Letter to the editor

New Zealand Science Review Special Issues *Mātauranga and Science*

The goal of strengthening Māori engagement in science and scientific research is a critical objective within our national vision for a modern knowledge-based society. But I was dismayed to read some of the articles in the two recent issues of *New Zealand Science Review*. Science cannot be predicated on mythical cosmologies. Science is universal. Myths are local. And there is no such thing as Western science or Māori science. Empirical science transcends all boundaries. It is totally inclusive in its philosophical constructs and its approach to collecting and validating data. As soon as its philosophy is built on local mythology it becomes exclusive and this surely cannot be condoned. The international research community is ruthless in weeding out such an approach. Editors of scientific journals have lost their jobs for allowing papers to creep through that breach this fundamental understanding.

My criticism does not lie in an assertion that science, and science alone, is the only route to truth. In fact, as a committed Christian I hold that total reality transcends the physical world which science explores and indeed imposes moral restraint on the activities of science. So I am sympathetic to the underlying thinking. But, in the same way that we cannot legitimately build a scientific curriculum based on a recent six-day creation and Noah's flood, we cannot resort to mythical cosmologies, whether Māori or any other. Everything that we assert in science must be validated on an evidential basis. And I like as much as possible to apply the same principle to my faith stance. That can be very fruitful.

Neither does my criticism reject the principle of Mātauranga, including traditional Maori knowledge. But data and knowledge must be distinguished from scientific understanding. The process by which understanding is achieved is testing through empiricism, then mathematical modelling, then prediction followed again by further empiricism in a continuing cycle. This is the process of empirical science and it is never captured by any individual sector but remains universal to all peoples. Modern international science conferences are a vivid testament to that.

In the early days of some new subject we scientists will disagree, often vigorously, but slowly this process weeds out false or incomplete ideas and consensus develops. We do not grudge the failure of our ideas for they were part of the melting pot from which veracity is established. Mythologies, locked in time and space, can play no part here for they are not subject to this essential process of testing, distillation and, if necessary, rejection. Science is not concerned with verity. Verity (truth) is the domain of our stories, our faith, our traditions, our culture, our morality – and there can be many truths. Veracity (what is true) is the domain of science – and science proceeds under the vision of there being only one true physical story, though it may take many successive refinements to get there.

Again, I am sympathetic to the goals of this NZSR exercise but I am deeply troubled by the many false dichotomies, stereotypes, misrepresentations and insular perspectives presented in the articles. We are not faced with a choice between (Western) science and sustainability. (Western) Science is not the cause of 'spectacular environmental failures'. One might blame the users, the power brokers, whether economic or political, but not science. Reductionism is not narrow-mindedness and does not negate holistic understanding. Reductionism is a methodological approach to a world which is terribly complicated yet which often lends itself to 1st order analysis followed later by 2nd order corrections that might incorporate wider ideas, and so on. The huge accomplishments of physics are a dazzling testimony to this approach. Reductionism is just the start of the scientific process. But using it we have been able to deduce the properties of fundamental particles which are a billionth of a billionth of a metre in size and which we can never ever hope to see. Yet we understand their essential necessity, how they interact with each other and how their properties have determined the physical history of the *entire* universe from the first moments of the Big Bang 13.82 billion years ago. Indeed, we see the mathematical necessity of these entities, and often they have been predicted before their discovery. Again, and again, science offers a route from minute specifics to the grandest scales we can imagine. (Western) science is not narrow-minded.

Over my career I have had the good fortune of interacting with many of the leading physicists of our time, including many Nobelists. What is impressive is their common grasp of the bigger issues of life and our attendant moral responsibilities – these leaders of science are not narrow-minded. Scientific reductionism versus holistic indigenous understanding is a false dichotomy.

Science offers the collective understanding of humankind compiled, curated and thoroughly sifted over two and a half millennia. It is the *collective* genius of the human mind. As Newton noted *if I have seen further, it is by standing on the shoulders of giants*. I feel it is not helpful then to set the limited scope of Mātauranga against the vast accomplishments of science in general – there can be no contest. All scientists, of whatever race, must be prepared to humbly recognise their own meagre contribution to what is a huge scientific enterprise – what David Deutsch called *the beginning of infinity*. But it is both helpful and necessary to share and respect each other's knowledge in order to build our own local contribution to this endeavour. Knowledge, like all data, needs then to be sifted by the scientific

method and only then retained or discarded in order to build a robust veracity.

The (let us call it) Western separation of verity and veracity is the only secure means of establishing scientific knowledge. But it is only a methodological separation. The founding of the Royal Society did not mean that 'scientific discovery became more important to society than religion'. The Royal Society in its founding Charter stated that *the activities of the Society shall be devoted to the Glory of God the Creator, and the advantage of the human race*. Einstein, the supreme icon of modern science, held a deeply spiritual view of the physical universe:

> *Everyone who is seriously involved in the pursuit of science becomes convinced that a spirit is manifest in the laws of the Universe – a spirit vastly superior to that of mankind, and one in the face of which we with our modest powers must feel humble…My religion consists of a humble admiration of this illimitable superior spirit who is revealed in the slight details we are able to perceive with our frail and feeble mind.*

So the basis under which science is to be communicated to our diverse communities is not through our individual community myths. Science does not need that. It has its own compelling dynamic – its own imperative. Science speaks to everyone through the understanding it creates, through its sheer wonder, through the amazing technologies it dispenses and through the connection it demonstrates between the abstract human mind and the subtle structure of the universe. Best of all, science promotes itself through the passion of its agents – scientists. These are the ones who must be harnessed to achieve the goal of strengthening Māori engagement in science and scientific research, and they are very willing.

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