BLG BIO

Bernard Ginsborg was an honours physics graduate from Reading University where he subsequently earned a PhD in 1953 for a thesis on eye movements. His life's work on membrane biophysics began when he joined the Biophysics Department in University College London. In 1957 Bernard moved to the MRC National Institute in Mill Hill when Walter Perry recruited him to join the scientific staff. In 1958 he moved to Edinburgh University again at Perry's invitation when Perry became the Professor of Pharmacology. Bernard ascended the academic ladder quickly from a Lectureship in 1962, to a Readership in 1964 and finally to a Personal Chair in 1976. He served as the Head of the Pharmacology Department from 1980 to 1984.

Bernard's record of scientific work is outstanding. Over four decades he published research papers on numerous biophysical themes with several collaborators. His papers stand as models of scientific writing. The range of topics was wide and included human eye movements, the biophysics of invertebrate muscle membranes, synaptic transmission in amphibian sympathetic ganglia, presynaptic inhibition at the mammalian neuromuscular junction, dopaminergic receptors on insect salivary gland cells and ion channel behaviour in human neuroblastoma cells.

Most of Bernard's papers were published in the *Journal of Physiology*. His first paper in the Journal described the results of his PhD project supervised by Professor Ditchburn in the Physics Department at Reading University. This paper is remarkable in several ways. First, it reported the measurement of tiny involuntary movements of the eyes during a subject's fixed gaze on a stationary point. To measure such minute eye movements in a human subject is a measure of Bernard's skill as an experimentalist. The second remarkable feature of this paper is that nearly all of the measurements were made on a single subject – Bernard himself. He called these tiny eye movements "flicks" but they are now called microsaccades. And these involuntary movements are still currently being studied in studies of visual perception.

The 1950s saw major advances in our understanding of the excitability of nerve and muscle cells. In the Physiological Laboratory in Cambridge University Alan Hodgkin and Andrew Huxley found that the signal passing along nerve axons was an all-or-none action potential arising from a transient inward current of sodium ions. And in the Biophysics Department of University College London Paul Fatt and Bernard Katz found that the signal passing from motor nerve endings to muscle cells was acetylcholine released in quantal packets. In the light of those marked advances in the understanding of the physiology of nerve and muscle Bernard's decision to join the Biophysics Department in London was wise and timely.

Bernard's entry into membrane biophysics was a study of the electrical properties of frog slow muscle fibres published in the *Journal of Physiology* with Liam Burke. Then Bernard collaborated with Paul Fatt in a study of the excitability of crustacean muscle fibres. The impetus for this project originated from an earlier paper in 1953 by Fatt and Katz showing that the sodium hypothesis of Hodgkin and Huxley to explain excitability of nerve axons did not apply to crustacean muscle fibres. In their paper Fatt and Katz report the unexpected finding that excitability is maintained in the absence of external sodium ions and concluded: "The mechanism of the action potential, and the species of ions involved in the movement of charge across the membrane remain a puzzling problem." In 1958 Paul Fatt and Bernard solved the puzzle when they discovered that electrical stimulation of the crustacean muscle membrane elicited a calcium action potential. Their paper was a turning point in the history of neuroscience. Before 1958 the existence of voltage-gated sodium channels dominated the understanding of cell excitability. After 1958 the existence of voltage-gated calcium channels transformed our understanding of cellular signalling. The transformation arose because the calcium ions entering excitable cells though these channels caused a rise in the intracellular calcium concentration large enough to influence events such as secretion and contraction.

When Bernard left the Biophysics Department he carried its powerful imprint of high standards and in all of his later work he maintained a strong analytical approach. He also obeyed the golden rule that his name would never appear as a listed author on a paper unless he had played a significant part in the work reported.

Working with Bernard was challenging, enlightening, productive and great fun. He had a marvellous sense of humour, often aimed at his own foibles. In the lab Bernard was committed to all of the demands of the experiments and writing papers was his speciality. He was a true

master of difficult dissections, experimental design, oversight of the electronic equipment and mathematical analysis of the results. He had a superb understanding of electrophysiology and its literature. If Bernard had chosen a musical career instead of science he would have been a virtuoso.

It was unsurprising to note that Bernard, with his scientist's mind, was wary of authority especially in the offices of bankers, lawyers and doctors. On one occasion he ended a meeting with a consultant who was giving him advice about healthy living by telling him that "you just want to control the way I die". Bernard, however, was the soul of old-fashioned courtesy and generous with his time and help. His modesty notably outshone his intellectual brilliance.

Bernard was a lovely man and a brilliant scientist. It was a huge privilege and honour to work with him and, even more so, to become his friend. It was wonderful to listen to stories about his experiments in the Biophysics Department in London. He also had a fund of tales about scientists who worked there, especially Liam Burke, Paul Fatt, Bob Martin, Ricardo Miledi, John Nicholls, Rolf Niedergerke . Bernard Katz and Sally Page.

In one of his novels P G Wodehouse referring to a rather dim character writes: "If men's minds were like dominoes, surely his would be the double blank." In Wodehouse's classification Bernard would be, without doubt, the double six, both as a scientist and a man.

Bernard, my highly valued collaborator and very dear friend, enriched my life. I am sure that he enriched the lives of others too.

Randall House