

IT'S IMMATERIAL

Hindu Council director Jay Lakhani is also a trained scientist. He believes science and religion meet at the level of the infinitely small

ONE OF THE endearing aspects of science is its preparedness to test all its hypotheses to destruction. This sounds easy in theory, but is not so easy to put into practice. Scientists are human and prone to becoming emotionally attached to their paradigms. It has long seemed to me, as someone trained in quantum mechanics and relativity theory, that the paradigm which now needs to be challenged is that of materialism, that worldview that everything and everyone is essentially just a product of little bits of matter. This form of materialism has, of course, its origin in mankind's earliest attempts to come to terms with reality using the norm of substance and its attributes. Explaining the universe in terms of sticks and stones or smaller versions of sticks and stones (elementary particles with mass, charge, and spin etc) has been a tried and tested paradigm that has certainly produced durable results for over 2,000 years and has exerted its influence on all branches of scientific thinking. The proclamation of the Vienna Circle that "only those statements that can be supported by empirical evidence are meaningful", perfectly captures this strictly materialistic locus of operation for scientific enquiry.

Why should this worldview now be challenged? Since the middle of the 1920s physics has been struggling to gain a conceptual handle on the phenomenon called the *quantum* (the counter-intuitive science of the very small). This discovery is at the heart of the most physical of physical sciences. It is hugely successful in explaining the workings of almost everything from a computer chip to DNA. But although the mathematical formalism is successful, it fails to deliver any conceptual grasp on the actual phenomenon. The quantum simply cannot be captured within the locus of a materialistic paradigm because the quantum that underpins matter is, crucially, non-material (*see the table on the next page*).

THESE CONCEPTUAL anomalies will not go away because physicists continue to dignify matter as primary and demote the quantum as a mere mathematical ploy invoked to handle the unexpected shenanigans of matter. This is not only like putting the cart before the horse but attempting to show how the cart is pulling the horse. Indeed, many physicists have been so fixated on matter that it has been almost impossible for them to think outside a materialistic box. Einstein exhibited his bias through the famous Solvay debates with Niels Bohr. Nobel-winning physicist Murray Gell-Man exhibits his bias in the dismissive way he treats the quantum as a ploy rather than a serious conceptual challenge. Roger Penrose seeks to link quantum with consciousness in matter

Anomalies of the quantum. The counter-intuitive science of the very small

1 The fundamental disjoint between the micro world of quantum that underpins the macro world of matter. If we were to smash two bricks together we still get two bricks (maybe part as rubble or part as energy) but if we were to smash two quanta together, they superimpose on each other and we can get anything from two quanta to no quanta as a

result. This shows that the underpinning to reality is non-material, though it manifests or appears as matter.

2 The fundamental problem of the observer. Who flips the micro world of quanta into the macro world of matter? This entity cannot be in the realm of matter or in the realm of the quanta, else it cannot

flip between them. So who or what is the entity that straddles both worlds?

3 The fundamental problem of place. Material objects occupy a certain location at a particular point in time but the quantum does not do that. This is technically called "the problem of non-locality". If two

elementary entities (like photons) that are once linked get separated by billions of light years, when we squeeze one, the other goes "ouch" instantly. How does it know? They appear to act as if they were not separated. They are linked with each other for ever and ignore the space-time divide that material objects cannot ignore.

(in the microtubules of the neuron cells). Hugh Everett's many-world interpretation is perhaps one of the most bizarre attempts to hang on to the materialistic paradigm. In order to get rid of a conscious observer from the realm of physics, Everett is happy for the whole universe to keep making infinite copies of itself at every quantum event – almost every instant of time. This is divergence with a vengeance. Occam must be turning in his grave.

It's difficult to avoid the conclusion that quantum is pointing to a non-material underpinning to reality. Matter has to be demoted to being a secondary feature. In the words of great theoretical physicist Erwin Schrödinger: particles are just appearances (*schaumkommen*).

But materialism has another problem. Just as at the heart of physics sits the quantum phenomenon that defies and challenges a materialistic paradigm, at the heart of neuroscience sits another intriguing phenomenon, consciousness. Can we find a slice of the brain (or a region in the brain) that generates consciousness? How are we going to verify this experimentally? Consciousness is a subjective phenomenon and every tool we come up with is bound to be an object. So how can we possibly carry out an experiment to find the seat of consciousness using material tools? Let us do a thought experiment: imagine that we have a highly sensitive probe which we can use to prod any part of the brain. Exactly how are we expecting the probe to detect consciousness? Remember, we are not exploring matter or motion or even a complex process associated with a living cell. We are in search of consciousness. How do we do that? This is the problem. Only consciousness can validate consciousness and neither can be objective by definition.

Not that this has stopped a host of thinkers from churning out volumes of literature attempting to explain consciousness away in material or social or psychological or computational terms. Take one classic example from materialist philosopher Daniel Dennett, who argues that "conscious human minds are more-or-less serial virtual machines implemented inefficiently on the parallel hardware that evolution has provided for us." This computer lingo is supposed

to lull us into thinking that he has explained consciousness away. So why is it that so many intelligent thinkers are keen to explain consciousness away as a secondary feature of matter rather than acknowledge and dignify it as a primary phenomenon? The answer comes from philosopher John Searle, who says: "If one had to describe the deepest motivation for materialism, one might say that it is simply a terror of consciousness."

THERE IS ANOTHER problem with materialism, the problem of life itself. In life sciences, the definition of life too does not sit well in a reductionist materialistic paradigm. In biological terms, a live entity is defined as a complex string of molecules undergoing complex processes like homeostasis, metabolism, growth, adaptation, response to stimulus and reproduction.

Life makes its appearance when an entity throws up a membrane to separate itself from the rest of the environment. This separation offers it a chance to build a kind of individuality for itself. After separation it exhibits its uniqueness by interacting with its environment in a selective manner. Here the word *selective* is the crucial term that exhibits the non-material underpinning to life.

Consider another definition of life: life is that which is not in conformity with its environment but in defiance of it. Even the simplest form of life does not roll over and play dead when nature prods it. It does not like being dictated by nature. When we see a bacterium buzzing it is fighting against natural, physical forces; when it stops its fight these forces will tear it apart. A biologist offered this tongue-in-cheek example of how to distinguish between living and non-living things. If you kick a piece of rock you can work out its trajectory to the nearest millimetre but if you kick a dog, its trajectory is the last thing you can work out – though it is likely that it will go for your leg. So when we hear the idyllic saying "let's get back to nature" don't listen. They are asking us to die. Everything humanity stands for has been achieved by standing up against nature and its forces, and not by playing ball with it. Some evolutionary biologists may object to this explanation and suggest that life is just complexified nature that is standing up to less complex nature. But in the process they have slipped in another meta-term, "complex", that reveals the non-material aspect

Is science afraid to step beyond matter to try and grasp the essential nature of life?

to what life is all about. It is fine to suggest that human beings are a continuation of the animal kingdom but this cannot necessarily be extended to suggest that life is a continuation of the material kingdom. The signature of life is that it does not like being buffeted by material forces; it stands up to them and attempts to harness them. Modern humanity reflects the culmination of this process.

TAKE YOUR PICK: quantum, consciousness or the unique characteristic of life. None of them sits well within the paradigm of materialism. This does not mean that we have to throw materialism out of the window. For example, even though we know that Newton's theory of gravity is just an approximation to the more elegant Einstein theory, we continue to use Newton's theory to do our day-to-day calculations. In the same way the materialistic paradigm can be accommodated as a useful fiction that gives us a methodology to relate to the world around us. However, this should not stop us from taking a conceptual leap and looking beyond matter. Where should we look?

Schrödinger was aware that the quantum phenomenon resonated well with the insights of Eastern metaphysics. It is that metaphysics – an esoteric, non-theistic Hinduism – which I believe offers an interesting insight into the nature of reality. It claims that the underpinning to everything including ourselves is Brahman. The two words that capture the essence of Brahman are Existence (*Asti*) and Consciousness (*Bhati*).

Esoteric Hinduism maintains that "When Brahman shudders, the world of appearance comes into being". The subject/object divide, too, is part of this appearance. Such stuff would be written off as poetry if it were not so incredibly close to what quantum and consciousness are revealing. For me as a scientist and a Hindu the resonance I discover between science and esoteric Hinduism is thrilling because this points the way to convergence, economy and elegance.

TRYING TO EXPLAIN quantum in terms of matter fails because it attempts to capture reality through the prism of appearance. The reason why neuroscience struggles to capture the essence of consciousness is because it ends up by focusing on what we are conscious about, rather than on what consciousness actually is.

Similarly in life sciences, the driving force behind evolution has never been fully explored or understood because it is assumed that there is none. Evolution is explained as an outcome of random mutations in the genes that sit well with the changing environment. This is a strictly materialistic interpretation of evolution. I am not attempting to revive the outdated concept of vital force, but I am suggesting that evolution and life itself are nothing but the struggle of consciousness to find greater and better expression in the material realm. In a single living cell this shows up as rudimentary cognition; in the human frame consciousness finds its greatest expression. This is why we have evolved so rapidly from a single cell to this complex being. Evolution is not random but directed. Directed by the quest of consciousness to find greater expression. A question still remains: why does consciousness seek expression in the material realm? In "Song of Apollo" Shelley provides an eloquent answer: "I am the eye with which the universe beholds itself and knows itself as divine." ■

