OBITUARY

ALAN BREACH TAYLER

Alan Breach Tayler, CBE, Director of the Oxford Centre for Industrial and Applied Mathematics, died on 28 January 1995, aged 63.

Alan went up to Oxford in 1951 to read Mathematics at Brasenose College. He obtained a first, and after a brief excursion to the Bristol Aircraft Company, he returned to work for a DPhil with George Temple. His thesis, completed in 1959 and entitled 'Problems in compressible flow', contained a mixture of analytic, approximate and numerical solutions which foreshadowed the new practical applied mathematics that he embraced later. He became University Lecturer and Tutorial Fellow of St Catherine's Society in 1959.

During the next twenty-five years, Alan Tayler brought a new ethos to applied mathematics. This change came about through his recognition that the status quo in the 1960s, which comprised a delicate balance between theory and practice in the area of applied mechanics, was capable of far-reaching generalisation; indeed, he saw that such a development was essential since the following decades were to be dominated by computers and an ever-increasing need for mathematical modelling. In 1967, with Leslie Fox, he initiated the mathematical *Study Groups with Industry*, wherein academic and industrial researchers interact in week-long workshops. These were an immediate success: (1) with industry, who found new insights into their problems and new recruiting possibilities; (2) with students, whose enthusiasm to use their theoretical knowledge soon led to the highly popular MSc in Mathematical Modelling and Numerical Analysis; and (3) with faculty, both pure and applied, who found an undreamed of source of fascinating new theoretical problems. For example, one intellectual consequence was the use of industrial case studies to uncover the new field of 'free boundary problems', on which several thousand learned articles have appeared since 1970.

The consequences of these initiatives have been far-reaching. The Study Groups and their infrastructure continue to this day, and industrial interfaces have been set up all over the world modelled on or strongly influenced by the Oxford example. In 1982 Alan was awarded the Gold Medal of the IMA for his services to Applied Mathematics. In Oxford a group of applied mathematicians crystallised around the Study Groups, and hence in 1989 the Oxford Centre for Industrial and Applied Mathematics (OCIAM) was founded, with Alan as its Director. He was made CBE in 1993 for 'services to applied science and industry'. All this, and much more, has followed from his vision that interaction with the real world, and in particular with industry, could vitalise and unite mathematics and satisfy countless students by seeing theory put to good use.

Europe was a recent enthusiasm of Alan's, and he helped to create the *European Consortium for Mathematics in Industry* (ECMI) in 1985, and became its President in 1989. In 1988 Alan participated in an ECMI outreach initiative in Argentina, lecturing on mathematics for industrial problems and working in a study group organised there. His illness prevented a similar contribution to a workshop in Oaxaca,

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Mexico, in January 1995, but he would have been pleased that the UK participants so successfully carried forward the study group ethos of analysing what an industrial scientist requires from a mathematical model. Contacts engendered by ECMI, which was originally set up for education and training, led to several European contracts, and his latest European venture was to coordinate an HCM network entitled *Mathematics as an Industrial Resource*. A meeting of this group was held in Oxford in January 1995, when Alan, although gravely ill, took the lead in welcoming the new Eastern European participants and making plans for the next proposal to the EU. Right until the end, he was deeply involved in setting up new transnational schemes further to facilitate the communication of mathematical ideas and satisfy the endless demand for quantitative thinking in industry.

Besides all this mathematical activity, Alan devoted much energy to St Catherine's College, where generations of undergraduates enjoyed his relaxed and friendly tutorial style as well as his legendary hospitality. He was President, 1990–95, of the Oxford University Rugby Union Football Club.

Mathematical work

Alan Tayler's mathematical research began under the supervision of George Temple, when he worked on iterative procedures for solving the equations of inviscid subsonic and transonic gas dynamics [**1**]. As in the case of so many of his contemporaries, this sparked off a lifelong interest in mathematical fluid dynamics, and his subsequent publication list is punctuated with work on lubrication theory, surface gravity waves and viscous dissipation; perhaps his least known but most far-reaching work concerned the classification of the local behaviour of flows near separation points, a topic suggested to him by G. Birkhoff [**10**]. However, his interests widened rapidly as the years went by, to include studies at various levels of the geometry of logging trucks, nonlinear wave propagation in the spine [**6**] (to explain the behaviour of cadavers placed in ejection seats), ion transport [**9**] and the famous 'waiting-time' behaviour of solutions of degenerate diffusion equations in certain situations when the initial data have compact support [**21**].

This diversity of interest should not mask the one real thread that motivated almost all Alan's research, namely 'mathematics-in-industry'. Its origins can be traced back to a paper he wrote with Leslie Fox in 1969 [**5**], where they described the ideas behind, and their early experiences with, what were then called the Oxford Study Groups with Industry. These were the greatest of the many ventures in which Alan was a prime mover, and the burgeoning of mathematics-in-industry all over the world can be directly traced back to the Study Groups. (The Claremont Maths Clinics were also influential, but they came four years later.) This is not the place to recount all that has happened since then, but the fact that Alan found time to publish seminal papers on the mathematics of fluidised beds [**11**], formica manufacture [**17**], counter-current heat exchangers and semiconductor manufacture [**29**, **30**] gives some indication of the richness of the seam that he and Leslie Fox had uncovered. The most enduring testimonial to Alan's endeavours will surely be his monograph *Mathematical models in applied mechanics* [**28**], which not only assembles the theoretical toolkit needed by any aspiring 'industrial mathematician', but also conveys the open-minded attitude that is so essential for success in this area of activity. Alan's hands-on experience in so many industrial situations put him in an excellent position to enthuse students about this, his most beloved mathematical activity. To this day, his book

stands in a class of its own among texts devoted to mathematical modelling, that most difficult of all mathematical skills to describe or to practise.

Publications

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3. (with R. J. SEEGER) 'Triple shock wave interactions', *Phys. Lett.* 2 (1962).
4. 'A uniformly valid solution of Reynolds' equation: the finite journal bearing with small clearance', *Proc. Roy. Soc. London Ser. A* 305 (1968).
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19. (with N. NICHOLAS) 'Unsteady slow flows over a cooled plate', *IMA J. Appl. Math.* 28 (1982).
20. 'Differential equations and the real world', *Bull. Austral. Math. Soc.* 26 (1982).
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28. *Mathematical models in applied mechanics* (Oxford University Press, 1986).
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