

Ziman, John Michael (1925–2005), physicist and philosopher of science, was born into a cultured Jewish family at 21 Rustat Road, Cambridge, on 16 May 1925, the elder son and eldest of three children of Solomon Netheim Ziman and his wife, Nellie Frances, *née* Gaster. His father, who was born of Ashkenazi parents who had emigrated to New Zealand, was a Rhodes scholar, joined the Indian Civil Service, and rose to be secretary of the government of Bombay; his mother came from an English Sephardi tradition, well-to-do and crossed with a brilliant and strongly intellectual Romanian line. He was taken to New Zealand as a baby and was educated at Hamilton high school and Victoria University College, Wellington, where he graduated with first-class honours in physics. In 1947 he moved to Balliol College, Oxford, obtaining a first-class degree in mathematics in 1949 and a DPhil in theoretical physics in 1952. His first paper, on antiferromagnetism, published in 1951, began ‘Some recent experiments’, heralding what would become a theme of his research in physics, namely the close connection of theory to observations on real materials. On 14 September 1951, at Exmoor register office, he married Rosemary Milnes Dixon (*d.* 2001), a thirty-year-old schoolteacher, of Brushford, Somerset, daughter of Robert Stanley Dixon, architect. They adopted two sons and two daughters.

After switching to the theory of the conduction of heat and electricity in solids, Ziman moved to Cambridge in 1954 as a lecturer and (from 1957) fellow of King's College. His research was summarized in his treatise *Electrons and Phonons* (1960), which became a classic text. His interests shifted to more subtle aspects of solid metals, in which the quantum behaviour of electrons plays a central part. This phase of his scientific life led to his textbook *Principles of the Theory of Solids* (1965). Overlapping with the work on solid metals was the research for which he was perhaps best known: the application of quantum mechanics to conduction in liquid metals. The first of two innovations was to treat the atomic nuclei together with their inner electrons, as structural units, weakly scattering the outer electrons that move nearly freely through the material. The second was to incorporate the fact that the random positions of the atoms were not independent but possessed statistical correlations. In this way he explained a wide variety of experimental data. His research was recognized by his election as a fellow of the Royal Society in 1967.

In 1964 Ziman moved to Bristol University, initially as professor of theoretical physics, becoming Melville Wills professor of physics in 1969, then Henry Overton Wills professor of physics and director of the H. H. Wills Physics Laboratory from 1976. Immediately after his move to Bristol he began to build up the theoretical physics group there. His gentle inclusiveness and abundant personal hospitality created a near-perfect working environment within the friendly and successful larger physics department, leading to developments not only in metal physics but also theories of liquid state structure and surfaces, geometry of waves and quantum chaos, and high-energy physics. His research in Bristol took a more formal turn, prompted by the realization that there were liquid metals, and, later, disordered alloys, for which the scattering was not weak. His work involved the study of waves interacting with disordered arrangements of spherical scattering objects, for which a wider literature already existed in acoustics and optics. The move towards formalism led in 1969 to another textbook, *Elements of Advanced Quantum Theory*. His gift for lucidly conveying complex phenomena was shown in his observation that the image of quantum theory as a pyramid

is misleading if it calls to mind a uniformly sloping edifice up which one may laboriously clamber ... quantum theory is much more like a *ziggurat*, with sudden high cliffs to be surmounted before one can move freely on the next plane of abstraction. (p. v)

Ziman's final contribution to theoretical physics was his book *Models of Disorder: the Theoretical Physics of Homogeneously Disordered Systems* (1979). Its philosophy, diametrically opposed to that of idealized perfect crystals explained in *Principles of the Theory of Solids*, was based on the observation that ‘Condensed-matter physics has expanded in recent years and shifted its centre of interest to encompass a whole new range of materials and phenomena ... steel and glass, earth and water’ (p. ix). The book ended with a valediction for his career as a physicist: ‘I ... take the opportunity of a natural break to announce

that this is, as far as I am concerned, THE END' (p. 491).

In Cambridge Ziman had already been drawn into what would become his second career, based on the realization that the key to understanding how science works lay as much in sociology as in philosophy. With the first of his half-dozen books exploring this theme, *Public Knowledge: an Essay concerning the Social Dimension of Science* (1968), he became established as a leading figure in the emerging field of 'science studies', exceptional for being able to speak with first-hand authority as a practising scientist. This sustained effort was later summarized by Peter Lipton under four themes:

The first theme is *naturalism* ... According to Ziman, science should itself be studied empirically, with priority given to causal rather than logical analysis. The second theme may be called ... *socialism*. As Ziman shows, any account of science that relies on the model of the lone heroic scientist is doomed to failure, because science is by its nature a social process. The third theme is *evolutionary epistemology*: Scientific models are imperfect maps ... Ziman exploits a biological analogy with natural selection to illuminate the way in which these maps evolve. The last of Ziman's themes ... is the emergence of *post-academic science* ... roughly the difference between blue-sky research and work strongly constrained by interests of funding bodies, public and private. (Lipton, 108–10)

In 1982 Ziman left Bristol to pursue these interests as a visiting professor in the department of social and economic studies at Imperial College, London. He also had a private reason for moving: to begin life with his second cousin, fellow scientist, and intellectual soulmate Joan Henriette Solomon, the daughter of Abraham Sigismund Diamond, lawyer. They eventually married on 27 October 2002, at the West London Synagogue, after Rosemary Ziman's death.

Ziman's interest in science as a social phenomenon was practical as well as theoretical: he was an active member of the Council for Science and Society (of which he was chairman, 1976–90), the Science Policy Support Group, the working party on science and the media set up by the British Association for the Advancement of Science, and the Bodmer committee of the Royal Society, which reported in 1985. Several books on how to teach the social aspects of science followed, including *Teaching and Learning about Science and Society* (1980) and *An Introduction to Science Studies* (1984). His passionate advocacy of scientific freedom, which included visiting Moscow to support the Jewish refuseniks, resulted in his book with Paul Sieghart and John Humphrey, *The World of Science and the Rule of Law* (1986), which connected the norms of academic science with the legal principles of human rights. He was also involved in the Achievement Project of the Renaissance Trust, which focused on Western economic growth and technological innovation since 1500 and was based in Oxford in the 1990s. His final book was *Real Science* (2000). He lived latterly at Oakley, near Aylesbury, Buckinghamshire. He died of heart failure, following complications after an infection of the heart valves, at the John Radcliffe Hospital, Oxford, on 2 January 2005. He was survived by his wife, Joan, and by three of his four adopted children, one son having predeceased him.

Michael Berry

## Sources

P. Lipton, 'The science of science', *Notes and Records of the Royal Society*, 57 (2003), 108–111 [review of J. M. Ziman, *Real science: what it is and what it means*] · *The Times* (1 Feb 2005) · *The Guardian* (2 Feb 2005) · *Daily Telegraph* (17 Feb 2005) · M. V. Berry and J. F. Nye, 'John Michael Ziman', *Memoirs FRS*, 52 (2006), 479–91 · [WW](#) (2005) · personal knowledge (2009) · private information (2009) · b. cert. · m. certs. · d. cert.

## Likenesses

obituary photographs · G. Argent Studio, photograph, 1985, [RS](#); repro. in Berry and Nye, 'John Michael Ziman', 480 · W. Bird, photograph, [RS](#)

## Wealth at death

£520,092: probate, 23 Nov 2005, *CGPLA Eng. & Wales*

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