

ship is supported by more than 900 numbered notes and references. The two mathematical chapters are certainly heavy going: the others are much easier. The amount of factual and analytical detail will be fascinating to some, tedious to others. Here are four nuggets of information, chosen virtually at random, which may be of interest.

Before the Civil War 'Oxford and Cambridge educated a larger proportion of the population than was to go to university until after the First World War'.

A small scientific club, of which Barrow was a prominent member, existed at Trinity College during the late 1640s and early 1650s. The members 'met regularly for the purpose of carrying out experiments and scien-

tific discussion'. The parallel with the better-known Oxford group is apparent.

The professorial rooms that Barrow occupied at Gresham College 'were the same in which a historic meeting on 28 November 1660 resulted in the foundation of the Royal Society'.

By 1686 over 100 of Barrow's much admired sermons had been published. They were widely read. Some of them took more than three hours to deliver; they were 'complete treatises rather than orations'.

The editor and his team deserve our congratulations and thanks. They have undoubtedly succeeded in their main aim: our perception of Isaac Barrow and his cultural significance will never be the same again.

Peter Rowlands, *Oliver Lodge and the Liverpool Physical Society*. Liverpool: Liverpool University Press, 1990. Pp. 336, £15.00. ISBN-85323-027-7

reviewed by LESLIE GREEN

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Oliver Lodge was born in 1851 and lived on until 1940. His reputation has perhaps suffered from his longevity and from his very public involvement in psychical research. Peter Rowlands's book is mainly concerned with his years in Liverpool, which were scientifically the most productive of his life.

Lodge arrived in Liverpool in 1881 at the age of 30. He had originally

applied for the chair at Owen's College, Manchester, to which Arthur Schuster was appointed. Lodge, having prepared his curriculum vitae, submitted it to the newly established University College in Liverpool and was the first professor to be appointed. By the end of his tenure of the Liverpool chair, at the age of 49, he was a national figure as a scientist and a science publicist.

Peter Rowlands has traced this development from Lodge's research notebooks, his correspondence with Fitzgerald and Larmor among others, and above all from the archives of the Liverpool Physical Society. This Society was not an organization for professional physicists; there were not enough of them locally. It was more a gentlemen's club. The membership largely overlapped that of the Literary and Philosophical Society, which was more literary than philosophical. Lodge formed the Physical Society at local demand, and through it he became a large-scale public educator. He lectured regularly on new discoveries shortly after they were announced; on Hertz's demonstration of electromagnetic waves, on X rays, the discovery of argon. His lecture on X rays drew an audience of 1000 and had to be repeated a week later to satisfy demand. In his last year in Liverpool he lectured to a large audience at the Literary and Philosophical Society for two hours on 'Modern views on matter'. Physically impressive at six feet four, he was a brilliant expositor and was able to stimulate non-technical audiences to share his own excitement in new discoveries.

Lodge was the main driving force in the Liverpool Physical Society and as his involvement declined, the Society itself declined and then changed to become a university student society. Rowlands has used the archives of the society to show the activities and development of a rising professor of

physics. Lodge was fascinated by the concept of the ether. He had attended in 1873 a lecture by Maxwell and had read soon afterwards his *Treatise on electricity and magnetism*. Most of his research was stimulated by this. Lodge has some claim to priority in demonstrating the existence of electromagnetic waves, though his waves were in transmission lines as opposed to Hertz's demonstrations of them in free space. He was a pioneer in the development of wireless telegraphy, where his main contribution was in understanding the significance of self-inductance and resonant tuning. In the summer of 1894, at a Ladies' Conversazione at the Royal Society and at the British Association meeting in Oxford, he gave some of the first public demonstrations of wireless telegraphy, signalling in Morse code over distances of 50 m. He developed his methods commercially in collaboration with Alexander Muirhead. The Lodge sparking plug company and the Lodge-Cottrell company producing electrostatic dust precipitators were other successful industrial applications of his electrical researches.

But for Lodge the transmission medium for electromagnetic waves was all important. He made long and heroic attempts to detect ether drag with large rotating metal discs in his 'great whirling machine'. His demonstration of a null effect was an important step on the road to relativity. The ether drag research was almost entirely funded with substantial grants from a local ship owner!

Lodge believed that the ether was a 'fundamental entity in terms of which everything else in the universe will ultimately be explained'. His early views were very physical and mechanistic, not far from those of Lord Kelvin. As he grew older, the physical and psychical aspects of his ether became blurred as the universal medium became increasingly dematerialized.

Lodge's interest in the paranormal, though intensified by the death of a son in World War I, was of long standing. He had joined Crookes, Lord Rayleigh, Tennyson and other prominent Victorians in the Society for Psy-

chical Research in the mid-1880s. He was doing thought-transfer experiments in 1888, and by the time he left Liverpool an increasing amount of his time was spent investigating psychical phenomena.

In 1900 he was invited by Joseph Chamberlain to become the first Principal of Birmingham University. His career as a research scientist was virtually over.

Peter Rowlands presents some fascinating material and it is well documented. It is a revealing view of an outstanding scientist and the intellectual life of a Victorian provincial city.

Trevor I. Williams, *Robert Robinson: chemist extraordinary*. Oxford: Clarendon Press, 1990. Pp. viii + 201, £25.00. ISBN 0-19-858180-7

reviewed by STEPHEN F. MASON, F.R.S.

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Previous publications<sup>1-3</sup> on the life and work of Sir Robert Robinson, F.R.S. (1886-1975) are primarily concerned with his scientific and professional activities; but, Trevor Williams suggests, they do not adequately portray, even in sum, Robinson's versatile genius and complex personality. The aims of this new biography, to fill the lacunae in his personal and professional life, are amply fulfilled, and the book has all the makings of a definitive personal biography. The author provides a series of coherent and detailed accounts of Robinson's multifarious activities throughout his 89

years, his personal relationships with family and friends, and professional relations with his research associates and others he thought of as rivals.

The book opens with the family tree of the Robinsons of Chesterfield, traced back to the mid-18th century with a possible ancestor two centuries earlier. The family owned a lint manufacturing business, which passed to the management of his younger brother Victor after Robert graduated at Manchester University in 1905, and began his research career with W.H. Perkin, Jr. Robert Robinson's early research achievements