refraction of partially orientated films is compatible with parallel arrangement of β -polypeptide chains in the direction of stretching, the planes of the purine and pyrimidine rings lying perpendicular to this direction. Other structures are, however, possible. K. Meyer presented evidence for the existence of protein complexes of hyaluronic acid and chondroitin sulphates from hyaline cartilage and connective tissue. Reversibly formed polar complexes with the protein are suggested except in the case of chondroitin sulphate from connective tissue, which is stably linked to protein. A. G. Ogston and J. E. Stanier have isolated the hyaluronic acid complex from synovial fluid by ultrafiltration, since they believe that precipitation affects the physical properties. Such preparations contain 27 per cent protein, the removal of which caused a change in properties. Physical methods have indicated that the complex exists as a random coil of nearly spherical shape and large hydration. Its biological function was discussed.

OBITUARY

Sir Richard Gregory, Bart., F.R.S.

"My particular mission has been to make men of science conscious of their power and influence in shaping civilized life." So wrote Sir Richard Gregory in his message of farewell published in *Nature* of January 7, 1939, when he resigned from the editorial chair which he had occupied with such distinction for so many years. Throughout his long life, which came to a close on September 15, his interest in science for its own sake, and equally for the appreciation by others of its value and significance for humanity, was a driving force which brooked no obstacle, and happily that interest was sustained to the end.

Richard Arman Gregory was born in Bristol on January 29, 1864. His first post was as laboratory assistant at Clifton College. From there he passed on to the Royal College of Science, London, where he met several of the men who were to exert such an influence on him, as he on them, in later years—H. G. Wells, T. H. (later Sir Thomas) Holland, and especially Sir Norman Lockyer. He became research assistant to Sir Norman, and from that period arose a lasting love for astronomy and astrophysics. At this time he began to contribute occasional notes to *Nature*, of which Sir Norman had been editor since its foundation in 1869, and in 1893 he was appointed sub-editor of the journal. This marked a turning point in his career. Until then, his first interest had been astronomy, with the general feeling for science as a whole and its applications to human welfare. From then on, this second interest grew in intensity, and as the years went by and Lockyer left *Nature* more in the hands of his young colleague, it became his guiding influence. In articles, in lectures and addresses, he was never tired of developing and enlarging this theme.

While Lockyer had established the general lines on which *Nature* was conducted, and built up its reputation, Gregory did not hesitate to introduce innovations. Thus to make the journal a living force in the nation and the whole world of science, he felt it was necessary to publish more than occasional leading articles; and in due course—but not without

a certain amount of opposition—he got his way, and the leading article expressing a point of view on matters scientific or their significance became a regular feature of the journal. For some fifteen or sixteen years of this period, he virtually conducted the journal himself, carrying out administrative duties as well as the normal tasks of sub-editor. During his annual holidays, he remained in touch by post. In 1919, Lockyer retired, and Gregory took over the full responsibility which he had already been exercising for some years. His work continued, for he was a true working editor, marking manuscripts for the printer and seeing the journal through the press week by week with all the attention to detail such work demands.

There was never an editorial committee; neither was there even a special panel of reviewers. The entire scientific world, both at home and abroad, has always been *Nature's* willing advisers and critics. Thus, through this valuable freedom from committee control and especially through the integrity and fearlessness of its editor, was Sir Richard able to contribute very largely towards making the journal what it is—a journal of science, published for men of science, written by men of science. He accepted the saying that 'a good editor wears out the soles of his shoes before the seat of his pants'; and was always ready to consider fresh views even if they conflicted with those accepted.

In spite of the heavy load of work which he assumed in this way, this did not by any means exhaust Gregory's seemingly unlimited store of energy. A short period of teaching in the Dockyard School at Portsmouth earlier on, coupled with his own personal experiences, persuaded him that there was a dearth of good school science text-books. Starting with astronomy and what used to be termed 'physiography', he began writing text-books which quickly made their mark for their accuracy and practical approach, and their appreciation of students' difficulties. Alone and in association with others, notably the late H. E. Hadley and A. T. Simmons, he wrote and edited a number of such books, many of which are still in use both in Great Britain and overseas after passing through several editions. By his sustained interest in scientific developments he was able to keep these books in line with scientific progress, even within the past two years.

This interest in education also showed itself in his activities in the British Association. He was one of the leaders in the formation of Section L (Education) of the Association, and for its first ten years served as one of its secretaries or its recorder. In 1922 he was president of the Section. In 1899 he helped to found the *School World*, which was later incorporated in the *Journal of Education*, and he was joint editor until 1938.

Almost as a by-product of his work for *Nature* was his book "Discovery: or the Spirit and Service of Science" published in 1916, in which he outlined in his characteristically clear and simple style some leading scientific discoveries, using them to illuminate his perennial theme, the worth of science.

From an early date, Gregory had been in considerable demand as a lecturer. On the platform he divided his attention between astronomy and the social implications of science; and as the years went by he identified himself more and more with the latter topic. Here may be mentioned his work for the British Science Guild. This body, formed to promote the appreciation and application of scientific

methods in public affairs (and incorporated in 1936 into the British Association), owed much to his untiring activities. At the close of the First World War, the Guild promoted a very successful British Scientific Products Exhibition, as a result of which Gregory was awarded the honour of knighthood.

A list of scientific societies which honoured him by electing him president ranges from the Science Masters' Association (1927), through the Royal Meteorological Society (1928 and 1929), to the Conference of Educational Associations (1931). Finally, just before the ill-fated Dundee meeting of the British Association was abandoned in 1939, he was elected president for the ensuing year and held office throughout the Second World War. During this difficult period he was ever mindful of the Association's affairs and even succeeded in organizing limited meetings at Reading, Manchester and London. Each body with which he became associated from time to time had his enthusiastic attention and support, and profited from his wide knowledge of men and affairs.

In 1931 he was created a baronet. Honorary degrees were conferred on him by the Universities of Leeds, Bristol and St. Andrews; but the scientific honour which he probably prized most was his election as a Fellow of the Royal Society under the rule which empowers the Council to recommend election "for conspicuous service to the cause of science". This was in 1933, when he was recovering from a long illness which had kept him—albeit very unwillingly—from the editorial chair for two to three months. This indeed was the first time since his appointment to *Nature* that he had been compelled to lay aside his duties and self-imposed tasks for so long a period. Yet even during that time he arranged to see one or the other of his assistant editors to discuss the journal.

It is probably no exaggeration to say that, by correspondence and personal contact, Sir Richard had a wider acquaintance with scientific men throughout the world than any other individual during the first two or three decades of this century. These friendships, many of which were warmly confirmed when visitors from overseas came to Great Britain, were strengthened and extended by three visits, to South Africa (with the British Association), to India and to the United States, where he delivered the Elihu Root Lecture in the Carnegie Institution of Washington in 1938.

Since Sir Richard was within two or three weeks of his seventy-fifth birthday when he retired from the editorship of *Nature* and took up permanent residence in the charming old Manor House at Middleton-on-Sea, it might have been thought that he would be content to rest from his labours. But as has been said, he sealed his long connexion with the British Association—he had attended practically every meeting for more than fifty years—by accepting the presidency and, as it transpired that this was for a long period (1940–46), he still worked for it while he was supposed to be living in retirement. This was not his only activity. He maintained correspondence with his many friends, and any appeal which seemed to offer a chance of promoting the cause of science or its appreciation was sure of his sympathy and advice. For example, during this period he was largely instrumental in securing the transfer of the Norman Lockyer Observatory at Sidmouth, of which he had been chairman of the governing body for many years, to the University College of the South-West, Exeter, thus ensuring its future.

One concluding word: we have tried to give an impression of the intense activity which filled Sir Richard Gregory's life. But he was no mere automaton, for he showed a very human enjoyment of his manifold interests, and we who worked with him always found him a very sympathetic, understanding and kindly man.

Sir Richard was twice married. In 1888 he married Kate Florence Dugan (*née* Pearn), who died in 1926 after a long and distressing illness; his son and daughter by this marriage both predeceased him. Secondly, in 1931, he married Dorothy Mary, daughter of the late Dr. William Page, general editor of the "Victoria County History", who survives him. Lady Gregory was his constant companion and helper throughout their married life, and her care and attention were a source of much happiness during his declining years.

THERE are very many of us who held Richard Gregory in close affection—scientists most of us, of all ages, but many with other activities and interests; and we are all feeling very deeply the gap which his going has left in our circle. We could not wish him to linger in his final illness; but, as members of an even much wider community of all who work in science, or are concerned in any way to promote the recognition of its present and future importance in the world, we are feeling sadly bereft of his genial presence, his tireless enthusiasm and his doughty championship. We seem to be looking at the end of a great chapter, with the closing of a long life so completely devoted to science and to all who serve it, during the period in which he watched its amazing development. When we heard his telegram of apology read at Belfast, it was heartening to feel that our gallant old friend still kept so much of his buoyant humour and that the flag of his courage was still flying, in face of the end which he must have known to be near.

A full tribute is being paid elsewhere to his central and most direct service to the progress of science, as the Editor of *Nature*, and to his other work for scientific education at all levels. We who knew him, however, in the intimacy of friendship, are thinking most now of his cheerful, generous, lovable personality, of his memory filled to overflowing with so rich a variety of knowledge and anecdote, of the racy, inconsequent, garrulous flow of his reminiscences. What a life-story he could have written!—from the days of his early, heroic climbing of the educational ladder—there were no escalators then—until, for well over half a century, he made friendly contacts with Britain's scientists, from the greatest to the least, and with many from other countries. Few, indeed, have been so widely known and trusted. Our deepest sympathy, in her bereavement, is with the brave and gentle comrade who brought him such happiness, and cared for him with such loving devotion in his later years.

H. H. DALE

MAY I be allowed among many others to pay my tribute to the work of Sir Richard Gregory in raising science to its present position in our national life, and particularly in insisting on the need for giving it a higher place in our educational system than it had had before. He early recognized the importance of developing agricultural science in Great Britain, even in the days before it was accepted at the universities as suitable for inclusion in their syllabuses, and he