he acknowledges) from the uncertainties in our understanding of oxygen levels in the late Proterozoic and early Phanerozoic, while the tests that Beerbower offers of his null hypothesis are weakened by the extent to which corroboration or refutation is critically dependent on a nexus of subsidiary hypotheses. Clearly, there is considerable scope for carefully directed neobotanical and palaeobotanical research in this area.

In addition to Beerbower's contribution, the other paper that most directly addresses the historical dynamics of plant–environment interactions is that by DiMichele, Phillips and Peppers. These authors build upon a series of earlier papers, and characterize Pennsylvanian coal swamps as edaphic islands with low diversity, rather uniform communities that remained discrete from other lowland vegetation for long periods; vegetational changes resulting from increases or decreases in abundance, phylogenetic changes in swamp plants or new introductions from other lowland environments were concentrated during intervals of stress or disturbance. Their analysis is unique among studies of pre-Cenozoic plant communities in the level of detail available, the extent to which macrofossil and palynological data have been integrated, and in the convincing links established between large-scale ecological and phylogenetic patterns. In all these respects it is a model study that other researchers, pursuing the themes of this successful symposium volume, would do well to emulate. □

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Isotopic man

Colin A. Russell

Frederick Soddy (1877–1956). Edited by George B. Kauffman. *Reidel:1986. Pp. 239. Dfl. 130, $44.50, £36.25.*

WHY should nuclear chemistry ever be called nuclear physics? Today there is plenty of room for each of them as well-differentiated entities. But it was not always so. This was a severe problem that greatly vexed Frederick Soddy, a man whose research laid the foundation of both sciences.

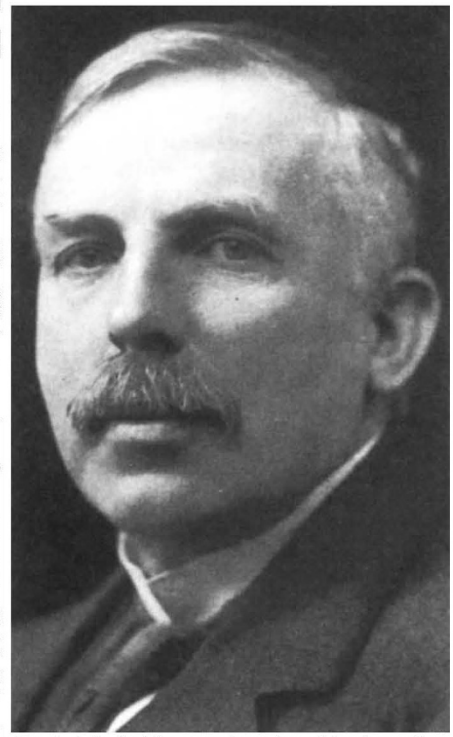
Soddy has been well-known to generations of students through two remarkable works, *The Chemistry of the Radioelements* (published between 1911 and 1914) and *Isotopy* (written with J.A. Cranston and published in 1954). In the 40 years between these publications he received the 1921 Nobel Prize for Chemistry, and was for 17 years Dr Lee's Professor of Chemistry at the University of Oxford. His fame rests on his "contribution to our knowledge of the chemistry of radioactive substances and his investigations into the origins of nature of isotopes", as the Nobel citation neatly puts it.

In fact it is to Soddy, more than anyone else, that we are indebted for the concept of an "isotope". It is therefore quite astonishing that so distinguished a founder of the nuclear sciences should have been bothered by the semantic problem mentioned above, and still more that in the four decades from 1914 to 1954 he should have done relatively little scientific work. To be sure, there continued to flow a stream of books, lectures and papers, but these were not on nuclear chemistry (or nuclear physics) but the remote subjects of sociology and economics. That this should be the case makes the subject of this book a scientist of more than ordinary interest. For if the history of science is to be worth anything at all, it must address itself to the question of how scientists tick, have ticked (and presumptively will tick). On that account alone their "failures" are as important as their "successes". What is particularly sad about Soddy is that, unlike other scientists such as Polanyi who have changed course in mid-stream, he made almost no impact in his new sphere of activity.

With Frederick Soddy it is all too easy to come to quick conclusions. He peaked early; he was hampered and indeed affronted by the First World War (in which his contemporary Henry Moseley was killed); he had an awkward personality; he did not suffer fools gladly; and he resented intrusion into his own field. Yet none of these judgements is sufficient explanation for the almost bizarre story of a man who failed not only to fulfil his early promise in chemistry, but also to impress his views on a world which most chemists fear to enter, that of the social sciences.

It would have been splendid if this book took us further and gave us a complete picture of the man and his work, together with a sustained analysis of his life. Regrettably it does not do so, nor could this reasonably be expected in a collection of essays from a dozen authors with minimum editorial correlation. So meticulously has the editor preserved the texts of his contributors that he has not even "Americanized the speling[!] of British authors". Nor, it may be added, has he unified the style of references or notes, not overimportant in itself but symptomatic of a degree of literary *laissez faire* that makes an integrated treatment impossible. Predictably, there is plenty of repetition — I lost count of the references to radioactive decay series with which Soddy was so closely associated.

We can, however, be grateful for the assembly between two covers of so much material on one person. Three important papers by Soddy are reprinted, including his letter to *Nature* of 4 December 1913 in which he introduced the term "isotopes". One of the most convincing chapters is that by A.D. Cruikshank, dealing with Soddy's long years at Oxford, while the account of the reception of his ideas in Japan and the USSR will be of great interest to anyone concerned with the wider development of sciences in those countries. His extreme popularity in the USSR



Frederick Soddy — a founder of both nuclear chemistry and nuclear physics.

is all the more remarkable in the light of the anti-Marxist emphases in his works on economics.

Perhaps one of the most provocative notes is sounded by L. Badash in his chapter "The Suicidal Success of Radiochemistry". So far as Soddy was concerned there was little more to do after 1914 except tidying up. He had no wish to join the lemmings. For radiochemistry the war could hardly have come at a worse time, with confirmation of isotopes announced by four laboratories in four countries within one month of 1914. Soddy was not the only scientist to find the discontinuities of war sufficient cause for substantial disengagement from chemical activity; Percy Frankland was another. But it seems that amongst the myriad casualties of that conflict we must also number the scientific creativity of Frederick Soddy. From a near oblivion for which he was in part deliberately responsible this book may rescue him in the nick of time. □

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