OBITUARY

HENRY GEORGE FORDER

Henry George Forder was born on 27 September, 1889 at Shotesham All Saints, near Norwich, the eldest son of Henry and Mary Ann Forder. Early in his life the family moved to Worstead, Norfolk where his father had bought the village blacksmith business. Books were cherished in the home and Henry became an avid reader from an early age. Until the time of his death books were his most valued possessions.

Apart from his free access to a wide range of literature the circumstance that had most effect on the scholarly turn his life took was the passing of an enlightened law which required local bodies to provide scholarships for the education of gifted children. Henry Forder was recognised by the headmaster of the village church school as having great ability and potential and he helped prepare him to compete for a scholarship funded by the county. Although it was at that time unusual for the son of a tradesman to advance his schooling beyond an elementary level, Henry Forder's family realised the importance of higher education. With their encouragement he won the scholarship and began his studies at the Paston Grammar School in North Walsham, 5 km from his home.

At Paston he was exposed to the rich world of classical scholarship and to the contrasting world of modern philosophical and scientific speculation. While his facility with languages was nurtured at this school, his mathematical development flourished to some extent independently of the school. Although he was greatly influenced by some gifted mathematics teachers, his own ability was of such an order that he was able to work most successfully unaided. The headmaster at Paston was particularly supportive and on one occasion, when preparation for an examination was hindered by the incidence of measles in the family, he came in person to the Forder home to work with Henry. Henry's brother Charles, who was the author of *History of Paston School*, records that although Henry passed that particular examination with honours, it had been through a mistake that he had even entered for it: he should have taken a lower examination first! Although his headmaster died in 1904, he was succeeded by another enlightened and perceptive teacher who also realised Henry Forder's potential and continued to give him the encouragement he needed.

In 1907, his last year at Paston, Henry Forder, along with another boy, founded the school debating society. The lively arguments on such subjects as conscription, female suffrage, the House of Lords and the justifiability of Mary Queen of Scots' execution were long remembered at the school and undoubtedly played an important part in developing Henry Forder's formidable skill as a public speaker and conversationalist. Also during that year he was awarded a scholarship of £65 per annum by the Norfolk County Council which, together with £20 per annum from the Governors of the School, was to provide his financial support at Cambridge. Sidney Sussex College promised him a further scholarship of £27 on condition that he pass

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the "Little-Go" examination to be taken soon after his entry to that college as an undergraduate. The school prizes that he chose for himself from a batch offered by the school were Huxley's *Lay Sermons*, *The Essays of Elia*, Longfellow's *Poems*, Milton's *Poems*, *Vanity Fair* and Morley's *Life of Cromwell*.

On 2 October, 1907 his life at Cambridge began. He quickly embraced Omar Khayyam as being the "ideal mixture of pessimistic agnosticism, epicureanism and determinism" to express his own philosophy, and he read every edition of Fitzgerald's translation that was available. He studied the standard mathematical books of his time and every other work of literature he could lay his hands on. His daily routine at Cambridge started at 7.30 or 8 a.m. He had two lectures in the morning, one at 9 and the other at 10 or 12. In the afternoon he studied in the library or copied out notes. In the evening he stayed out until 10 or 11 but then studied until after midnight. On 4 May, 1908 he found a proof in a book that any integer is the sum of four or fewer squares—a result he had been trying to prove on his own for six or seven years.

In between his mathematical studies he read a dazzling variety of books and in some cases recorded his impressions of them. For example, *Crime and Punishment* was "good but horrible", *King Solomon's Mines* was "rotten". He sought and received permission not to be confirmed as a member of the Church of England and started taking part in the activities of Pan, an exclusive society devoted to discussing religious questions.

When Henry Forder completed his degree as one of the 23 Wranglers of 1910, the possibility of staying on at Cambridge had to be abandoned for financial reasons and he sought employment, in the occupation he had most wished for, as a schoolmaster. He began as an apprentice mathematics master at Hulme Grammar School in the town of Oldham and stayed in this post until July 1913. He was pleased to find he was not nervous and could control the class but thought that mathematics at the school was in a state of anarchy. He started taking part in the activities of the Manchester Mathematical Society and in December 1912 he read a paper to that society on abstract geometry. His next position was as senior mathematics master in Cardiff and later he moved to St. Olave's School in London and eventually to Hymer's College in Hull. In 1922, during his time in Hull, he married his wife Dorothy and, until her death in 1970, she provided the warm and stable environment that a person of his gifts needed for his work.

Although the life of a schoolmaster was the usual career for a British mathematician, even of his high attainments, he eventually became dissatisfied with it, and when invited to apply for the vacant mathematics chair at Auckland University College in 1933, he did so. Against the advice of friends and colleagues he accepted the position and came to New Zealand to take up his duties in 1934. Apart from a period of leave in England soon after the war, he spent the remainder of his life in New Zealand.

Auckland University College was at that time a vastly different place from the modern university that has replaced it. There were 383 students in the whole institution and everything else about the place was on a similarly small scale. There were only two on the mathematics staff, himself and the late Keith Bullen, who was later to become professor of applied mathematics at Sydney University. There was essentially no mathematics library and the curriculum under which they had to teach was antiquated. At that time the centrally based system of university administration made changes in anything difficult to achieve and impossible to achieve quickly.

That almost every aspect of the college fell short of the Cambridge model could hardly be questioned. The move towards educational egalitarianism that was being achieved in Britain by scholarship assistance to selected working class students was replaced in New Zealand by more of an open-door policy for everyone. His comment on this situation:

> We give degrees at moderate fees
> In a democratic way;
> If others deride and put on side
> Then this is the thing we say:
> We take no pains with first class brains—
> We've always managed without 'em;
> We owe our positions to local conditions
> So why should we grumble about 'em?

Henry Forder soon became a notable figure in Auckland, not only as a mathematician and a man of learning, but also as a wit and conversationalist and as a critic and observer of events of the day. Was he a good teacher? Students who wanted nothing more than a set of notes to swot up for exams would have said not. Students who were themselves mathematicians and scientists in the making would have said that he was. For these people, he was more than a good teacher, he was a brilliant teacher. While a good set of notes can be copied from a textbook, an insight into what mathematics is certainly cannot, and that is exactly what he gave to those who were prepared to receive this insight. He loved mathematics with a burning intensity and most of all he loved geometry. You had to share this with him or, intellectually speaking, you had to part company with him.

His international reputation rests heavily on two advanced books, *The foundations of Euclidean geometry* and *The calculus of extension;* on his textbook, *A school geometry* and its second volume, *A higher course geometry*; and on his masterly piece of exposition entitled, simply, *Geometry*. He had a comparatively small output of research papers and most of them are quite short. Each one, however, is a gem.

E. Helly in *Mathematical Reviews* 3 (1942), 12 describes *The calculus of extension* as the first modern textbook arising from Grassmann's work. "It gives a very lucid account of Grassmann's original methods and of the investigations of other mathematicians who continued his work. Many concrete applications and examples, which, for the first time, are here collected in a book, clarify and extend the theory". In the introduction to his book Forder himself points out its significance as providing geometrical applications of Grassmann's general theory. "The algebra of vectors created by Grassmann and Hamilton has at last won an established place in Physics. Grassmann's methods are of equal use in Geometry, but this application is less widely appreciated. It is hoped that this book will redress this balance".

At the other end of the scale amongst the expository works of H. G. Forder, *Geometry* stands as a masterpiece of conciseness and accessibility. In *Mathematical Reviews* 12 (1951), 273–274, H. S. M. Coxeter summarizes the contents of this book and quotes several of Forder's colourful phrases expressing geometrical ideas in popular terms. For example, *Archimedes' Axiom*: "you will always reach home, if you walk long enough"; *Genus of a curve:* "The number of nodes and cusps it might have, but hasn't". In addition to ten chapters dealing with Euclidean and non-Euclidean geometry, projective geometry and other aspects of plane, solid and many

dimensional geometry, the final chapter deals with General space. To quote Coxeter's review, this chapter "deals with Riemannian geometry, free mobility in the infinitesimal, groups and their fundamental regions, locally Euclidean spaces, distance geometries, and metric topology, all in fourteen pages!"

Although he retired in 1956, Professor Forder retained a link with the university, particularly through continuing to give a single master of science course each year. In addition to this course, usually on projective geometry, he gave a variety of non-credit courses from time to time on such subjects as relativity theory and quantum mechanics.

The last few years of his life were spent at Selwyn Village, a retirement home in the suburbs of Auckland. Because of the necessities of space, he anticipated his generous bequest of his mathematical library to the University of Auckland, retaining for his own use only the books that would fit into his bedroom. Even in these changed surroundings he remained a focal point of intellectual conversation. I well remember the delight of a young European colleague who met him there and who wrote home to his friends about a wonderful old man sitting in his room reading a book, written in Russian, on category theory.

Such honours as his adopted country had to offer were heaped on him. The Royal Society of New Zealand elected him a fellow in 1947 after awarding him its Hector Medal for *The calculus of extension* in 1946. The University of Auckland awarded him an honorary D.Sc. in 1959 and the Auckland University Press published *A spectrum of mathematics*, a collection of mathematical papers commemorating his eightieth birthday. Special issues to commemorate his eightieth and ninetieth birthdays were published in the *New Zealand Mathematics Magazine* and the *Mathematical Chronicle*.

Henry Forder was a member of a number of local and international Mathematical societies and associations. In particular, he had been a member of the London Mathematical Society since 1921 and was a generous benefactor of the Society.

Was Henry Forder a happy man? He denied this although admitting to cheerfulness. Except on brief occasions, happiness was not compatible with the pessimistic view he held of the world. Was he contented and fulfilled? In many ways he was. He knew his work was valued and he most certainly had some idea of the esteem in which he was held by other people, whether or not they were mathematicians. I suspect that this self-effacing epitaph he wrote for himself fell short of his own judgement and the judgement he believed other people had of him:

> The time will come when men will say:
> "Old Forder died the other day,"
> As long ago one autumn morn,
> They said: "Another child is born."
> And all the interval between
> Might just as well have never been.

The 92 years in between those two events were packed with intellectual activity. If that interval had never been, several generations of mathematicians and scientists would not have been inspired by studying with him and a multitude of people would not have been enriched by the acquaintance of this great and scholarly man.

Henry Forder died on 21 September, 1981, a few days before his ninety-second birthday. As a mathematician he will be remembered most especially for three important books; as a teacher he will be remembered for the high standard of

scholarship and for the enthusiasm and love of mathematics and all learning that he passed on to his students; as a raconteur and conversationalist he will be remembered for his piquant sense of humour and for his gentle ridicule of anything hinting of bombast and sham.

I will remember him always as the person who, for me, made mathematics live.

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