

obituary

Lew Kowarski

LEW KOWARSKI was the last survivor of the French team that, immediately after the discovery of uranium fission, explored the chances of a nuclear chain reaction. The paper by Otto Hahn and Fritz Strassmann reached Paris about 16 January 1939 and Frédéric Joliot at once saw its tremendous implications. Hans von Halban offered his experience of neutron physics and suggested that Lew Kowarski should join the team. Within weeks they had proof that neutrons, in causing uranium nuclei to split, produced further neutrons; by April they were sure that under suitable conditions those further neutrons would produce further fissions and vice versa, a chain reaction that would lead either to an explosion or to the generation of useful power if the reaction was controlled.

Born in 1907 in St. Petersburg (now Leningrad), Lew had an insecure childhood in a divided household, as son of a Jewish businessman and a Ukrainian singer. At the age of 12 he was smuggled from the Russian revolution to Vilna (in what later became Poland) across the remnants of the German army, some months after his father had gone there. He grew into a giant; musical though he was he had to give up his piano lessons when his fingers grew too thick for the piano keys; so it had to be science. With modest support from his father he studied chemical engineering in Belgium and France.

In 1929 he enrolled in the University of Paris, studying physics and chemistry from books and supporting himself by a job in a firm that made gas pipes, a job he kept part time until 1938. In 1931 he began work on a thesis on crystal growth in Jean Perrin's laboratory, made friends with his son Francis Perrin, and got in touch with Madame Curie, her daughter Irène and Irène's husband Frédéric Joliot just when the couple discovered "artificial" radioactivity at the end of 1933. That brought them the 1935 Nobel prize for chemistry, and Joliot then became professor at the College de France. Kowarski had already been his part-time unpaid assistant for a time; he now became a paid part-time secretary, "Joliot's little typist" as the huge Russian got nicknamed; and then he got a grant that allowed him to drop his other job, of designing gas pipe systems, about which he had just written a book. He still felt an intruder in spite of his doctorate, having got into science by the back door, at the late age of 31; but he was in.

The team agreed that, in publishing, no

ideas should be attributed to individuals; but later it became clear that some of the best ones had been due to Kowarski, who combined inventiveness with meticulous logic. The neutrons were slowed down in water to make them better at causing fission, but many were absorbed before they did. Kowarski urged that heavy water be used, known to absorb hardly any neutrons. It has to be extracted from ordinary water at great cost, and one firm in Norway was doing that; in March 1940 their entire stock, about 40 gallons, was moved to Paris just before the Germans attacked Norway. During that transfer those aliens, Halban and Kowarski, were interned on two separate islands! But time was running out; in May France was invaded, and in June — as instructed by Joliot — Halban and Kowarski escaped to England with their families and the heavy water.

At the Cavendish Laboratory in Cambridge new equipment was built with help from local physicists, mainly under the guidance of Kowarski while Halban negotiated with the USA. The results were promising, but much more heavy water was needed, no longer obtainable from Norway. And why should the USA help Halban, with his German manner, who waved French patents and allied himself with ICI? He seemed more intent to compete after the war than to help win it.

With influential friends and fluent English (though Kowarski soon caught up) Halban assumed a dominant position. In 1942 he was sent to Canada to set up a laboratory; Kowarski, offered an inferior post, decided to stay in Cambridge, as did some of his co-workers. Late in 1943, with some US help promised, (Sir) John Cockcroft took over from Halban, and at last Kowarski got his way: he came to Canada with his team to build a heavy-water reactor. He did it in less than a year; it was the first nuclear reactor outside the USA where Enrico Fermi had achieved the first self-sustained chain reaction in 1942.

After the war Kowarski would have liked to go back to England, where in Cambridge he had felt at home from the first day; but he felt in duty bound to return to France. Under Joliot, scientific head of the Commissariat a l'Energie Atomique, he began to prepare for nuclear power in earnest. Again he built a small heavy-water reactor, both for experimentation and prestige, which went critical late in 1948; nobody knew that the USSR had a reactor going two years before that. Bigger reactors were on the drawing board; would their main product be power or plutonium?

Joliot, now an open communist, publicly refused to make atomic weapons and in 1950 was dismissed from the Commissariat. Kowarski, still working for it part-time, found a new career with CERN, nursing that young European Centre for Nuclear Research. In 1948, his first marriage broken up, he had married Kate Freundlich, daughter of a German scientist; in 1954 they settled in Geneva for good.

As CERN grew his work was gradually taken over by others; in the end he concentrated on data processing with computers, whose importance he saw earlier than most; the device for measuring bubble-chamber tracks that Paul Hough and Brian Powell built with his guidance was used all over the world. A few years' working and travelling for ENEA (the European Nuclear Energy Agency) restored his freedom to visit the USA, denied for years because of his past work with that notorious communist Joliot, and enabled him to hold visiting professorships, two extended ones at Purdue University and shorter ones at Austin (Texas) and at Boston University. In his last years he worked to warn the public against too headlong a growth of nuclear power.

Outwardly like a big jolly Russian peasant, he had a nimble mind and a fine command of both French and English. Honest to the point of bluntness, he made some enemies and many devoted friends. His interest gradually shifted from science to the philosophy and strategy of scientific organisations. Overwork damaged his health, and the single kidney he was born with began to fail years ago; on 27 July he died in a Geneva hospital, cared for by his wife and his daughter Irène from his first marriage. That he survived so long was due to medical art, his own tremendous will, and the care of his calm and gentle Kate.

Otto R. Frisch

Percy Brian

PERCY WRAGG BRIAN died at the age of 68 on 17 August 1979. He was one of the leading botanists of the day with a wide range of interests.

Percy Brian graduated from Cambridge in 1931 with first class honours in the Natural Science Tripos, was awarded the

Frank Smart Studentship as the best student of his year and remained at Cambridge to take a PhD, awarded in 1936. He was awarded an ScD in 1951. His professional career started at Long Ashton Research Station in 1934 and he joined ICI in 1936, where he remained until 1963 — first at Jealott's Hill and later at the Akers Laboratories. He returned to academic life in 1963 as Regius Professor of Botany in Glasgow; in 1968 he moved to Cambridge as Professor of Botany, where he stayed until his retirement in 1977. He was awarded an honorary DSc by Hull University in 1978.

Brian's most productive years as a research worker were spent at the Akers Laboratories. Here he collected an active research group and enjoyed close collaboration with organic chemists who shared his interest in natural products. His research planning and management were faultless; he maintained his interest in a problem only as long as the results justified the work involved; he noticed potential developments peripheral to his central theme, but he did not pursue them until he could give them adequate backing; he did not fritter his energy on red herrings. Once he had launched a new line of research, he gave the workers themselves complete freedom to develop it. The result was a happy, well-integrated and purposeful group.

Brian's central interest as the Akers Laboratories was the influence of antibiotics on the balance of fungi in the soil; this involved collecting antibiotics from soil fungi, examining their effects on other fungi and on higher plants and trying to establish whether the same chemicals were produced in soils. Brian was not deterred by the magnitude and complexity of this problem. During the course of this work he noticed that although most of the antibiotics were generally toxic, a few, notably griseofulvin, were more specifically active against fungi and might have a potential in plant chemotherapy. Brian launched a programme to study this possibility some 10 years before the subject became respectable. Griseofulvin was never successful as a plant chemotherapeutant, but found a unique place in the treatment of mycoses in man and other animals, a possibility which Brian foresaw some years before the chemical was developed.

The chemical interactions of soil fungi included the activity of parasites as well as saprophytes. Among other parasites he studied the products of *Gibberella fujikuroi* and isolated the active chemical, gibberellic acid, in large enough quantities to launch a new area of botanical research. The interactions between fungal parasites and their hosts, particularly as related to the balance of hormones in the plant, remained Brian's central research interest. He pursued these studies at Glasgow and Cambridge with the support of the Agricultural Research Council. The ARC Unit of Developmental Botany was established at Cambridge in

1969 with Brian as honorary director. Here hormone physiology was studied in both healthy and diseased plants.

Brian had less time for research in his university posts but he was known as a tower of strength in his departments and he and his wife, Meg, were untiring in their hospitality to students and to their colleagues.

In addition to research and teaching, Brian was unstinting in the time he would give to the substructure of his science. He was a member of the Agricultural Research Council, twice president of the British Mycological Society, president of the Association of Applied Biologists, the Society of General Microbiology and of the Cambridge Philosophical Society at the time of his death. He was vice-president of the Institute of Biology and served on the council of the Society for Experimental Biology. He also maintained his interest in plant pathology and was one of the chief organisers of the 1st International Congress of Plant Pathology. He was elected a Fellow of the Royal Society in 1958 and served on its Council from 1968 to 1970. He delivered the Leeuwenhoek Lecture in 1966. He was created CBE in 1975.

Brian was never a loquacious man and never pushed himself forward. However, he never refused help and advice when it was requested or needed and what he did say was to the point and well worth listening to. It was probably a measure of his greatness that so many people 'beat a path to his door.' He will be sorely missed by his friends and colleagues and particularly by his family, who must command our deepest sympathy.

S.H. Crowley

Martin Prestige

MARTIN CALDER PRESTIGE, developmental biologist and Senior Lecturer in Physiology at Edinburgh University, died suddenly on 27 August 1979.

His death, at the early age of 44, removes from the world of developmental neurobiology one of its most incisive minds and able investigators. Educated at Cheltenham College and Trinity College, Cambridge, his basic scientific training was in physiology and led to his being awarded a Michael Foster Studentship. In 1958 he started research, with Patrick Merton, on the occurrence of initial collaterals on kitten motoneurons.

In 1963 Martin joined Arthur Hughes in work on the development of the amphibian spinal cord. This collaboration started in the Anatomy School in Cambridge, continued from 1964 at the Zoology

Department in Bristol, and had a great and continuing effect on the general direction of his work. He took his PhD at Bristol in 1967; this was on the development of the nervous system to the hind leg of *Xenopus* tadpoles and it outlined what was to be one of his main research interests. He continued working in Bristol until he moved to Edinburgh as a Lecturer in Physiology in 1968. He loved Edinburgh and remained there, being appointed Senior Lecturer in 1975.

Two main themes run through Martin's work. The first concerns how the nervous system is put together in terms of cell types and cell numbers; and, with a slight modification of emphasis, this changes into the second theme, which concerns how the system is established in terms of adult functional connectivity.

In Martin's early work his friendship with Arthur Hughes shows most clearly, for he started from Hughes' observations on development in *Xenopus* and extended these brilliantly. In a series of papers starting in 1965 he analysed the phenomena of cell death during the development of the spinal cord and its sensory and motor connections. This was beautiful work, highly relevant to ideas that were then beginning to emerge on the role of central-peripheral relationships in the developing nervous system, and it continued up to his death, with a paper currently submitted for publication.

In 1975 the second main theme of Martin's work was illustrated by the publication, with David Willshaw, of their now well-known paper on theoretical aspects of the formation of retinotectal connections. This paper was very important in that it introduced, for the first time, a welcome touch of rigour into the study of how the eye connects with the brain. Up till then there had been, unbelievably, virtually no serious assessment of the assumptions underlying the various mechanisms that had been proposed to account for the formation of retinotectal connections. Since then there have been several (and more comprehensive) papers on this subject, by others, but the initial credit must go to Prestige and Willshaw.

Martin was also a poet of considerable ability. He had, in his youth, been a mountaineer, and he maintained this interest until his death, in the form of an extensive collection of books on the Himalayas. His first wife, Anne, was killed in a tragic accident. He was married for a second time, to Lucina, in 1972, and their further years in Edinburgh were happy.

In the last year of his life Martin was much troubled by respiratory disability resulting from an illness in youth. Those who knew him over the years will miss him as a friend, as a distinguished scientist, as an inspiration to his colleagues and as an outstanding example of how to behave in the face of adversity.

R.M. Gaze.