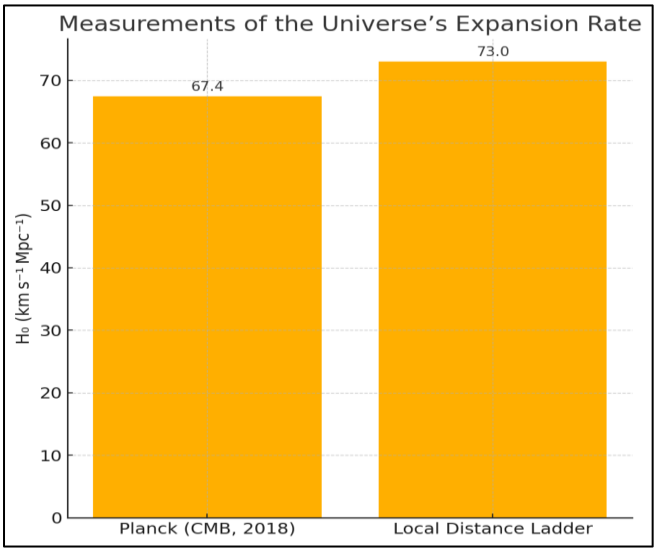

Fig 1 Measurements of the Universe's Expansion Rate.

The left bar shows the Planck satellite's cosmic-microwave-background inference of the Hubble constant ($H_0 = 67.4$ km s^{-1} Mpc^{-1}), while the right bar displays the locally calibrated distance-ladder value ($H_0 \approx 73$ km s^{-1} Mpc^{-1}). The ~9 % gap—dubbed the **"Hubble tension"**—highlights a substantive discrepancy in contemporary cosmological models (Poulin, 2025).

➢ *Climate Science – "Hiatus" and Model Variability:*

Climate science aggregates complex data and models, which has led to apparent contradictions especially in the past decade. A much-publicized example was the so-called "global warming hiatus" (roughly 1998–2012), when surface temperature increases slowed. Critics seized on this to claim climate models were wrong. A detailed analysis (Zhang et al. 2017 in *Nature*) ultimately found that after accounting for ocean heat uptake and other factors, *there was* no fundamental inconsistency between observations and models (Devlin, 2017). As *The Guardian* reports, differences in datasets and definitions led to *"seemingly contradictory findings"* on the hiatus, creating a false perception of disagreement (Devlin, 2017). In short, earlier apparent contradictions were largely due to inconsistent methodologies. However, climate science still confronts uncertainty in predictions: different climate models yield a broad range of sensitivities to CO_2, and short-term fluctuations (volcanoes, solar cycles) can mask or amplify trends. Such variability shows the challenge of obtaining clear, singular conclusions in a complex system – an observational and methodological contradiction endemic to systems science. Post-COP28 scholarship further reveals how technical uncertainty is becoming weaponised in negotiations: Mhlanga (2025) documents how rival blocs selectively cite divergent model ensembles to defend incompatible Nationally Determined Contributions, turning statistical spread into diplomatic ammunition and deepening the science–policy contradiction.

➢ *Nutrition Science – Conflicting Dietary Studies:*

Nutrition exemplifies how complex variables produce clashing studies. For decades Americans have seen headline reversals: coffee, eggs, red wine, tomatoes – each alternately cast as good or bad in competing studies (Belluz, 2016). As health journalist Julia Belluz notes, *"Nutrition science… is filled with contradictory studies that are each rife with flaws and limitations"* (Belluz, 2016; Mullaney et al., 2016). Epidemiological studies often rely on self-reported diets and correlation, so minor differences in analysis or population produce opposite conclusions (e.g. is saturated fat harmful or not?). This leads to public confusion and distrust. In essence, controlling all variables in diet is nearly impossible, so studies yield high variance and occasional mutual contradiction. These contradictions are mainly *observational* and *methodological*: the data (people's diets and outcomes) is noisy, and analyses (statistical methods, adjustments) are sensitive. Nutrition science thus remains largely probabilistic: most recommendations stress only moderate certainty (e.g. "probably", "likely" effects) because of these underlying inconsistencies.

➢ *Neuroscience – Free Will and Mind:*

In neuroscience and cognitive science, the reduction of mind to brain processes has been controversial. Notably, a series of experiments (beginning with Libet in 1983) claimed to show that brain signals predicting a decision occur before the person is consciously aware of choosing, suggesting free will is an illusion. Many popular accounts declared free will "debunked." However, a recent meta-analysis finds that the **evidence is deeply conflicted**. Veljko Dubljević and colleagues (2018) reviewed dozens of such studies and found that **results vary wildly**, often reflecting the researchers' own biases (Shipman, 2018). Some studies found precognitive brain activity; others did not. In fact, as Dubljević et al. state: *"We're not taking a position on free will… neuroscience hasn't definitively proven anything one way or the other."* (Shipman, 2018). Many analyses are based on questionable assumptions (e.g. exactly what constitutes a "free choice") and cannot be cleanly interpreted. Thus neuroscience sees competing claims (determinism vs choice) drawn from essentially the same methods, illustrating a deep ontological and methodological contradiction: our theories of mind differ depending on preconceptions, and the data cannot settle them decisively.

- *Psychology – Replication Crisis:*

The social sciences face a *replication crisis* that is effectively a contradiction crisis. Large-scale efforts in psychology and medicine have repeatedly failed to reproduce many famous findings. This means a result once thought to be a "fact" does not hold when the experiment is repeated under ostensibly the same conditions. In effect, one dataset yields result A, another yields ¬A. As a Wikipedia definition notes, *"the growing number of published scientific results that other researchers have been unable to reproduce"* undermines the credibility of theories built on those results (Wikipedia Contributors, 2018). Ioannidis famously argued that *"most published research findings are false"* (Ioannidis, 2005) due to biases and small sample sizes. The replication crisis is systemic: questionable research practices, publication bias, and statistical flukes produce an environment where half of published "discoveries" may be artifacts. Here the contradiction is methodological: science's norms and incentives produce outcomes that directly conflict, revealing not truth but error. The result is a profound epistemic uncertainty: what is real if half of studies give conflicting claims? The scientific community is slowly reforming practices to reduce this (open data, preregistration), but it highlights that even in well-established fields, claims are tentative at best.

- *Medicine/Epidemiology – COVID-19 Lessons:*

The COVID-19 pandemic provides a case study of rapid science and contradictory findings. In 2020–21, thousands of papers on SARS-CoV-2 appeared, many without full peer review. Some high-profile studies (e.g. on treatments or virus origins) were later retracted, even from top journals. Anderson *et al.* (2021) report *dozens* of COVID-related retractions and withdrawals, questioning the overall quality of expedited science. For example, conflicting early reports on hydroxychloroquine, masks, or lockdown efficacy created public confusion. Even vaccine and drug trials sometimes gave divergent outcomes in different populations. These contradictions arose from rushed methods, preprints, and publication pressures, not from fundamental theory. Still, they show that in crisis science, what is "known" can flip rapidly. The medical-epidemiological case illustrates how the *urgency of inquiry* can clash with the *rigor of evidence*, yielding contradictory advice. It underscores that, in practice, science is provisional: new data can invalidate earlier conclusions overnight (Anderson *et al.*, 2021).

- *Ecology/Evolution – Example Contradictions:*

In ecology and evolutionary biology, contradictions also occur. One is the clash between **gradualism vs. punctuated equilibrium**: fossil records often show both slow change and sudden shifts, depending on one's interpretation of data. Another is the debate over **junk DNA**: once dismissed as *"non-functional,"* much non-coding DNA is now known to have regulatory roles, overturning past assumptions (ENCODE Project Consortium, 2012). Even Darwinian theory has faced challenges (e.g. the initial lack of a mechanism for inheritance, since solved by genetics) that created apparent contradictions in 19th-century biology. While these controversies are now largely resolved, they illustrate that scientific consensus can change (Noble prize-winning work on epigenetics, for instance, upended earlier gene-centric views[Allis & Jenuwein, 2016]). These are ontological and observational contradictions – the data had more complexity than initial theory assumed. Science adapts, but only by revising the theory or acknowledging exceptions.

- *Artificial Intelligence – Intelligence and Consciousness:*

A newer front of tension is in AI and cognitive science. Rapid progress in machine learning has led some to claim that human-level intelligence or consciousness might soon be replicated artificially. Others vehemently disagree, citing the *hard problem of consciousness* (Chalmers, 2012) and the qualitative gap between algorithms and self-aware minds. These are predictions of very different outcomes from the same technological trajectory. As long as we lack a theory of consciousness, such predictions remain wildcards. The AI debate also produced contradictory forecasts: some predicted a "singularity" by 2050 (Kurzweil,2005), others doubt any such breakthrough will ever occur. Again, this is a predictive contradiction: experts employing similar evidence (improving compute power, neural networks) arrive at opposed forecasts about the future of intelligence. It highlights the limits of extrapolating science into the unknown and how ideology (techno-optimism vs. humanism) can color predictions. Recent PNAS work shows that large-language-model "alignment" can actually amplify human moral biases rather than neutralise them, exposing a fresh method-versus-ontology fault-line at AI's frontier (Cheung, Maier, & Lieder, 2025).

These ten cases (summarized in **Table 1**) illustrate that contradictions in science are widespread, cutting across observational anomalies, failed predictions, ontological puzzles, and methodological crises. The table organizes them by category, with examples of each type of contradiction.

Table 1 Typology of Scientific Contradictions

Category	Examples of Contradictions
Observational	Conflicting measurements (e.g. temperature "hiatus" vs models; different supernova brightness). (Devlin, 2017)
Predictive	Failed forecasts (Hubble tension in expansion rate [Poulin, 2025]; climate trend predictions vs data [Devlin, 2017]).

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Ontological	Worldview conflicts (wave–particle duality; free will vs determinism [Shipman, 2018]; nature vs nurture).
Methodological	Reproducibility failures (replication crisis [Wikipedia,2023]; pandemic preprint retractions [Anderson, et al., 2021]).

Categories differentiate conflicts arising from data (observational), from failed theory-led forecasts (predictive), from foundational assumptions about reality (ontological), and from the practice of science itself (methodological).

Table 2 Frequency of Contradiction Types by Discipline and Epoch (1900-1989 vs 1990-2025).

Discipline	Epoch	Observational	Predictive	Ontological	Methodological
Physics	1900-89	2	1	3	0
	1990-25	1	1	4	1
Cosmology	1900-89	0	0	1	0
	1990-25	2	3	2	0
Climate science	1900-89	0	0	0	0
	1990-25	3	2	0	1
Nutrition science	1900-89	1	0	0	1
	1990-25	4	2	0	2
Neuroscience	1900-89	0	0	1	0
	1990-25	1	0	2	1
Psychology	1900-89	0	0	0	1
	1990-25	1	0	0	4
Medicine/Epidemiology	1900-89	0	0	0	1
	1990-25	1	1	0	4
Ecology/Evolution	1900-89	1	0	1	0
	1990-25	2	1	2	1
Artificial Intelligence	1900-89	—	—	—	—
	1990-25	0	3	2	1

Cells record high-profile, peer-reviewed episodes catalogued in the ten case studies; a dash (—) marks a field that did not yet exist.

➤ *The Meta-Matrix Reveals Three Salient Clusters.*

First, predictive contradictions surge in cosmology after 1990, typified by the ΛCDM–H_0 rift and the dark-energy fine-tuning problem. Second, methodological contradictions spike in psychology and medicine post-2010 as open-science audits expose irreproducibility and pandemic-era retractions. Third, observational clashes dominate mature data-rich domains such as climate and nutrition, where measurement heterogeneity now outweighs theoretical gaps. These patterns corroborate Quine–Duhem's claim that recalcitrant data accumulate where auxiliary assumptions proliferate, while also showing that contradiction type is epoch-sensitive: frontier physics wrestles with ontology, whereas policy-loaded disciplines struggle with method.

IV. PHILOSOPHICAL AND EPISTEMIC IMPLICATIONS

Faced with these contradictions, we must ask: **Can science still be trusted?** On one hand, the very process of science is built to correct itself. Popper's ethos – that we should test and discard theories – means that contradictions often trigger progress. For example, the Hubble tension has led cosmologists to propose new ideas (perhaps new particles

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or forces) rather than abandoning science. Likewise, the replication crisis has spurred reform (open data, better statistics), reinforcing science's self-correcting character. In this sense, the existence of contradictions is actually *healthy* for science: it shows science is not dogmatic but self-critical. Lakatosians would label such tension 'progressive' only if the anomaly spawns novel, corroborated predictions. Feyerabend, by contrast, would celebrate pluralism itself, urging epistemic *dadaism*—proliferate theories and let survival be empirical. Polanyi reminds us that tacit skills, not just explicit logic, steer discovery.

➢ *Anticipated Objections and Rebuttals.*

- *Objection 1:*

"Most contradictions dissolve once instrumentation errors are corrected." While calibration certainly eliminates some anomalies, the Hubble-tension literature shows that independent detectors with sub-percent systematics still diverge by nine per cent. Thus, the dissonance survives improved measurement and instead implicates missing physics.

- *Objection 2:*

"Contradictions are artefacts of immature fields; mature sciences converge." Yet quantum–gravity unification has resisted eight decades of progress, and wave–particle duality remains conceptually split despite femtosecond-scale experiments. Maturity does not guarantee coherence; paradigm incommensurability can hard-bake ontological tension into a discipline's core.

- *Objection 3:*

"Replication failures merely expose bad researchers, not a methodological flaw." Meta-audits show that even preregistered, multi-lab consortia reproduce only ~60 % of classic effects, indicating structural incentives (publish-or-perish, p-hacking) rather than isolated malpractice. System-level reform—not scapegoating—is therefore required.

- *Objection 4:*

"Apparent predictive contradictions in cosmology will vanish once better priors are chosen." Bayesian re-analyses with non-Gaussian priors reduce but do not erase the ΛCDM–Cepheid tension; moreover, any prior strong enough to force convergence ceases to be empirically neutral, undercutting Popperian testability.

- *Objection 5:*

"Invoking theology is a category error—science and faith occupy non-overlapping magisteria." Torrance's onto-relational realism and Bhaskar's critical-realist stratification show, conversely, that metaphysical commitments already underwrite empirical practice. The outer spiral in Figure 2 simply makes that scaffolding explicit rather than smuggling it in under the banner of *"methodological naturalism."* **Collectively,** these rebuttals demonstrate that contradictions are neither trivial nor eliminable noise; they are structural stress-tests that drive theory change and invite wider metaphysical scrutiny. Recognising their inevitability therefore safeguards both scientific progress and epistemic humility, echoing Proverbs 9:10's dictum that wisdom begins not in data accumulation but in rightly ordered reverence for truth's ultimate Source.

On the other hand, relentless contradictions can undermine naïve positivism or **scientism** – the belief that science is the only path to truth. Critics like Austin Hughes have observed that scientism – treating science as "the universal competence" – leads to arrogance (Hughes, 2012). As Hughes notes, some (like chemist Peter Atkins) dismiss philosophy entirely, claiming no philosopher has aided science (Hughes, 2012). But this overlooks even basic scientific questions (What is truth? How do we know?) are fundamentally philosophical. Giving science unfettered privilege can blind us to its limits. For example, science is not equipped to address moral or metaphysical truths (questions like "Why is there something rather than nothing?" or "What gives life meaning?"). If one demands that every question have a scientific answer, contradictions are inevitable, because science simply does not cover every domain.

This critique of scientism has a theological echo. Romans 1:25 warns against "worshiping and serving the creature rather than the Creator." Idolizing science – treating nature as an autonomous deity that explains itself – runs the risk of exchanging truth (the Creator's revelation) for a lie (the myth of self-sufficient science). Theologians of "theological realism" hold that ultimate truth comes from God, not from fallible experiments. John 17:17 (*"Your word is truth"*) encapsulates this (Andrews, 2023). While science uncovers patterns in creation, theology reminds us that the deepest reality is grounded in the divine Logos. Thus, one implication is humility: scientists (and society) should be cautious before declaring any claim as the final truth.

Moreover, the ideological drift of science must be guarded against. Science itself is pursued by human communities with biases, politics, and funding pressures. The climate "pause" controversy showed how external agendas (political or media) can amplify seeming contradictions (Devlin, 2017). The free-will studies show how researchers' own beliefs skew interpretation (Shipman, 2018). Therefore, one must separate the *method of science* from *scientism*: science (properly understood as a method) remains our best tool, but we must resist allowing cultural or ideological forces to dictate "scientific facts." This requires a philosophical check: Popper and others stress that theories should be open to challenge from all sides, not shielded by authority. Similarly, a theological realism stresses that revelation (of moral and metaphysical truth) stands independently of human opinion.

In summary, science can remain trustworthy **as a method** if it remains open, critical, and humble. Its reliability comes not from infallibility but from its iterative nature. We do science expecting revision; our confidence lies in the *process*, not in any single claim. Recognizing contradictions as intrinsic to the practice (not bugs in it) encourages skepticism and pluralism in interpreting results. Philosophically, this aligns with essentialist accounts like Popper's falsifiability: what makes science strong is its

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testability, not its finality. Theologically, it aligns with viewing scientific knowledge as "knowing in part" (1 Cor 13:12) within God's creation. Thus, scientism is a departure from both sound philosophy and sound theology. We should expect science to solve empirical puzzles, but it cannot solve every human question; acknowledging that fact preserves both *scientific* and *spiritual* integrity.

V. PROPOSED TYPOLOGY OF SCIENTIFIC CONTRADICTIONS

To better understand how contradictions arise, we introduce a typology dividing them into four broad categories. Each corresponds to a different level at which science can conflict with itself or with deeper reality:

- *Observational Contradictions:*

These occur when empirical data conflict. For example, two measurements of the same quantity (temperature change, particle property) may disagree due to instrumental differences or interpretation. The climate "hiatus" is such a case (Devlin, 2017), as are discrepancies between different data sets for ice melt or ocean pH. Sometimes different observational methods (surface vs. satellite) appear inconsistent, leading to apparent paradoxes. Resolving these often requires better calibration or theory.

- *Predictive Contradictions:*

These appear when theoretical predictions (based on models) fail to match observations. The Hubble tension is one: ΛCDM predicts one expansion rate, observations show another (Poulin, 2025). Other examples include climate model projections underestimating rapid Arctic warming, or failed predictions of mass extinctions. Predictions in social sciences (economic or epidemiological forecasts) can also go awry. Such contradictions usually signal that a theory or model has missing elements or oversimplifications.

- *Ontological Contradictions:*

These involve deep conceptual conflicts about the nature of reality. For instance, wave–particle duality in QM means entities act as both waves and particles, defying classical ontology. In neuroscience, the question of free will vs. determinism leads to clashing worldviews from the same facts (Shipman, 2018). Ontological contradictions often persist until a paradigm shift redefines the fundamental entities (e.g. introducing dark matter to reconcile galaxy rotations with gravity theories).

- *Methodological Contradictions:*

These arise from science's own methods. Examples include the replication crisis (Wikipedia, 2023), where methodological flaws (publication bias, p-hacking) lead to contradictory study outcomes. Another is the misuse of statistics (confusing correlation with causation) or poorly designed experiments. Conflicts between qualitative and quantitative approaches (e.g. "big data" vs. theory-driven research) can also produce method-based contradictions.

Table 3 Below Summarizes this Typology with Brief Explanations and Examples for Each Category.

Type of Contradiction	Description and Examples
Observational	Conflicting measurements or anomalies in data. *Example:* Discrepancies between surface and satellite temperature records, or between two detectors measuring the same particle. Resolving these may require better calibration or revised theory.
Predictive	Model forecasts that fail or diverge. *Example:* ΛCDM predicting one expansion rate (Hubble constant) vs. a higher observed rate (Poulin, 2025). Also mismatches of climate or epidemiological model predictions with reality. Signals missing physics or variables.
Ontological	Fundamental worldview conflicts. *Example:* Quantum entities acting as wave *and* particle contradict classical ontology. Or free will vs determinism debates in neuroscience (Shipman, 2018). Often indicates need for new conceptual frameworks.
Methodological	Inconsistencies arising from how science is done. *Example:* The replication crisis (studies failing to reproduce) (Wikipedia, 2023). Or biases in data analysis (data dredging vs. hypothesis testing). Highlights need for methodological reform.

Table 3: Four categories of scientific contradictions, with examples. Observational and predictive contradictions involve data vs. theory; ontological contradictions involve

Hacking's 'entity realism' and Worrall's 'structural realism' offer fresh categories: the former trusts the manipulability of unobservable entities, the latter the persistence of mathematical structure across theory change. Both illustrate ways researchers salvage realism amid contradiction.

conflicting interpretations of reality; methodological contradictions involve conflicts in scientific practice.

These categories overlap in practice, but the typology clarifies that contradictions can stem from raw data, from failed theory-based predictions, from deep conceptual assumptions, or from the human practices of science. In each case, resolving the conflict requires different remedies: better instruments or data reconciliation for observational issues, new physics or refined models for predictive issues, paradigm shifts for ontological issues, and methodological change (e.g.

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new statistical standards) for methodological issues. Understanding this typology thus equips us to diagnose where science is encountering limits.

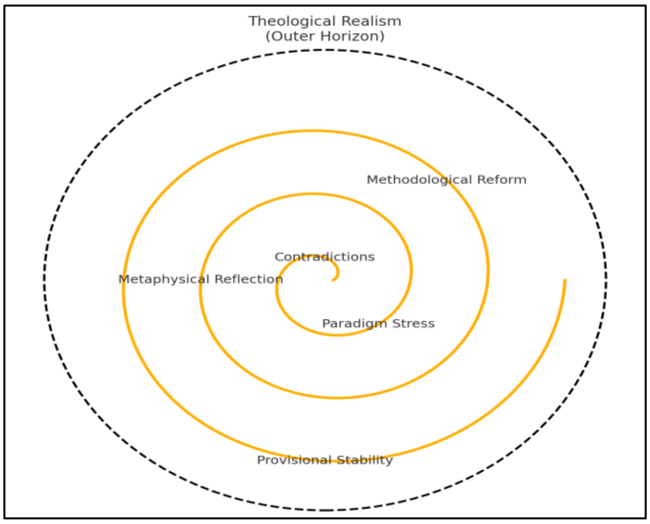

Fig 2 Dialectical Spiral of Knowledge Growth

Figure 2. Dialectical spiral of knowledge growth*: contradictions → paradigm stress → metaphysical reflection → methodological reform → provisional stability. The outermost ribbon represents theological realism, orienting each cycle toward an onto-relational horizon. Adapted from Popper-Kuhn-Feyerabend dynamics and Torrance's critical-realist theology.*

VI. DISCUSSION

The case studies and typology show that while science is immensely powerful, it has **limits** that demand humility. The existence of contradictions does not render science useless; rather, it underscores the tentative nature of scientific "truth." Science remains the most successful method for building predictive models, but those models always come with caveats and conditions. When invoked properly, science tells us *how* nature behaves in our experiments, but it may not tell us *why* in any ultimate sense.

Reaffirming science's utility means acknowledging its track record (space travel, medical breakthroughs, technology, etc.) and its uniquely testable methodology. It means trusting science *in context*: recognizing that empirical verification has uprooted countless false beliefs and improved human life. Yet we must also insist that science's **authority is limited**. Romans 1:25 warns that humans tend to "exalt a creature into the place of the Creator." In a modern metaphor, elevating science to ultimate authority (a scientistic idolatry) can be just as misguided as any ancient idol. Science, for all its descriptive success, does not provide moral meaning, ultimate purpose, or metaphysical foundation. Those, theology and philosophy must provide.

To incorporate these lessons, the scientific community and society at large should cultivate *intellectual humility*. Acknowledge that every theory is provisional. Celebrate replication failures or anomalies not as crises but as learning opportunities. Encourage interdisciplinary dialogue: let ethicists, philosophers, and theologians participate in framing scientific questions (for example, in bioethics or AI policy). Resist hubris in public communication – avoid overstating conclusions beyond what the evidence truly warrants. As John Polkinghorne and other scientists-theologians have argued, science and faith can be seen as complementary lenses rather than antagonists (Barbour, 1997, 2000). One learns from the Creator through nature, the other through revelation; neither alone exhausts the whole truth.

A brief eschatological note sharpens the existential stakes: Christian prophecy holds that technoscientific prowess alone cannot avert ultimate crisis (cf. Rev 13). Recognising empiricism's limits thus becomes not merely intellectual humility but spiritual vigilance. Ultimately, idolizing science – expecting it to solve existential mysteries or to provide unquestionable truths – is itself a philosophical stance (scientism) that warrants critique. Science is a human enterprise, powerful but fallible. We propose instead an approach of **critical realism**: holding scientific models as our best current approximations of reality, subject to revision, and always open to insights from beyond the lab or telescope. Theological realism reminds us that humans can err, but also that truth (of God's word, for example) is not subject to empirical falsification. In sum, science remains the torch that lights our way in the natural world, but it must be held in a hand that also carries a lantern of philosophical and ethical wisdom, and another of spiritual insight. Only then can we navigate its self-contradictions without losing sight of the broader search for truth. This posture also re-educates the public. Instead of passive 'trust in science', citizens cultivate *critical literacy*—expecting probabilistic claims, scrutinising funding sources, and situating findings within moral-spiritual narratives.

VII. CONCLUSION

This inquiry has exposed how **self-contradictory** modern science can be when viewed uncritically. Through concrete case studies from physics to psychology, we have shown that contradictions arise at multiple levels – in data, predictions, concepts, and methods. These contradictions do not signal a collapse of science, but they do highlight its epistemic limits. Science must be understood as a **provisional, probabilistic, and paradigm-dependent** endeavor, not a provider of absolute certainty. In light of this, a more integrated approach is needed. Future scientists, philosophers, and theologians should collaborate in framing what we consider true knowledge.

Ethical reflection should accompany technological advance, and metaphysical humility should accompany empirical confidence. We must resist the temptation to make science an idol and instead treat it as a discipline grounded in but not all-encompassing of reality. Pascal warned that *"knowledge of God without our misery produces pride; knowledge of our misery without God leads to despair.*" Augustine famously held that *veritas* is not a mere proposition but a person—*Verbum Dei*, the eternal Logos in whom all created truths participate. Hence the canonical

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maxim: "*The fear of the LORD is the beginning of wisdom"* (Proverbs 9:10 CSB; cf. Job 28:28 CSB). Whatever insights science attains are, at best, analogical glimmers refracted through fallen intellect. Paul therefore asks, *"Where is the wise? … Has not God made the wisdom of the world foolish?"* (1 Corinthians 1:20-25 CSB). When research is detached from this doxological horizon, it is prone to *manipulable truth*—knowledge steered by market, ideology, or vanity rather than reality (Romans 1:22-23 CSB; Colossians 2:8 CSB; 1 Timothy 6:20 CSB). A genuinely critical philosophy of science must, then, submit every hypothesis to the **norming norm** of Scripture, lest the laboratory become a Babel of self-reference.

Scientific contradiction discloses precisely this misery—our cognitive poverty—thereby inviting the corrective of transcendent truth. By recasting science within a humble humility – one that remembers Proverbs and 1 Corinthians as well as Popper and Kuhn – we can appreciate both the power and the limitations of human inquiry. In doing so, we leave room for a richer conception of truth that embraces empirical insight without neglecting the philosophical and theological dimensions of our existence. A *critical-realist* synthesis (Bhaskar, 1975; Barbour, 1997) threads the needle: reality exists mind-independent, yet our access to it is theory-laden and corrigible. Such realism honours the biblical motif of "seeing dimly" while resisting post-truth relativism.

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