obituary

John Richardson Marrack, DSO, MC, Emeritus Professor of Chemical Pathology in the University of London, died in the USA on June 13, 1976. He was born on November 26, 1886 at Clevedon, Somerset, but soon moved to Tiverton, where he attended Blundell's School, to which he remained greatly attached, and of whose Old Boy's association he later became Vice-President. He went to St John's College, Cambridge and then to the London Hospital Medical College, graduating in 1908.

His first research was on rheumatoid arthritis as a John Lucas Walker student, and later Beit Memorial Fellow at the laboratories of the Cambridge Research Hospital (which has become the Strangeways Laboratory). After the First World War, when he served in the RAMC, he went to the London Hospital as lecturer in Chemical Pathology. He became interested in the properties of colloids, initially from studying the binding of calcium by serum proteins, and came to the conclusion that colloid interactions were caused by definable and verifiable physical and chemical forces, acting between distinct protein entities. As an example he chose antibodies, whose nature was quite unknown and whose very existence as separate entities was doubted. In 1930 he showed that diphtheria antitoxin behaved as a distinct protein whose interaction with diphtheria toxin could be measured quantitatively. In a monograph published in 1934 (*The Chemistry of Antigens and Antibodies*) he proposed that the specific affinity of antibodies for antigens is determined by the same factors which determine the specific binding of molecules to form crystals, that is, the shape of the molecules and the spatial distribution and strength of polar forces. The monograph contains a clear diagram elaborating the theoretical studies of Heidelberger and Kendall to illustrate what has now become accepted as the 'lattice hypothesis' of antigen–antibody interactions.

Revised in 1938 this work has had a lasting influence, and convinced many chemists and biochemists that immunology was a fit subject for scientific study by themselves as well as by bacteriologists and serologists. Marrack was also the first to use methods which are now commonplace: equilibrium dialysis, whereby he indicated that antihapten antibodies were probably bivalent, and the attachment of coloured dyes to antibacterial antibodies, which inspired Albert Coons later to develop the technique of immunofluorescence. Marrack wrote few papers, by present day standards, and his encyclopaedic knowledge of immunochemistry appeared mostly in review articles.

John Marrack was a colourful character. Behind a shyness and apparent abruptness lay kindness and intellectual integrity. He always wanted to be an athlete and was by temperament a fighter—for seven years he was welterweight champion in the London University boxing tournaments. Throughout the whole of his adult life he was a keen walker (he knew Dartmoor intimately) and he never drove where he could go by bicycle. On more than one occasion when roused to righteous anger he took the law into his own hands and used his fists: once to apprehend a thief in the laboratory and again to despatch a gang of hoodlums who misguidedly attacked him on Whitechapel Station. His war record in the RAMC—DSO as a line medical officer and MC for investigations on the poison gas used against the British Army in 1917—illustrates this aspect of his character. So also does his consistent championship of the underdog.

During the Civil War in Spain, he was an active member of the Spanish Medical Aid Committee, and visited the International Brigade and the Spanish Republican army. About this time he became deeply concerned about the nutrition of children in Britain, influenced by L. J. Harris and Jack Drummond, and spent much time and effort campaigning for the Children's Nutrition Council—to such good effect that he was adviser to the Ministry of Food during the Second World War and wrote in 1942 a book (*Food and Planning*) which influenced the post-war planning of nutrition.

These activities were regarded by many of his contemporaries as indicating that he was finished with research, but were entirely consistent with his character. When he returned to the laboratory in the Department of Pathology at Cambridge in 1952, his main work had, in fact, been completed, but he began to exploit the growing knowledge of the structure of antibodies while devoting most of his energy to editing, for its first ten years, virtually single handed, the new journal *Immunology*. By now the importance of his earlier work had become widely understood and recognised and at the age of 76 he was made Visiting Professor at the University of Texas. At the First International Congress of Immunology in 1971 he was one of five to receive the Distinguished Service Award "For revolutionary ideas that have become commonplace in his lifetime, and for pioneering work in the physicochemical interpretation of antigen–antibody interactions".

J. H. Humphrey

Marie Laura Violet Gayler, March 1891–August 1976, was the youngest of five daughters of Mr William Gayler, Director of Stamps and Excise at Somerset House. Her mother was an artist, a Gold Medallist of the Slade School, whose paintings were often exhibited at the Royal Academy. Marie graduated from London University in 1912, and after teaching botany at the Colstan Girls' School, Bristol, in 1915 she joined Walter Rosenhain's scientific staff in the Metallurgy Department of the National Physical Laboratory, and later married Dr J. L. Haughton, a member of the same Department. She retired in 1947.

Marie Gayler and a physical chemist, Miss I. H. Hadfield, were the first women to be appointed to the scientific staff of the Department. She became a distinguished member of Rosenhain's team, which in the 1920s and 30s at the NPL, helped to lay the scientific foundations of physical metallurgy and to give this country the leading position which it enjoyed in the subject for a couple of decades or more.

Marie Gayler's outstanding contribution, with Hanson and Haughton, was the elucidation of the mechanism of age-hardening in the duralumin family of aluminium alloys, which had been developed empirically by Wilm in Germany. A very important outcome of the NPL work was Y-alloy, an aluminium alloy which contained nickel as well as copper, magnesium and silicon, the normal alloying elements in duralumin. The presence of nickel greatly improves the strength and hardness of age-hardened duralumin at temperatures of 150–200 °C. This makes Y-alloy eminently suitable as a material for the pistons of internal