CENTREFOLD

Professor William Davidson

I first met Bill Davidson when I joined the staff at Battersea College of Advanced Technology in London [1] where he was Reader in Applied Mathematics. That was way back in 1964, and I little imagined then that after such a large displacement in both space and time we would both still be together, and it is perhaps not surprising that when Bill recently announced his impending retirement, it should fall to me to write this appreciation of his career.

William Davidson was born in Ardoe, which is just south of Aberdeen in Scotland, in 1924. He was educated first at the Mary Culter East Primary School, and then the Central Secondary School in Aberdeen, which he joined at the age of twelve after winning a Carnegie Trust bursary.

In 1941, Bill left school and was temporarily employed at the Ministry of Labour before enlisting in the RAF the following year. He was assigned to the Pathfinders and spent much of the war "swinging compasses" at various airfields in Cambridgeshire. Perhaps it was his war work that first aroused Bill's lifelong interest and dedication to applied mathematics. Anyway the war's end saw Bill in the role of an instructor in the Educational and Vocational training scheme while at the same time he pursued his own studies in mathematics.

Bill was demobilised from the RAF with the rank of flight sergeant in 1946, and became a student of Mathematics at Queen Mary College, London. This was the era of G.C. McVittie and S.L. Green, and both these applied mathematicians undoubtedly had a great influence on his subsequent career. After obtaining his B.Sc. in 1950 Bill joined the Mathematics staff of Battersea College of Technology as an assistant lecturer, and continued his own studies in both Fluid Mechanics and Relativity Theory, for which he was awarded his M.Sc. in 1952.

In 1954 Bill married Irene Cook, whom he met through their common interest in a country-rambling club. That same year he became a student of W.H. McCrea and was subsequently

awarded his Ph.D. for his thesis on \emph{"Problems in Relativity and Cosmology"}. This work, which was published in a series of papers between 1957 and 1959 in the Monthly Notices of the Royal Astronomical Society, was mainly concerned with the theoretical treatment of observational relations in Cosmology, and formed the basis of much of Bill's subsequent researches. Recognition soon followed when Bill was elected a Fellow of the Royal Astronomical Society in 1958, and became a Recognized Teacher of London University in the following year. In 1963 Bill was appointed Reader in Applied Mathematics, and in 1964 he became a foundation fellow of the Institute of Mathematics and its Applications.

In 1966 Bill moved to New Zealand with his wife and two children, Malcolm and Josephine, to take up the first Chair in Applied Mathematics at Otago University. In this second period of his career Bill has continued to publish at regular intervals in the more classical areas of Relativity, and now has about fifty papers to his credit. Of particular note was the work he did with his student A.B. Evans on Newtonian Cosmology in the early seventies. Bill's more recent work includes a discussion of the theory of tests of General Relativity, and an investigation of the possibility of a variable gravitational constant, this last project being undertaken with W.H. McCrea while he was a Visiting Evans Professor at Otago.

Bill's reputation however, as an Applied Mathematician must surely be linked to his contribution to the resolution of the controversy that raged among cosmologists in the fifties and sixties. The modern subject of Cosmology only became possible with the advent of General Relativity and may be dated to 1917 when papers on the subject were published by Einstein and de Sitter. Within the framework of General Relativity the cosmological problem consists in finding a model of the physical universe which is a solution of Einstein's equations. In 1948 Bondi and Gold proposed a cosmological model which does not rely on Einstein's equations. Instead they postulated the "perfect cosmological principle", which requires the universe to be uniform in time as well as space and which in view of the known expansion of the universe, requires matter to be created at a constant rate throughout space. When astronomers look at distant galaxies they are, of course, also looking into the past and this gives a means of distinguishing between the two theories. For example if the universe is both expanding and evolving, one would expect matter to have been more concentrated in past epochs and so just by counting the number of galaxies per unit volume in various regions of the sky one could hope to decide whether or not the Universe is actually evolving, or whether a steady state in fact persists. Needless to say it is not at all a simple problem in practice, and in a series of papers which appear between 1958 and 1970 Bill contributed significantly to the resolution of this problem [2]. Incidentally it is now believed that the evidence points to a fundamental singularity of the observable Universe that occurred about ten thousand million years ago, and that this was followed by hyperbolic expansion.

During the seventies Bill received further recognition for his work. Most significant was his election as a Fellow of the Royal Society of New Zealand in 1976, and the award of a D.Sc. degree by London University in 1972. I must add here that Bill was not too shy to remark to us when he broke the news, that there were very few other D.Sc.'s at Otago!

Bill has also served on many committees during the tenure of his Chair in Mathematics at Otago. Among these I must mention that in 1973 he was both a member of the N.Z. National Committee for Astronomy, President of the Otago Branch of the Royal Society, and in 1978 Chairman of the Local Organising Committee of the International Astronomical Union regional meeting at Wellington. Further, members will know that Bill is currently President of the NZMS.

In the department Bill will above all be remembered for his endeavours to keep the flag flying for classical Applied Mathematics and Modelling in our syllabuses. Bill has never been afraid to express his views or take on the opposition, and we shall all certainly miss his lively debate at our meetings! I am sure that I speak for the whole department when I wish Bill and Irene a long and happy retirement.

H.C. Levy

[1] Later to become the University of Surrey at Guildford.
[2] The interested reader could consult the survey paper by W. Davidson and J.V. Narlikar which appeared in Reports on Progress in Physics (1966).