

## *Guest Editorial*

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### THE TWO CULTURES REVISITED

The two cultures debate initiated by C.P. Snow in a lecture at Cambridge snowballed into a major controversy. For C.P. Snow, the two cultures concerned the intellectual world, in particular, science and literature. His 1959 Rede Lecture, which highlighted the divide between the two cultures, provoked a savage response peppered with ad hominem from the literary critic F.R. Leavis. When the Leavis outburst was published in the *Spectator*, readers wrote berating him for spewing what they called ‘reptilian venom’. Leavis was dismissive, charging Snow with not knowing what he was talking about.

Snow, an academic scientist who entered the ‘corridors of power’ wrote 11 novels drawing on his own experiences. Though not a great novelist, he was a pioneer of a new genre, the campus novel, which increasingly turned salacious in the hands of his successors like Malcolm Bradbury. ‘*The Masters*’ is about the internal power struggles between dons to elect the Master of his college. As you probably know, the only academic appointment in Britain made by the government is the Mastership of Trinity.

C.P. Snow started out as a physicist before entering the bureaucracy. As the first science, brought into being by Isaac Newton, physics has long set standards of rigour that other sciences aspire to. In the first half of the twentieth century, the dominance of physics was plainly manifest, with the revolutions of relativity and quantum theory; which transformed our understanding of the world. The transition from the old to the new was not exactly palatable to those schooled in the old ways. Russell McCormach vividly pictures the predicament of a physicist who is so firmly set in the old ways that he finds himself in a twilight zone.<sup>1</sup>

Ernest Rutherford, the discoverer of the nucleus, (for whom ‘there is physics and there is stamp-collecting’), dismissed talk of the possible applications of nuclear physics as ‘moonshine’. Little did he realize that these developments would soon open a whole Pandora’s box of genocidal weaponry capable of wiping out humankind several times over.

Isaac Newton (1642-1727) ‘the last of the great Magi’ as Keynes called him, was a transitional figure, straddling the medieval and the modern. To escape the plague, Newton returned home from Cambridge in the summer of 1665 and returned only after the university re-opened two years later. Survival in Newton’s England was a matter of sheer luck and the two years he spent

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<sup>1</sup>Russell McCormach’s ‘Night Thoughts of a Classical Physicist’ (Harvard University Press, 1982)

at home saw his talents flower. In Newton's England medicine, sanitation and hygiene were woefully primitive. Things were a whole lot better though than during the first millennium, Europe's Dark Age. Umberto Eco argues that European civilization would have been extinguished but for the widespread cultivations of beans (lentils included) which provided a cheap source of protein and hence enhanced resistance to disease for the poor for whom meat was a luxury, which could only be poached at great risk from the lands of the rich.<sup>2</sup> Renaissance Europe saw the invention of the microscope as well as the telescope, extending the range of human perception.

The industrial revolution in the late 18<sup>th</sup> century soon transformed the fortunes of England. The epic voyage of Charles Darwin on the naval survey ship H.M.S. Beagle, whose captain Robert Fitzroy chose him as a gentleman for dinner company, for the oddest of reasons - he liked the shape of his nose! Darwin clearly had a nose for discovery! Chemistry found its Dalton (an English Quaker and schoolteacher) and Lavoisier - who ended up on the guillotine in the French revolution. Though Jenner is credited with the discovery of vaccination, it was traditionally practised in India until the colonizers banned it in Bengal. Louis Pasteur proved the germ theory of disease and invented the rabies vaccine. Antibiotics arrived in the twentieth century, with Alexander Fleming's serendipitous discovery of penicillin. The phenomenal growth of the

human population is largely the result of the control of disease, increased life expectancy and reduced child mortality. In a sense the 20<sup>th</sup> century is the beginning of the modern world, with the expansion of mechanized production along with developments like universal adult suffrage, the 8-hour working day and welfare measures.

With technologies generating a range of utilities arising out of science, the distinction between science and technology is often overlooked and science is viewed as the handmaiden of technology. However, the holy grail of science is the Book of Genesis, whether of the universe as a whole or of life on earth. As Steven Weinberg puts it, the quest for the fundamental laws of nature "lifts human life above the level of farce and gives it some of the grace of tragedy"<sup>3</sup>.

Thomas Kuhn's 'Structure of Scientific Revolutions',<sup>4</sup> encouraged social scientists to argue that science is a 'social construct', and not the account of the world it claims to be. However the fact that science is a human enterprise and that it concerns things in the world we confront, are hardly contradictory. After all, in the standard model of cosmology, the big bang occurred billions of years before the solar system or life on earth came into being. Thanks to the revolution in biology, we are now reasonably certain that homo sapiens originated in East Africa and some groups flowed into other parts of the world, to

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<sup>2</sup>In a Millennium essay carried in translation by The New York Times Umberto Eco shows how after 1000 AD the cultivation of beans, peas and lentils had a profound effect on European civilisation, which could otherwise have become extinct.

<sup>3</sup>Steven Weinberg, 'Dreams of a Final Theory', Vintage 1993.

<sup>4</sup>Thomas Kuhn, 'The Structure of Scientific Revolutions' The University of Chicago Press (1962 revised version 1970)

which they acclimatized. There is evidence from mitochondrial DNA of an Eve for all of humanity.

Science fiction, pioneered by Mary Shelley, Jules Verne and H.G. Wells, straddles both cultures (although nowadays with a proliferation of outré scientific hypotheses, the dividing line between science and science fiction increasingly wears thin). Literature as fiction, is an item of mass consumption in literate societies, where there is an insatiable hunger for the new. There are gifted scientist-expositors, like Charles Sherrington, Peter Medawar, Freeman Dyson, Stephen Jay Gould, Oliver Sacks, Richard Dawkins and V.S. Ramachandran. While writing popular books, Stephen Hawking and Roger Penrose among others do not dilute scientific content. Hawking's "A Brief History of Time" contained only the equation  $E = mc^2$  having been warned that each equation would halve his sales. The book remained on the bestseller list for years on end, especially after the Hawking saga became folklore. The availability and readership of popular science books have grown, helping to bridge the divide to an extent.

Yet the public perception of science as remote and arcane and of literature as personal and edifying persists. This is an unfortunate misunderstanding – the worlds imagined by the physicist of today contain such elements as 'dark matter', whose existence is required to explain galactic dynamics, or 'dark energy', which caused an acceleration of the universal expansion several billion years ago when it overwhelmed gravity. If the new scenarios

are true the end of the universe will not be in fire but in ice. Similarly, the concept of the 'ekpyrotic universe' which substitutes the big bang with a collision between two branes like cymbals, represents another leap of the imagination.<sup>5</sup> In science, imagination is necessary but not sufficient, since a theory must pass several tests before it gains acceptance; by comparison, the literary imagination appears to be unfettered, which is not quite the case, because at some point, its ability to relate to experience and to draw in the reader is a crucial test.

Rabindranath Tagore, in his discussions with Einstein, anticipated the 'two cultures' debate. Tagore maintained that the abstract world of science is conjured up by the intellect and did not correspond to reality. On the other hand he says. "... there is another world which is real to us. We see it, we feel it; we deal with it with all our emotions. Its mystery is endless because we cannot analyse it or measure it. We can but say, 'Here you are'. This is the world from which Science turns away, and in which Art takes its place". Tagore would not disavow the sensuous world in favour of the world of science or even the Atman/Brahman of the Advaita Vedanta.

Today, the two cultures debate extends beyond literature to the humanities as a whole where recondite vocabularies are invented, in contrast to the clarity, forthrightness and simplicity that science strives for. Not so long ago, Alan Sokal, a physicist at New York University sent in a piece entitled 'Transgressing the Boundaries: Towards a Transformative

<sup>5</sup>Stephen Hawking, *The Universe in a Nutshell* (Bantam Press, 2001).

Hermeneutics of Quantum Gravity' to a journal called 'Social Text', whose editors published it as they felt that it was "the earnest attempt of a professional scientist to seek some sort of affirmation from postmodern philosophy for developments in his field". Later, Sokal revealed that the article was a parody packed with erroneous statements, which he had found exceedingly difficult to assemble. In the ensuing row, literary critics charged Sokal with dishonesty, while Sokal defended himself on the grounds that humanities scholars freely employed scientific terms, with scant regard for their meaning, vicariously appropriating the authority of science.<sup>6</sup> Commenting on the Sokal controversy, Steven Weinberg, says: "The gulf of misunderstanding between scientists and other intellectuals seems to be at least as wide as when C.P. Snow worried about it three decades ago".

It is a common complaint that the scientific worldview leaves little room for free will. In the clockwork universe of Newton, although deterministic chaos is often seen as a possible chink in the armour. Newton had to introduce a 'God of the gaps' who would set the clockwork solar system in place once more. With the efforts of Lagrange in his 'Analytical dynamics' as well as Laplace's own work proving the stability of the solar system, the 'God of the gaps' could be dispensed with. It is in

this context that when Napoleon asked Laplace where God figured in his work, the latter said 'we have no need of that hypothesis.

The fundamental indeterminism of quantum theory is seen by some as a possible route to embed free will in physical theory. Tied to quantum theory, however, human decisions will be completely unpredictable and random, which is somewhat worse than determinism. Quantum physicists have speculated on the role of consciousness in bringing about a definite result in a measurement – quantum theory specifies the probabilities of various outcomes, such as alive or dead for Schrödinger's cat upon measurement, but prior to the experimenter taking a peek, the cat is in a quantum 'superposition' of alive and dead states. The measurement problem in quantum mechanics remains a thorn in the flesh.

If science is a prism, which analyses, the humanities offer a mirror into which you look at yourself. A creative tension between science and the humanities, between knowledge and self-understanding, would only enrich both. To quote Tagore once again, 'Let us boldly declare that both facts are equally true. .... when we take the side of one to revile the other, we hurt the truth, which comprehends them both.'

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<sup>6</sup>Alan Sokal and Jean Bricmont, *Fashionable Nonsense: Modern Intellectuals' Abuse of Science*, First Picador Paperback Edition, 1999