

OBITUARIES

Sir Kenneth Lee

SIR KENNETH LEE, who died recently at Ewhurst in Surrey at the age of 88, was a firm believer in the need to apply science to industrial problems, and a good friend to science. He entered the firm of Tootal Broadhurst Lee as a young man; for 54 years he was a director, and for 30 of these chairman of the firm. He had the foresight and wisdom, not only to realize how important research could be in the cotton industry, but also to pose the problems for his researchers to solve. He appointed a physicist, the late Dr R. S. Willows, as head of his research laboratory and set him to find a way to produce a cotton fabric which resisted creasing. He had faith in Willows, and gave him unquestioning support for the many years during which Willows was struggling with the problem. I was a professor at Manchester during these years, and was able to follow the progress of the quest because Willows and I often played golf together on Saturday afternoons. I remember more than one occasion when Willows used the shelter of a convenient bunker to pull out and display to me some portion of his clothing which was getting nearer to the realization of his ideal, while indignant shouts of "fore" came from a distance. He succeeded in producing a polymer inside the tube of the cotton fibre, but at first it was unpopular with the ladies because it was too springy and would not drape. This was solved, but then it would not take dyes. As is well known, the final result was the famous and popular Tootal fabrics.

Kenneth Lee, though diffident about the fact that he had no scientific education, loved meeting scientists and talking about their discoveries. But he was a shrewd judge of character, and had no patience at all with the kind of industrial researcher who makes a noise like a scientist but gets no further with a practical problem.

When I retired from the Royal Institution, the problem arose of the future of the team engaged on protein research which I had gathered there, and the happy solution was found of its migration *en bloc* to the Zoology Department in Oxford. There were difficulties, however, in establishing fellowships for some members of the team. Kenneth Lee was one of two friends who came to my help. His contribution was characteristically given without any question or any delay. In spite of his age and increasing frailty, he made the business arrangements to ensure that the necessary covenant would continue to run if he died.

His many public services have been recorded elsewhere; his services to science are perhaps not so well known because he was so modest about them, and they should also be remembered.

W. L. BRAGG

Professor K. S. Kirby

THE death at his home on November 10 of Professor Kirby, while still at the height of his career, will be a blow for cancer research in general and the field of nucleic acid chemistry in particular.

Ken Kirby was born in Yorkshire on January 16, 1918, and, although he lived there only for short periods after leaving for the University of Manchester in 1937, his determination and great sense of humour remained those of a Yorkshireman.

He gained a first class honours degree in chemistry in 1940, but was prevented his obtaining further academic qualifications at this stage. He was directed to work at the Wellcome Laboratories for Tropical Medicine where he first worked on chemotherapy of amoebiasis. He

became interested in the structure of alkaloids and this led to five papers in the *Journal of the Chemical Society* (1945-1950) on the structure of quinamine, a minor alkaloid of cinchona bark. The final two papers of this series were published in collaboration with the group of Sir Robert Robinson at the Dyson Perrins Laboratory in Oxford.

At the end of the war Kirby returned to the university and obtained his Ph.D. from Leeds in 1949. His thesis was concerned with the structure of tannins and his interest in this field continued when he joined the staff of the Forestal Research Laboratory in Harpenden. The results of his extensive studies into the complex field of tannin chemistry appeared between 1948 and 1954 in a series of six papers in the *Journal Society of Leather Trades' Chemists*. It was during this period that Kirby gained valuable experience of the techniques of chromatographic and counter current fractionations which he later applied so successfully in other fields.

Kirby's transfer from tannin chemistry to cancer research may seem strange, but he made it because he believed that the knowledge he had of the interaction and behaviour of polyphenolic substances could be applied in the isolation and study of cellular macromolecules. He was able to convince the British Empire Cancer Campaign of the value of his ideas, and it awarded him a five-year fellowship. He joined the staff of the Chester Beatty Research Institute at the Pollards Wood Research Station on October 1, 1953, and began the work which gained him wide international recognition.

At this time, nucleic acid chemistry had received great stimulus from the publication by Watson and Crick (*Nature*, 171, 737; 1953) of the structure of DNA. Kirby determined to apply the discipline of chemistry to the isolation of nucleic acids in a state of purity which would satisfy an organic chemist.

The first papers describing what soon became known as "the Kirby method" for the isolation of RNA and DNA appeared in the *Biochemical Journal* (64, 405; 1956, and 66, 495; 1957). He was always anxious to improve and extend his methods and this led to the publication of many papers, the most recent of which, describing the isolation of DNA from mammalian tissues (*Biochem. J.*, 104, 254; 1967) and of RNA and DNA from bacteria (*Biochem. J.*, 104, 258; 1967), appeared only shortly before his death.

The publications reporting his methods for nucleic acid isolation are fine examples of clear and explicit experimental detail, but many biochemists found them rather complex, for they employed a number of unusual chemicals, and to the uninitiated it was not always clear why a certain procedure was used. He was often asked how he arrived at the finally published methods, to which he always replied that he was sure that anyone who had applied a logical approach to the problem must have come up with the same answer. The truth was that he had clear ideas on the nature of the bonds between nucleic acids and proteins and his methods were designed to break these bonds and so allow the purification of the nucleic acids.

Having achieved his initial objective, Kirby wished to isolate a chemically homogeneous sample of DNA or RNA and so he devised a number of counter-current distribution systems for use with nucleic acids. He subsequently employed this technique to study and attempt to separate mRNA from mammalian tissues. His paper with Kidson (*Cancer Res.*, 25, 472; 1965) reporting changes in the counter-current distribution pattern of the mRNA of rat liver during azo-dye carcinogenesis indicated the potential of this approach.

Kirby was aware of the possibilities of nucleic acid fractionation using centrifugation in density gradients, and, typically, he was not content to rely only on sucrose gradients but sought alternatives, such as sulpholane (*Biochim. Biophys. Acta*, 123, 202; 1966).