The man behind the CAT scanner


Allan Cormack’s story is worth telling, as that of one of three ‘scientifc’ Nobel prize-winners to whom South Africa can lay some claim. Born in Johannesburg in 1924, he was educated at Rondebosch Boys’ High School and at the universities of Cape Town (UCT) and Cambridge. Appointed to a lectureship in the Physics Department at UCT in 1950, Cormack spent the next six years honing his skills as a stimulating teacher and struggling, with very limited facilities, to establish his research reputation. In 1956 he was asked to act in a part-time capacity as a medical physicist at Groote Schuur Hospital in Cape Town. He started to think about the fundamentals which lay behind the problem of calculating in detail the dose distribution in human tissues subject to X-ray bombardment, and he realised immediately that the problem was a mathematical one. In 1957 he did a simple experiment in the Physics Department at UCT on a ‘phantom’ comprising a cylinder of aluminium surrounded by an annulus of wood, and the results confirmed the theory he had worked out for the case of spherical symmetry.

Cormack then moved from Cape Town to a post at Tufts University, Massachusetts, where he worked intermittently on the problem over the next six years. In 1963 he did an experiment on a phantom without spherical symmetry and obtained quite good agreement with the more complex theory he had by then developed. He published the results in two papers in 1963 and 1964 in the Journal of Applied Physics, entitled ‘Representation of a function by its line integrals, with some radiological applications.’ With hindsight it seems astonishing, but there was virtually no response to these publications, and Cormack turned his attention to other research and to teaching and administration. In 1972 the situation changed. Godfrey Hounsfield, at the EMI laboratories in England, developed the CAT scanner, and in 1975 a paper appeared in the journal Science which drew attention to the fact that Cormack had already, in a remarkable paper of 1963, developed the basic theory.1 In 1979 Cormack shared the Nobel Prize for Physiology or Medicine with Hounsfield for the development of computerised tomography.

C.L. (Kit) Vaughan has now written a biography of Allan Cormack, entitled Imagining the Elephant—a reference to an Indian legend in which six blind men observe an elephant, taken as an analogy to computerised tomography. Vaughan has benefitted from the close cooperation of many members of Cormack’s family, as well as many of his friends and associates. A prodigious effort has gone into this book, and the result is a comprehensive work of reference which will be a valuable source for those interested in the history of science and medicine. It is well-indexed and has several convenient appendices, including Cormack’s publication list and his Nobel lecture. A criticism is that some of the background historical detail is only distantly relevant: if you feel you already know as much as you need to about the history of northern Scotland or the founding of Cambridge University, these sections can be skipped.

The anecdotes about Cormack himself, are, on the other hand, mostly pertinent and insightful, and some are fascinating. Who could resist Aaron Klug’s description of a climb up Table Mountain with Allan Cormack in 1947? Klug was not only a postgraduate colleague of Cormack’s in the Physics Department at UCT at the time, but thirty-five years later he joined Cormack as a Nobel Laureate, in his case in chemistry. He recounts how one weekend the two of them were climbing Africa Face. Allan, an accomplished climber, was leading, when Aaron slipped and swung into space but was held and pulled up to safety by Allan. The image of two future Nobel Laureates in such a precarious situation is certainly worth recording! A particularly insightful item illustrating Cormack’s sense of humour and his pragmatic attitude to life’s vicissitudes is the account of the collapse of his doctoral research at Cambridge in late 1949. This had been subject to many problems, and the last straw came when someone else published a result on the problem he had been working on. Cormack’s comment: ‘Then there was nothing to do but bugger off’. Which he did, back to the lectureship at UCT—with an essential diversion to X-ray tomography of the human body. Science 186(4160), 207–212.

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