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The Anomaly of Consciousness

All descriptions of reality are temporary hypotheses.

Buddha

Today, after thirty years of investigation into the nature of consciousness, I have come to appreciate how big a problem consciousness is for contemporary science. Science has had remarkable success in explaining the structure and functioning of the material world, but when it comes to the inner world of the mind—to our thoughts, feelings, sensations, intuitions, and dreams—science has very little to say. And when it comes to consciousness itself, science falls curiously silent. There is nothing in physics, chemistry, biology, or any other science that can account for our having an interior world. In a strange way, scientists would be much happier if there were no such thing as consciousness.

David Chalmers, professor of philosophy at the University of Arizona, calls this the "hard problem" of consciousness. The so-called "easy problems" are those concerned with brain function and its correlation with mental phenomena: how, for example, we discriminate, categorize, and react to stimuli; how incoming sensory

data are integrated with past experience; how we focus our attention; and what distinguishes wakefulness from sleep.

To say these problems are easy is, of course, a relative assessment. Solutions will probably entail years of dedicated and difficult research. Nevertheless, given sufficient time and effort, we expect that these "easy problems" will eventually be solved.

The really hard problem is consciousness itself. Why should the complex processing of information in the brain lead to an inner experience? Why doesn't it all go on in the dark, without any subjective aspect? Why do we have any inner life at all?

I now believe this is not so much a hard problem as an impossible problem—impossible, that is, within the current scientific worldview. Our inability to account for consciousness is the trigger that will, in time, push Western science into what the American philosopher Thomas Kuhn called a "paradigm shift."

PARADIGMS

The word *paradigm* (derived from the Greek *paradigma*, meaning "pattern") refers to the commonly accepted theories, values, and scientific practices that constitute "normal science" within any particular discipline. A paradigm is basically a school of thought, a set of assumptions within which a particular science operates. Quantum theory, Newtonian mechanics, chaos theory, Darwin's theory of evolution, and the psychoanalytic model of the unconscious mind are all examples of paradigms.

Over time paradigms change. For nearly two thousand years Plato's theories governed the way people thought about the motion of heavenly bodies. In the seventeenth century Newton's laws of motion became the paradigm. Today, Einstein's theories of relativity are regarded as a more accurate description of how matter moves in space and time. Similar changes in worldview can be found in biology, chemistry, geology, psychology—indeed, in all the sciences.

> For those who believe, no proof is necessary. For those who do not believe, no proof is possible.
>
> The Talmud

In his seminal book, *The Structure of Scientific Revolutions*, Thomas Kuhn showed that the transition from one paradigm to the next is not smooth. The pressure for change builds over time, but the shift itself is abrupt.

The process begins when the existing paradigm encounters an anomaly—an observation that cannot be explained by the current worldview. Because our assumptions as to how the world works are so deeply ingrained, the anomaly is initially overlooked, or rejected as an error. Or, if it cannot be so easily discarded, attempts are made to incorporate the anomaly within the existing paradigm. This is what happened when medieval astronomers tried to explain the motions of the planets through the sky.

DEFENDING THE PARADIGM

For more than a thousand years, astronomers had interpreted their observations based on the model formulated by the Greek philosopher Ptolemy, around A.D. 140: The sun, moon, planets, and stars all revolved around the earth in circular orbits.

But there were problems with this model. Although the stars appeared to move smoothly along circular orbits, the planets did not. They wandered among the stars[1] , their orbits wobbled, their speed varied, and they occasionally appeared to reverse direction in what is known as *retrograde* motion. This was an anomaly the existing *geocentric* (i.e., earth-centered) paradigm could not explain.

The solution astronomers came up with was a system of epicycles—the paths traced out by circles that are themselves rolling around larger circles. If the planets moved along epicycles, this would explain some of the strange planetary motions without having to give up the idea of circular motion.

As more accurate data was collected, it became apparent that simple epicycles were not sufficient to explain all the irregularities. So the medieval astronomers proposed more complex epicycles—circles rolling around circles rolling around circles. When these, too, failed to account for all the observations, they added other modifications and oscillations, making the system yet more cumbersome.

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[1]The word planet comes from the Greek word *planeta* meaning "wanderer."

THE COPERNICAN REVOLUTION

Kuhn showed that a paradigm starts to shift when some brave soul challenges the assumptions behind the existing worldview and proposes a new model of reality. Often, however, the new model runs so counter to the existing worldview that it is initially rejected, or even ridiculed, by the establishment.

In the early sixteenth century the Polish astronomer Nicolaus Copernicus proposed just such a radically different worldview. The reason the stars appeared to orbit the earth, he suggested, was that the earth itself was moving, spinning on its own axis. The apparent motion of the heavens was an illusion caused by the motion of the observer.

Copernicus not only proposed that the earth was not stationary; he suggested it was not even at the center of the universe. He found that the anomalous movements of the planets could be explained if they were assumed to be orbiting the sun rather than the earth. From this came his most heretical conclusion: The earth itself was just another planet going around the sun.[2]

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[2]This was not a totally new theory. In 270 B.C. a little-known Greek philosopher, Aristarchus, advanced the idea that the earth and the other planets moved around the sun. If his views had held sway—rather than those of Plato and Ptolemy—history might have taken a very different course.

It is easy for us, born into a world in which the *heliocentric* (i.e., sun-centered) model is the accepted truth, to overlook just how radical a proposal this was. The earth's central position was not only an article of faith upon which everyone agreed, it was also confirmed by personal experience. One had only to look up to see the sun and stars moving across the sky, while the earth clearly remained as still as could be. To suggest that the earth moved was ludicrous.

Copernicus was a clergyman and knew his theory not only went against common sense but also challenged the church's view of reality. So, for thirty years, he kept his ideas to himself. Only as he neared death and felt he did not want to take this important knowledge with him to the grave, did Copernicus finally decide to publish. The first copy of his little book, *On the Revolutions of the Celestial Spheres*, arrived in his hands on the day he died.

> Every truth passes through three stages before it is recognized.
> In the first, it is ridiculed.
> In the second, it is opposed.
> In the third, it is regarded as self-evident.
>
> Arthur Schopenhauer

Copernicus's fears of repression turned out to be well founded. The Vatican immediately placed his work on the papal index of forbidden books. There it remained, ignored and forgotten, for nearly seventy years.

COMPLETING THE PARADIGM SHIFT

In 1609 the Italian scientist Galileo Galilei, using his newly invented telescope, found convincing evidence in favor of Copernicus's ideas. He saw that Venus, like the moon, moved through phases—sometimes only half, or just a crescent, of the planet would be illuminated—which showed that Venus did indeed circle the sun. Galileo also discovered moons orbiting Jupiter, further dispelling the idea that everything circled the earth.

After Galileo published his findings, he was contacted by the Pope, who demanded Galileo retract his heretical ideas. A few years earlier, the philosopher Giordano Bruno had been burned at the stake in Rome for supporting Copernicus's model, so Galileo wisely accorded with the Pope's demands.

But Galileo was not happy that so important a truth should remain suppressed. In 1632 he published *Dialogue*, a brilliantly composed book in which he again defended the Copernican theory. Once more the Vatican demanded a retraction. Galileo was forced to "abjure, curse, and detest" the view that the earth moved around the sun, and was condemned to house arrest for the remainder of his life.

> To assert that the earth revolves around the sun is as erroneous as to claim that Jesus was not born of a virgin.
>
> Cardinal Bellarmine
> (during the trial of Galileo)

Meanwhile, a German mathematician, Johannes Kepler, was solving another piece of the planetary puzzle. Kepler had had the good fortune to study under Tycho Brahe, a Danish astronomer who had accumulated a vast inventory of accurate astronomical data. These clearly showed that even if the planets were orbiting the sun, they were not following circular orbits. After pondering the data for many years, Kepler found that he could explain all the irregularities in the planets' movements if he assumed they followed elliptical orbits. But as to why this should be, he had no idea.

The answer came seventy years later when the English mathematician Isaac Newton realized that heavenly bodies are governed by exactly the same laws as earthly objects—the force that causes an apple to fall is the same force that holds the moon in its orbit around the earth. Working out the resulting equations of motion, he proved that any orbiting body would move in an ellipse, just as Kepler had discovered.

With this final piece of the puzzle, the revolution was complete. Copernicus had provided the key idea, but it had taken several other equally significant breakthroughs, involving people from five countries, spread over 150 years, to put the sun firmly at the center of things and irrevocably shift the way people viewed their world.[3]

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[3]However, it was not until 1992 that the Vatican formally apologized for its treatment of Galileo.

THE METAPARADIGM

The process by which the geocentric worldview changed to a heliocentric one is a classic example of a paradigm shift occurring in a particular area of science. Yet Kuhn's model need not be limited to individual scientific disciplines. I believe the model can, and should, be taken a step further and applied to the worldview of Western science as a whole.

All our scientific paradigms are based on the assumption that the physical world is the real world, and that space, time, matter, and energy are the fundamental components of reality. When we fully understand the functioning of the physical world, we will, it is believed, be able to explain everything in the cosmos.

This is the belief upon which all our various scientific paradigms are based. It is, therefore, more than just another paradigm; it is a *metaparadigm*—the paradigm behind the paradigms.

So successful has this metaparadigm been at explaining just about every phenomenon we encounter in the material world, it is seldom, if ever, questioned. It is only when we turn to the nonmaterial world of the mind that this worldview begins to exhibit weaknesses.

Nothing in Western science predicts that any living creature should be conscious. It is easier to explain how hydrogen evolved into other elements, how they combined to form molecules and then simple living cells, and how these evolved into complex beings such as

ourselves than it is to explain why we should ever have a single inner experience.

The problem is, in essence, one of *type*. When elementary particles combine to form atoms, and those atoms combine to form molecules, they are forming entities of the same type—they are all physical phenomena. The same is true of a simple cell. DNA, proteins, and amino acids are of the same basic type as atoms. Even the human brain, unfathomably complex as it may be, is still of the same essential type.

Consciousness, however, is of a fundamentally different type. Consciousness is not composed of matter. And matter, we assume, does not possess consciousness.

We may not be able to account for consciousness, yet the fact that we are conscious is one thing of which we are absolutely certain. This realization was one of René Descartes's great contributions to Western philosophy, some two hundred and fifty years ago. Like many philosophers before and since, Descartes was looking for absolute truth. To this end, he created his method of doubt. Anything that could be doubted could not, he argued, be the absolute truth.

Descartes found that he could doubt any theory or philosophy. He could doubt what anybody said. He could doubt what his eyes showed him of the world. He could doubt his own thoughts and feelings. He could even doubt that he had a body. But the one thing he could not doubt was that he was doubting. This revealed one certainty: he was thinking. If he was thinking, he had to be an

experiencing being. As he put it in Latin, *Cogito, ergo sum*—"I think, therefore I am."

> Scientists are in the strange position of being confronted daily by the indisputable fact of their own consciousness, yet with no way of explaining it.
>
> Christian de Quincey

This is the paradox of consciousness. Its existence is undeniable, yet it remains totally inexplicable. For the materialist metaparadigm, consciousness is one big anomaly.

DEFENDING THE METAPARADIGM

As Kuhn showed, the first reaction to an anomaly is to ignore it. This is what most scientists have done with consciousness, and for what seemed good reasons.

First, consciousness cannot be observed in the way that material objects can. It cannot be weighed, measured, or otherwise pinned down. Second, scientists have sought to arrive at universal *objective* truths, independent of any particular observer's viewpoint or state of mind. To this end they have deliberately avoided subjective considerations. And third, they felt there was no need; the functioning of the universe could be explained without having to explore the troublesome subject of consciousness.

But developments in several fields have now shown that consciousness cannot be quite so easily sidelined. Quantum physics,

for example, suggests that, at the atomic level, the act of observation affects the reality that is observed. In medicine, a person's state of mind can have significant effects on the body's ability to heal itself. As neurophysiologists deepen their understanding of brain function and its correlation with mental phenomena, the nature of subjective experience again raises its head.

As a result of these and other developments, a growing number of scientists and philosophers are now trying to explain how consciousness arises. Some believe that a deeper understanding of brain chemistry will provide the answers; perhaps consciousness resides in the action of neuropeptides. Others look to quantum physics. The minute microtubules found inside nerve cells could create quantum effects that might somehow contribute to consciousness. Some explore computing theory and believe that consciousness emerges from the complexity of the brain's processing. Others find sources of hope in chaos theory.

Yet whatever idea is put forward, one thorny question remains unanswered: How can something as immaterial as consciousness ever arise from something as unconscious as matter?

> A new scientific truth does not triumph by convincing its opponents and making them see the light. But rather because its opponents eventually die.
>
> Neils Bohr

The continued failure of these approaches to make any appreciable headway into solving this problem suggests they may all be on the

wrong track. They are all based on the assumption that consciousness emerges from, or is dependent upon, the physical world of space, time, and matter. In one way or another, they are attempting to accommodate the anomaly of consciousness within a worldview that is intrinsically materialist. As happened with the medieval astronomers who kept adding more and more epicycles to explain the anomalous motions of the planets, the underlying assumptions are seldom, if ever, questioned.

I now believe that rather than trying to explain consciousness in terms of the material world, we should be developing a new worldview in which consciousness is a fundamental component of reality. The key ingredients for this new metaparadigm are already in place. We need not wait for any new discoveries. All we need do is put various pieces of our existing knowledge together and explore the new picture of reality that emerges.