

# 13

## Philip Goff Galileo's Error

To understand the problem of consciousness, we must trace it back to the Scientific Revolution. More than almost anyone else, Galileo shaped the philosophical foundations of emerging science. One of his big ideas was that science should describe the physical world in a purely mathematical vocabulary. That is something we take for granted now, but at the time it was a revolutionary move. This is captured in his famous quote from *The Assayer*, in 1623, where he claimed that the universe is written in the language of mathematics:

“Philosophy is written in this grand book, the universe which stands continuously open to our gaze, but it cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth.”

This aspiration toward complete objectivity is what Thomas Nagel later called the “view from nowhere”. To see what this means, imagine aliens with sensory systems radically different from our own. They might not understand our music or art, but if they could grasp mathematics, they would understand our physics. Science aims to provide a purely objective description of reality, one that could be understood by anyone, regardless of their particular sensory or cultural background.

Mathematical equations capture quantities, but it is hard to see how they could capture qualities. Qualities are smells, colors, sounds, and tastes. Quantities are what can be captured in the mathematical language called physics. No mathematical equation seems capable of capturing what the deep red of a sunset is like. The problem is that the qualities that fill our experience of the world are inherently subjective. They can only be grasped from a particular perspective, by someone who has experien-

ces. Consider a scientist blind from birth. No matter how much physics they learn, they will never know what it is like to see red. This illustrates the fundamental tension Galileo confronted: qualities versus quantities, the subjective versus the objective. If science is to be fully objective, what are we to do with these apparently subjective qualities?

Galileo's solution was radical. He didn't solve the problem experimentally. Instead, he introduced a new philosophical theory of reality. According to this view, qualities are not part of the physical world. The yellowness of the bottle is not on its surface. The smell is not in the air. These qualities exist only as experiences within the consciousness of the observer. Once the physical world was stripped of these subjective qualities, everything that remained could be captured in the purely objective language of mathematical physics. This marked the beginning of mathematical physics as we know it. But where did the qualities go? Galileo could not place them in the brain, because then the brain itself would not be fully describable in objective terms. So he placed them in the soul, outside the domain of science.

### **Galileo's error: what went wrong?**

The upshot is striking. The science we have been practicing for the last four hundred years is built on a form of mind-body dualism: a separation between the physical world described by science and the realm of subjective experience. This proved enormously fruitful, enabling extraordinary scientific and technological progress. Yet the cost of this success is often forgotten. From its inception, the scientific enterprise placed consciousness outside its explanatory domain. This exclusion was not the result of an empirical discovery about the nature of reality itself. Rather, Galileo introduced a deliberate methodological and philosophical decision about what would count as describable within science. The resulting framework gave rise to modern physics, offering a

powerful account of structure, motion, interaction, and relation. But it also left us with a world that moves without feeling, an experientially silent universe.

Mathematical physics thus captures only one aspect of physical reality. If consciousness is to be brought back into view, science and philosophy must once again work together. Philosophy is, after all, the mother of the sciences, and its task here is to make explicit the assumptions that continue to shape how we interpret the world around us, rather than allowing them to operate silently in the background.

### **The comeback of consciousness into science**

If consciousness is to be reintegrated into science, we must first recognise that science explicitly excluded consciousness from its domain. For much of the twentieth century, consciousness was effectively a taboo in science, something science simply was not meant to address. Then, in the 1990s, consciousness suddenly re-emerged as a "serious scientific problem". Many people still underestimate how unusual this problem is. Consciousness cannot simply be slotted into science as it currently exists. So where do we go from here? One response is to claim that Galileo was mistaken. Perhaps objective, mathematical science really can capture consciousness after all. On this view, we're grateful to Galileo for getting science off the ground, but ultimately consciousness will be explained in terms of physical processes in the brain. This position is known as materialism, and it remains the dominant view in both mainstream science and philosophy.

At first glance, this may seem reasonable. On closer examination, however, it becomes difficult to sustain. For the same reasons we've already discussed, a purely objective description of the physical world, expressed in mathematical or quantitative terms, is always going to leave something out. It necessarily omits

subjective qualities. If our account of the brain is framed solely in the objective language of electrochemical signalling and neural activity, then those subjective qualities are simply absent from the picture. They're not explained; they're excluded. For this reason, materialism does not seem to work.

The alternative is to embrace mind-body dualism, the view that consciousness exists outside the physical world. This remains a genuine possibility, especially given how little we still understand about the brain. Yet dualism violates a principle most scientists and philosophers accept: Occam's razor, that is, the idea that a simpler and more unified picture would be preferable. Mind-body dualism divides reality into two fundamentally different kinds of things: subjective qualities on the one hand, and the objective, mathematical physical world on the other. Reintegrating consciousness is not about rejecting physics. It is about recognizing that its mathematical formalisms describe only one aspect of reality: what things do, not what they are like. This opens the possibility of a third way, one that preserves the successes of physics while restoring experience to the natural world. Panpsychism offers one such avenue.

### **Panpsychism: Making the World Experientially Alive Again**

One way to understand panpsychism is as the continuation of a long historical widening of what we count as "conscious". At the start of the Scientific Revolution, consciousness was often treated as something uniquely human. Animals were reduced to mechanisms: living bodies without inner lives. That picture had a clear purpose. It made the world easier to describe in purely objective terms. If science wants to map reality as measurable and external, then experience itself becomes an awkward problem, so the simplest move is to exclude it.

But over time, consciousness gradually extended beyond humans to other mammals, birds, fish, and more recently even to

insects. In this context, panpsychism can be understood as the next step in the same trajectory: not merely that animals are conscious, but that consciousness may be a fundamental feature of reality itself. That is, consciousness is present in some minimal form even in the molecules, atoms, and subatomic particles that make up the physical world. It is not an afterthought of evolution, but something woven into the structure of nature from the start.

Panpsychism is the view that consciousness extends all the way down to the fundamental constituents of matter. In this picture, even basic particles or fields possess unimaginably rudimentary forms of experience, and the complex consciousness of human and animal minds is somehow built up from these more basic forms. The idea has a long intellectual history, spanning both Western and Eastern traditions. Early modern philosophers such as Gottfried Wilhelm Leibniz and Baruch Spinoza defended views that resemble panpsychism, and the theory enjoyed a kind of heyday in the nineteenth century. It later fell out of fashion, especially in the latter half of the twentieth century. Over the past decade or so, however, panpsychism has returned as a serious option in academic philosophy, and even, to some extent, in neuroscience.

For its defenders, panpsychism offers an appealing alternative to two extremes: the metaphysical extravagance of an immaterial soul on one side, and the hard reductionist idea that consciousness is "nothing but brain chemistry" on the other. In practice, the latter often risks explaining consciousness away rather than explaining it. A walk in the woods is a conscious experience, writes Thomas Lewton. Green in a hundred tones, rain glistening on the leaves, air thick with a fresh sensation. In moments like these, experience is central to our existence. And yet physics, for all its power, remains silent about this inner dimension. It can measure light, map wavelengths, and describe reflection with perfect precision, but it cannot touch the simple fact of what it

is like to stand deep among trees and feel the world enclosing us in. There seems to be a strange distance between the world as it is subjectively lived and the world as it is objectively described. Subjective experience glows at the centre of reality, while objective explanation circles it from the outside. And still, the mind arises from a brain made of matter. So it feels natural to assume that consciousness must, in some way, be explainable in physical terms. But the question remains stubbornly open: by what process does matter give rise to experience? And if consciousness cannot be captured by physics alone, how can it be placed within a complete picture of the universe? How does matter ever come to feel like anything at all?

The hypothesis that the universe is conscious is not as outlandish as it initially sounds. Physics gives mathematical structure, but structure alone does not explain why there is something rather than nothing. As Stephen Hawking once put it, what “breathes fire into the equations”? One possibility is that it is the mind that breathes fire into the equations. This proposal is no less parsimonious than its rivals, and it has the additional advantage of offering a framework for understanding fine-tuning. On this view, the source of cosmic order is not an omnipotent God, but an entity that pursues goals under genuine constraints, constraints recognised as the laws of physics.

Ultimately, what is needed is a hypothesis that can account for both the apparent goal-directedness implied by the fine-tuning of life-permitting physics and the arbitrariness and gratuitous suffering that pervade the world. Cosmopsychism may sound strange, but it fits the data. Physics will be confined to telling us what matter does, as Goff writes in *Galileo's Error* (2019), remaining silent on its intrinsic nature: “When it comes to the basic causal workings of the universe, scientists provide mathematical laws which describe with great accuracy how matter behaves, but they provide no explanation of why matter behaves in that way”.

### **What makes panpsychism new and exciting?**

What makes contemporary panpsychism distinctive is not only its claim that consciousness is fundamental, but the way this claim can be integrated with our best physical theories and accounts of evidence. Panpsychism holds that consciousness exists at the most fundamental level of reality. It is often presented, somewhat misleadingly, as the idea that the world is composed of tiny conscious particles. This picture, however, sits uneasily with contemporary physics. Modern theoretical physics no longer understands the universe as a collection of discrete, billiard-ball-like entities. Instead, it describes reality in terms of universe-wide fields, with what we call particles understood as local excitations within those fields.

Quantum entanglement reinforces this shift away from a world of fully independent parts. Entangled systems behave as though they are a single unified whole, even when separated by vast distances, and without any possible exchange of signals between them. Whatever the correct interpretation of entanglement ultimately is, it suggests that separateness may not be as fundamental as common sense assumes. Reality begins to look less like an aggregate of self-contained independent parts and more like a deeply interconnected structure, one in which the whole is, in some sense, more basic than the parts.

On its own, this physical picture does not establish panpsychism. However, when combined with the panpsychist claim that consciousness is fundamental, a striking possibility emerges. Reality may ultimately consist in a deeply unified field that is not only physical but also experiential, with individual conscious systems, including human minds, understood as local manifestations or excitations within that more fundamental consciousness. This yields a remarkably simple and unified picture of reality. If materialism struggles to explain how subjective experience could be derived from purely objective description, pan-

psychism suggests a reversal of that direction. The subjective cannot be derived from the objective. Rather, the objective world described by physics might be understood as emerging from something already experiential. At least in principle, we can begin to see how such an account might proceed.

### **How panpsychism can make the mystical and spiritual scientifically credible**

One of the most direct ways into the problem of consciousness is through mystical and spiritual experience. A mystical experience is an experience in which one seems to have direct awareness of ultimate reality. By “ultimate reality”, we mean the fundamental ground of existence. For a physicalist, this consists in particles or fields; for others, it may be God or something analogous. In mystical experience, this reality is encountered as wondrous, as possessing an extraordinary and unfathomable value, far exceeding anything found in ordinary experience. Mystics consistently report that what they encounter is better than anything the everyday world has to offer.

A further characteristic is a profound sense of unity with this ultimate reality. Different mystical traditions interpret this unity differently. In Advaita Vedanta, unity is understood as identity: the experiencer is literally identical with ultimate reality. In Eastern Orthodox Christianity, it is described more relationally, as an intimate but non-identical union. Despite these interpretive differences, the experience of deep unity is strikingly consistent across cultures. The most influential study of such experiences remains William James’s *The Varieties of Religious Experience* (1902). James treats mysticism as a genuine psychological problem, but he ultimately raises a deeper epistemological question: can mystical experiences be trusted? Is it rational for someone who has such an experience to believe that it reveals something about the nature of reality? James does not offer a definitive

answer, but he presents a compelling argument. If we deny the mystic the right to trust their experience, we seem to introduce a double standard. Ordinary sensory experience is generally regarded as trustworthy. We believe there is a table before us because we can see it. While sensory experience can be tested, any such testing ultimately relies on further experience. At some point, trust in experience is simply taken to be rational.

Why, then, should mystical experience be treated differently in principle? One might object that mystical experience could be delusional, perhaps the product of unusual brain states. But the same sceptical possibilities apply to ordinary perception. We might be brains in vats or living in a simulation, yet we continue to regard trust in experience as rational. James’s suggestion, then, is that it may be rational for a mystic to trust their experience as revelatory of ultimate reality. An important qualification is that whether such trust is rational depends on how well the experience coheres with one’s broader worldview.

This brings us to a familiar framework in probabilistic reasoning: Bayesian reasoning. On a Bayesian approach, evaluating a hypothesis involves both the strength of the evidence and its prior probability, that is, how well it fits with what we already believe about the world. Testimony that someone ate a cheese sandwich for lunch is easily believed. Testimony that they arrived on a dragon is not. The evidence is the same, but the prior probabilities differ dramatically. Flying on dragons has an extremely low prior probability and would require extraordinarily strong evidence.

The same structure applies to mystical experience. Whether it is rational to trust such an experience depends in part on one’s underlying metaphysical commitments. And this is where the issue becomes significant: mystical experience looks very different when approached from a physicalist worldview than when approached from a panpsychist one. Panpsychism also leaves room for understanding ultimate reality as wondrous in the relevant

sense. While not required by the theory, it is at least plausible that when surface-level mental contents quieten, attention shifts toward a deeper layer of consciousness, naturally experienced as profoundly valuable. Similarly, if individual consciousness is grounded in a more fundamental universal consciousness, this grounding could be disclosed phenomenologically, as an experience of unity with something deeper and more expansive than the everyday self. While such experiences are not inevitable, they fit naturally within a panpsychist framework.

Taken together, these considerations suggest that from a panpsychist perspective, it is rational to take mystical experiences seriously, not merely as psychological anomalies, but as potential insights into the fundamental nature of reality. This may also help explain why the cultural revolution toward mysticism in the 1960s ultimately failed to sustain itself. Lacking a rigorous metaphysical framework, such experiences were easily dismissed or reduced. Panpsychism may offer a scientifically respectable framework in which mystical experiences can be understood as revealing something genuine, rather than as curiosities to be explained away.

### **The core challenge of panpsychism**

The central challenge facing panpsychism is the combination problem: how simple forms of consciousness at the fundamental level combine to produce the unified consciousness we experience. This problem is a major focus of contemporary research in philosophy of mind, and while no fully satisfactory solution has yet emerged, a range of promising proposals have been developed.

One version of the problem is this. If my consciousness is made of trillions of particles, why do I not experience each of them individually? One possible response is that not all experience is cognitively accessible. Some forms of experience may exist at

subpersonal or unconscious levels, contributing to conscious unity without appearing as distinct items in awareness. Even if panpsychism ultimately requires additional theoretical primitives to explain the combination, it still offers a strikingly simple and elegant picture of reality, one in which physics emerges from a deeper, subjective foundation rather than the other way around. This is a central and exciting problem in consciousness research today.

### **Panpsychism: A third way**

So what does all this mean for how humans situate themselves in the world? These debates are not merely technical. They also shape how we think about the ultimate character of reality and our place within it. One such debate is the long-standing tension between theism and atheism. Panpsychism may offer a middle path between traditional theism, which posits a supernatural designer, and atheism, which typically regards the universe as fundamentally indifferent. Rather than excluding either position, this approach invites a more open stance. One that acknowledges the limits of our knowledge and resists premature metaphysical closure.

One of the standard arguments for theism appeals to the apparent fine-tuning of the laws of physics of life. Over recent decades, physicists have discovered that many fundamental constants must lie within an extraordinarily narrow range for stars, planets, and life to exist at all. Slight deviations in values such as dark energy would have resulted either in a universe that expanded too rapidly for structure to form, or one that collapsed almost immediately. Theists typically interpret this fine-tuning as evidence of a supernatural designer. Atheists typically respond by appealing to a multiverse: given enough universes, one is bound to have the right conditions by chance. Panpsychism, however, opens a different possibility. If the universe is conscious in some

fundamental sense, it may not be unreasonable to suggest that it possesses tendencies or orientations of its own. Rather than being externally designed or purely accidental, the apparent order of the cosmos may reflect an ongoing, immanent process whose full character we do not yet understand.

The panpsychist view requires no appeal to the supernatural, but it does leave conceptual space for higher or more encompassing forms of consciousness. Unsurprisingly, some find this suggestion uncomfortable, perhaps because it challenges the assumption that consciousness must be confined to localised systems. Yet if consciousness is a fundamental feature of reality, it is not obvious why it should be confined to localised systems alone. These questions become especially intriguing when we move beyond human beings and begin to consider how unity and sharing might apply to particles, fields, and the fundamental structure of reality itself.

Where does this leave us? Seen in this light, the same considerations that place panpsychism between theism and atheism also explain its philosophical appeal. Panpsychism offers a way of taking consciousness and spirituality seriously while remaining fully compatible with science. At the same time, panpsychism invites an ontological integration of consciousness into our picture of reality. What emerges is no longer a dead, purely mechanical universe, but one that is fundamentally experiential: a reality in which consciousness is not an anomaly, but part of the fabric of the world. Panpsychism is, then, not a proof of spirituality, but it may be the first metaphysical view that takes subjective experience seriously while remaining compatible with our best physical theories.