OBITUARY

EDITH BÜLBRING FRS

Photograph by Professor Giorgio Gabella

Edith Bülbring was a great personality who was famous internationally for her work on the physiology and pharmacology of smooth muscles. She retained her interest in the field right up to her death on July 5th 1990 at the age of 86 years. Her collaborators came from all parts of the world and almost all of them when they returned to their own countries became eminent in their own right. Many of them trained others in smooth muscle pharmacology and so Edith acquired a generation of scientific 'grandchildren'.

Her father was German and a professor of English first in Groningen (The Netherlands) and later in Bonn. Her mother was Jewish and Dutch and came from a well known family of bankers in The Hague. Edith was the youngest of four children (three sisters and a brother) and was born on 27th December 1903 in Bonn. Edith's Jewish origins were to have profound effects on her later life.

Her family was very scholarly and Edith became fluent in German, Dutch, French and (somewhat later) English. She could also speak tolerable Italian. She developed as an accomplished piano player under the tutelage of a family friend. Her early life was probably rather sheltered but made difficult by the death of her brother killed during the First World War and even more difficult by the death of her father in 1917. However, due to help from her mother's family Edith was able to continue her education which had begun at the Gymnasium and she entered the University of Bonn to study physiology and medicine. During her preclinical studies she worked on nerve staining with the histologist, Boeke, in Utrecht. She studied medicine also in Munich where she was attracted by the work of von Müller, a famous Professor of Medicine. She was by this time in her early twenties and she very much enjoyed the social life in Munich which included

operas, dancing, skiing in the winter (which was a very energetic sport in those days) and walking in the mountains in the summer. After Munich, Edith went to Freiburg, drawn by the presence of another famous scientist, Aschoff. There she heard and was inspired by Trendelenburg's lectures on pharmacology. She returned to Bonn to finish her clinical training and her medical degree, studying the histology of phaeochromocytoma cells for her doctorate. After this she was a house physician in Berlin before joining Trendelenburg to work in his laboratory in Berlin for two years (1929–1931). She worked as this famous pharmacologist's assistant until his death in 1931; among other topics she studied was the action of cardiac glycosides on the frog heart. It was in this laboratory that she began her lifelong friendship with Marthe Vogt. After Trendelenburg's death she returned to clinical work as a paediatrician in Jena and then in Berlin. However, the rise of antisemitism led to her being dismissed from her post in Berlin. She returned briefly to Bonn before coming to England in 1933.

Edith came to England with her sister Maud initially for a holiday but during this she visited her old mentor Friedemann who was working at Henry Dale's laboratory in Hampstead. In this way she met Henry Dale who introduced her to Professor J.H. Burn. He was then at the laboratories of the Pharmaceutical Society in Bloomsbury Square. So began her life and work in England which became her home. Edith worked at the Pharmaceutical Society Laboratories until 1938 when she followed Burn who had moved to head the Department of Pharmacology, Oxford. She was initially a departmental demonstrator there but became increasingly independent and was appointed successively as University demonstrator (1946), Reader (1960) and eventually to a personal Professorship (in 1967). She was elected to a Professorial Fellowship of Lady Margaret Hall in 1960 and remained a fellow of that college up to her death. Her work before 1951 was on many aspects of physiology and pharmacology. It included a description of the rat phrenic nerve-diaphragm preparation (Bülbring, 1946). She also worked with D. Whitteridge and G.L. Brown as well as publishing extensively with J.H. Burn.

Her interest in smooth muscle began in her late forties after returning from a year in Johns Hopkins University in 1949–50. Her first interest was in the metabolic activity of smooth muscle (Bülbring, 1953) but was soon followed by studies on its electrical activity (Bülbring & Hooton, 1954). It was for her work on the electrical properties and innervation of smooth muscles that she became most famous. Her main contributions were to show that tension in intestinal muscle was correlated with the frequency of spike discharge. Later she went on to show with Tadao Tomita that in smooth muscle, calcium entry was responsible for the action potential rather than sodium entry as in nerve and skeletal muscle. She showed with Hiroshi Kuriyama that during the action of excitatory transmitters, such as acetylcholine, the action potential frequency was increased whereas inhibitory hormones, such as adrenaline, decreased spike discharge frequency and hyperpolarized the membrane. Her interest in the metabolism of smooth muscle continued and involved several collaborators notably Gustav Born. Her early work on excitation was done with Mollie Holman and on the actions of neurotransmitters with Geoff Burnstock. She worked extensively on peristalsis and on the mechanism of α - and β -adrenoceptor effects in intestinal smooth muscle. Perhaps her greatest scientific contribution was to excite the interest of so many talented investigators who continued and expanded her pioneering work on smooth muscles and the actions of hormones and transmitters in laboratories around the world.

In her middle years it is probably fair to say that Edith was

a formidable woman. She pursued excellence with single-minded determination and had little time for the mediocre. In all things she was meticulous, neat, organised, generally exacting and uncompromising. Another side of her was, however, in a way impulsive and generous; she had great warmth and enthusiasm which drew those about her. Her passion for experimental work persisted even after her retirement. Her determination and indomitable spirit triumphed over the disability of losing a leg in her late seventies. Her cheerfulness never left her. Her mind was clear to the end and she never lost her interest in smooth muscle research and scientific ideas – 'Now tell me what exciting discoveries you have made' she used to say as a greeting.

Her house in north Oxford was built in the expectation that her two sisters Maud and Lucie would join her. However Maud died rather early and only Lucie came to live with her. She predeceased Edith by a few years. Well remembered are the weekly meetings of the members of her research group held after work at Edith's house where results of experiments were discussed either in the garden or in the sitting room overlooking it. Visitors were common and subjects were wide ranging – Edith was keen to learn about discoveries in other fields as well as in smooth muscle. Edith loved these informal gatherings which included over the years visitors and collaborators from all parts of the world. Outside of work Edith played the piano solo, in duet, or as an accompanist, although after retirement she gave up playing before an audience. She

still enjoyed opera and paintings and had an enviable library on the old masters. Dutch painters, especially Rembrandt, were some of her favourites. She was a remarkable woman who said she had noticed no disadvantages of her gender or nationality in this country.

Edith Bülbring's work brought great credit to British Pharmacology. She became a member of the Society in 1936 and was elected to honorary membership in 1976. In 1983 she was awarded the Wellcome Gold Medal. Her work was also recognised in the numerous other honours she received both in the U.K. and abroad. She was given a personal Professorship at Oxford in 1967, nine years after she was elected Fellow of The Royal Society. She was elected honorary member of the Italian Pharmaceutical Society, Deutsche Physiologische Gesellschaft, The Physiological Society, and received honorary degrees from Universities of Groningen (The Netherlands), Leuven (Belgium), Homburg Saar (Germany) and was awarded the Schmiedeberg-Plakette der Deutschen Pharmakologischen Gesellschaft.

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