



Sir ERNST BORIS CHAIN

Obituary

ERNST BORIS CHAIN, whose name will always be associated with the discovery of the chemotherapeutic properties of penicillin and who shared a Nobel Prize with FLEMING and FLOREY in 1945, died in Ireland on August 12th, 1979.

CHAIN was born in Berlin on June 19th, 1906, the son of a chemist and industrialist of Russian origin, and graduated in chemistry and physiology at the Friedrich-Wilhelm University. After research for three years in the Institute of Pathology at the Charité Hospital, Berlin, he came to England in 1933 as a Jewish refugee from HITLER's Germany. Following a short stay in University College Hospital Medical School, London, he went to work at Cambridge under Sir FREDERICK GOWLAND HOPKINS and obtained a Ph. D. in 1935. In the same year HOWARD FLOREY (later Lord FLOREY) was elected to the Chair of Pathology in Oxford and this coincidence led to a major turning point in both their lives. For some years FLOREY had been interested in the function of lysozyme and had believed that experimental pathology would benefit from the collaboration of pathologists with chemists, but the money he needed for a chemical collaborator only became available after his arrival in Oxford at the Sir William Dunn School of Pathology. He then enquired in Cambridge for a suitable biochemist and HOPKINS suggested CHAIN.

In Oxford, CHAIN worked at first on the biochemistry of certain snake venoms. Then, at FLOREY's suggestion, he took up a study of lysozyme and discovered (with L. A. EPSTEIN) the nature of the substrate of this bacteriolytic enzyme in the cell wall of *Micrococcus lysodeikticus*. This study led him to look into the already extensive literature on other naturally-occurring antimicrobial products; in discussions with FLOREY he proposed that they should make such substances the subject of a systematic investigation. This project gained support from the Medical Research Council and, on a larger scale, from the Rockefeller Foundation.

Fortunately, one of the first three substances chosen for study in this project was penicillin. ALEXANDER FLEMING had discovered the antibacterial properties and low toxicity of penicillin in 1929, but had never envisaged that it would cure systemic infections. CHAIN's interest in penicillin was aroused by its instability, which had defeated previous attempts to purify it. FLOREY's interest was stimulated by CHAIN and by the ability of penicillin to kill the staphylococcus, against which the sulphonamides were ineffective. However, the successful implementation of the decision to study penicillin was undoubtedly the work of a small team. FLOREY stated later "I am quite clear that nothing would have gone along except for a group of five or six people".

While FLOREY devoted much time in the early nineteen forties to ascertaining how penicillin could be used most effectively, CHAIN was engaged, with a colleague, on chemical and biochemical studies of penicillin. One outcome of this work was the discovery of the first penicillinase while another was the production of highly purified penicillin and the finding of characteristic properties that threw light on its nature. CHAIN then became an active and enthusiastic member of a small group, headed by Sir ROBERT ROBINSON, which took up the work on the structure of penicillin in Oxford and contributed to the intensive, though unsuccessful, Anglo-American efforts to make it by chemical synthesis.

After the spectacular and gratifying success in medicine of the penicillin project, CHAIN's once cordial relationship with FLOREY deteriorated. In 1948 he left Oxford after an invitation to organize a department of biochemistry and set up a fermentation plant in Rome and for thirteen years he was the Scientific Director of the International Research Centre for Chemical Microbiology at the Instituto Superiore di Sanità. There he initiated fruitful research on the ergot alkaloids.

During this time he was partly responsible for the initiation of work which culminated in a further important advance in chemotherapy. When consulted in 1954 by the then Chairman of Beecham, who wished his company to enter the field of antibiotics, he suggested that attempts should be made to modify the penicillin molecule rather than to search for entirely new substances. This led to the isolation by members of the Beecham Group of 6-aminopenicillanic acid, (detected earlier, unknown to them, in Japan) and to the production of a series of clinically valuable new penicillins.

In 1961 CHAIN returned to England to become Professor of Biochemistry at the Imperial College of Science in London. He obtained financial support from Sir ISAAC WOLFSON, who provided funds for a new building containing a fermentation plant, and stimulated work on the fusicoccin phytotoxins and on glucose metabolism.

ERNST CHAIN was a gifted and voluble man who spoke fluently in English, German, Italian, French and Russian, and was an amateur pianist of distinction. He believed in a close relationship with industry; held strong views on many subjects, including molecular biology, and was never backward in voicing them; and he became an almost legendary figure in his life-time. He was elected a Fellow of the Royal Society in 1949, was honoured by many foreign academies and universities, and was made a Commandeur de la Légion d'Honneur. He was knighted in 1969.

He married in 1948 Dr. ANNE BELOFF, a biochemist, and they had two sons and a daughter.

(E. P. ABRAHAM)