

neutrons either.” He once said to one of us, “There are only two experiments that matter—the first and the best. And the ultimate is when they are both the same.” Nothing less than superior science was ever acceptable to him. Perhaps his most lasting legacy is the many scientists who struggled to meet his exacting standards and who now populate elite research centers worldwide. It falls to them to recall and pass along to a new generation some of Gen’s enthusiasm, dedication, and passion for both science and life.

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John Michael Ziman

John Michael Ziman died at his home in Aylesbury, England, on 2 January 2005 after a short illness. A towering intellect, John left his mark both in theoretical physics and in his contributions to the broader aspects of science in society.

Born in Wellington, New Zealand, on 16 May 1925, John went to Victoria University College in Wellington, where he received his bachelor’s degree, and then Balliol College at Oxford University. At Oxford he studied mathematics and theoretical physics and completed his DPhil in 1951 on the theory of solids. In 1954 he accepted a lectureship at Cambridge University, where he became interested in the electrical properties of metals and transport in metals and alloys; his monumental textbook *Electrons and Phonons: The Theory of Transport Phenomena in Solids* (Clarendon, 1960) remains a delight and inspiration to students and established theorists alike.

It was about this time that John became aware of the long-standing problem surrounding conduction in liquid metals. More than 100 years ago, Gustav Kirchhoff and others had shown that a metal’s melting transition had a comparatively small effect on its electrical conductivity. That behavior seemed to go against all the current thinking in solid-state physics, which in the 1950s emphasized the role of order. Given the catastrophic collapse of long-range order at the melting transition, why was the conductivity not likewise greatly reduced?

By a brilliant application of diffraction theory combined with the

new idea of the pseudopotential, John produced his seminal *Philosophical Magazine* paper in 1961. The “Ziman formula” essentially explains all the significant properties of liquid metals and is now standard textbook fare. That work was arguably John’s greatest achievement. It was often said that after his work and subsequent studies that his approach had stimulated, we had a better understanding of the liquid state (which until 1961 had appeared intractable) than we had of solids!

John left Cambridge in 1964 and moved to Bristol University as a professor of theoretical physics. He created a leading school of theoretical physics at Bristol by appointing young theorists such as Michael Berry, Balazs Gyorffy, and Bob Evans. John continued to make outstanding contributions to the theory of solids and liquids. A more general interest in disorder finds its expression in his last book on theoretical physics, *Models of Disorder: The Theoretical Physics of Homogeneously Disordered Systems* (Cambridge U. Press, 1979).

In 1976 John became head of the physics department at Bristol. He had a lasting influence on the teaching side by creating a joint degree with the department of philosophy. Around the same time he became increasingly interested in the social and ethical aspects of science. He had already made one excursion into this general area by writing, with Jasper Rose, the book *Camford Observed* (Gollancz, 1964), a tongue-in-cheek analysis of some of the foibles of the ancient and famous universities of Oxford and Cambridge. Some members of those distinguished establishments apparently felt rather let down by what was perceived as an attack by one of their own. In fact the two authors were arguing that the Oxbridge model was

but one of many that could be used in the higher education sector.

With his book *Reliable Knowledge: An Exploration of the Grounds for Belief in Science* (Cambridge U. Press, 1978), John completed a major contribution to the sociology of science. Because he felt that to occupy a chair in theoretical physics would be inconsistent with his new field of research, he took voluntary early retirement from Bristol in 1982. His services were rapidly in demand, and he accepted a visiting position at Imperial College London, where he could pursue in depth the role of science and scientists in the wider society. He became an influential director of the science policy support group and also chaired the council for science and technology between 1976 and 1986.

His output from 1990 to 2004 was immense both in volume and influence. Notable written contributions include *Prometheus Bound: Science in a Dynamic Steady State* (Cambridge U. Press, 1994) and *Real Science: What It Is, and What It Means* (Cambridge U. Press, 2000). John came to view with alarm the growth of managed science. His phrase “post-academic science” defined a science that seeks an immediate economic payoff. Such a system, where the laws of intellectual property are more important than the laws of physics, can lead to personal and institutional corruption. John’s wise words in *Prometheus Bound*, which emphasize the dangers of ignoring the importance of curiosity-driven science, should be read, noted, and digested by all those who support science and influence its direction. “Society,” he declared, “needs a model of critical rationality for the proper conduct of democratic debate, judicial inquiry, and consumer protection.”

John received many awards and honors during his distinguished career, but he was particularly pleased that his alma mater, Victoria University, made him an honorary DSc and that the Royal Society appointed him to the Rutherford Memorial Lectureship. The lectures associated with that award were delivered in India and Pakistan, countries where—before partition, of course—his father had served so loyally in the Indian Civil Service.

John left as legacies a thriving theoretical group at Bristol and a stellar array of books, papers, and pamphlets. Above all, he will be remembered for his sharp intellect, his integrity, and his commitment to scholarly debate and analysis. He will be greatly missed.

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