Personalities and Presidents

WILLIAM McCREA

Introduction

The Editor's invitation to make a contribution to the centenary issue of the *Gazette* naturally makes one reflect upon the part played by the Association, its meetings and its publications, in keeping mathematicians in the country abreast of developments in their field. Any conclusions must be compared with what one may see to be happening in other fields.

Such a note as this is not the place for details. But it is obvious that in much of science and technology the latest discovery or invention gets reported in the media before a majority even of experts, other than a few directly concerned, have heard any first thing about it. But one must then add that in some fields a great service is done by a few recognised expositors whose broadcasts, articles and books provide so many of the general public with some perception of the significance of the developments in progress.

I had been going to say that mathematics is different. Then I might have gone on to say that for most mathematicians the only means for keeping in touch with developments, outside any specialities any individual might happen to have, is through the services of the Mathematical Association or another organisation like it. Indeed I believe this actually was the situation until perhaps the mid-1970s. Once electronic computation had come into widespread use, however, that surely transformed everything. Now a great proportion of everyday work and play is computer-controlled. Everything done by a computer is mathematics. Most of the operations may be dull mathematics but, if the tactics are mostly elementary arithmetic, the strategy may depend upon abstract pure mathematical thinking. It seems that the time has surely come when as many people as possible should understand as much as they can about the principles and capabilities of present-day computing. Everything indicates that people would enjoy this if it were suitably presented to them. What we require is a Patrick Moore or David Bellamy of mathematics – quite a few such, preferably and perhaps it should become a mission of the Mathematical Association to bring this about. It may be unduly materialistic to say that we live in the age of technology and we may do better to think in terms of an age of mathematics! This may not be the highest attainment of the human race. But it may be a step in the right direction. At least one leading British musical composer employs a computer in all his work.

It becomes interesting to speculate about what could have been the reaction to such a trend of ideas of two of the mathematicians to be remembered below. E. T. Whittaker could have claimed that he had himself done something to prepare the way for such developments by his invention of a 'mathematical laboratory' as a component of the department of mathematics of which he was head in the University of Edinburgh. G. H. Hardy might have been expected by his admirers to be horrified by what

they might be inclined to regard as a utilitarian view of mathematics: on the other hand, I feel that Hardy, on due consideration, would see the ubiquity of computers as an overwhelming demonstration of the universality of mathematics.

One obvious means the Association can employ in order to make members aware of current developments in mathematics is to elect as its President a mathematician responsible for some of those developments. It does so in the expectation that he or she will tell about them in a presidential address. I hope that some recollections of a few such individuals whom I happened to have known personally are appropriate for this issue of the *Gazette*. I retain this hope even though conditions have changed so greatly as indicated in foregoing remarks. In particular we can reflect that, even though each of the four individuals concerned was a national figure in the world of mathematics, almost certainly he or she never at any one time addressed a live audience any larger than that at the annual meeting of the Mathematical Association. The contrast with performances of 'media personalities' of to-day is incredible, but hitherto probably no mathematician has yet become such a personality. I did not hear the presidential address of any of the four individuals (it was in each case published in the *Gazette*); here I attempt only to depict the kind of person each was.

E. T. Whittaker

Sir Edmund Taylor Whittaker (1873-1956) was President 1920-21. After a brilliant early career at Cambidge he remained there as a mathematical don 1897-1906. Nearly every one of the notable British mathematicians who started to work around the turn of the century came under his influence during those years. From 1901 to 1907 Whittaker served also as one of the two Secretaries of the Royal Astronomical Society. For most of that time the other was (Sir) Frank Dyson, Astronomer Royal for Scotland 1906-1910, then Astronomer Royal at Greenwich 1910-1933. From 1906 to 1912 Whittaker was Royal Astronomer for Ireland and Director of Dunsink Observatory. So these two Cambridge mathematicians exercised a major influence upon the course of astronomical science throughout the whole of the British Isles. In Whittaker's case his influence in Ireland endured to the end of his life. For when about 1941 Eamon De Valera, who had been a mathematical student under Whittaker when in Ireland, as Prime Minister in Dublin sought to re-activate Dunsink Observatory he took advice from Whittaker as to what course he should pursue. For the 34 years 1912 to 1946 up to his retirement Whittaker was the Professor of Mathematics in the University of Edinburgh. He probably ranks as the most versatile professional mathematician of modern times. The amount of his teaching of undergraduates and postgraduates, writing of monographs and his independent research

demonstrate how truly professional, in the best sense of this, he was. The books were in themselves phenomenal. In Cambridge up to about 1925, any time they were mentioned, it seemed it was only to dismiss them as, though of good quality, still somehow not quite what was needed in that day and age. But then, around 1925, came the new quantum theory and its wave-mechanics; the only place where English-reading workers could find solutions to their wave-equations was *Modern Analysis* by E. T. Whittaker first published 1902 (later editions in collaboration with G. N. Watson). Then there is the story told by P. A. M. Dirac that his own development of quantum mechanics was held up for a whole weekend until on the Monday morning he could go to a library to see Whittaker's *Analytical Dynamics* (1904) the only place where he knew he could find the properties of 'Poisson brackets' which were crucial for the next stage in his theory. How did Whittaker's intuition or genius tell him that he ought to include in his books such items which most other mathematicians had deemed a waste of time? Even more prophetic surely was the book *The Calculus of observations: a treatise on numerical mathematics* by E. T. Whittaker and G. Robinson (1924), which dealt with the activity of the 'mathematical laboratory' already mentioned and which as a feature of academic mathematics was a whole generation ahead of its time.

Whittaker himself was a vivid sparkling personality. He took an understanding and kindly interest in everyone with whom he had to deal. At the height of his career there can have been scarcely a mathematician anywhere in the British Isles who had not come under his direct personal influence, and he seemed to have some personal acquaintance with every active mathematician in the world! It may have been partly this element of human interest that induced him to write *History of theories of Aether and Electricity* (Volume 1, 1910, second edition 1951, Volume 2, 1953). But I think it was his deep concern about the evolution of natural philosophy that inspired him. Actually he came to be criticized for some of his attributions of credit, but his critics were demonstrably ignorant of the literature.

G. H. Hardy

Godfrey Harold Hardy (1877-1947), unquestionably the leading British pure mathematician of his day, was President 1924-26. Alone or in collaboration with J. E. Littlewood he discovered many important new theorems in number theory and in function theory. But, apart from the specialists in those fields, most mathematicians in the country remember him as the professional who first instilled concern for rigour and for appropriate degrees of generality into the minds of British professional mathematicians as a whole.

In this context correctness and rigour are not the same. A mathematician wishing to solve a given problem may see that he could make progress were a certain general theorem proved valid. He might find himself unable to prove that theorem. But he might then see that for his immediate purpose

only a particular case of the general result of the theorem is required, and he may find that the validity of the particular case he needs can be verified directly. There is then no doubt about the correctness of the outcome. The conjectured theorem has turned out to be irrelevant for the immediate purpose. Nevertheless the exercise has checked a particular case. So it leaves open the question as to the conditions (i.e. degree of generality) under which its validity can be proved rigorously. Thus we see that rigour and degree of generality must go together or simply that the conditions for validity of a theorem are part of the theorem. Hardy wanted his fellow-mathematicians to take good care about all this – and to enjoy doing so.

Hardy had a lean ascetic handsome appearance. He did nothing to court popularity but he was a natural leader; the mathematicians he led had a somewhat austere affection for him. The distinguished mathematical astrophysicist and cosmologist E. A. Milne (1896-1950), who had been a wartime undergraduate pupil of Hardy and after World War I a colleague, wrote in an obituary, quoting words of a non-mathematical colleague, that 'he radiated an attitude to mathematics which made it shine as something supremely worthwhile, something clean and clear and bright and universal'. At the same time there was a slight fastidious streak of mischief in Hardy. He had been known to deprecate skill in mere exposition when he himself owed his more general recognition to his masterly exposition in his *Pure Mathematics* (1908 and many later issues). Again he could give an appearance of being a trifle disdainful regarding applied mathematics when at the same time he had actually become a Fellow of the Royal Astronomical Society simply in order to have the right to attend its monthly meeting. This was at a time when the famous debates between the astronomers J. H. Jeans and A. S. Eddington about stellar constitution were taking place.

The presidential address from such a personality upon the structure of mathematics must have been an inspiration to all who heard it or read it afterwards in this journal.

M. L. Cartwright

Dame Mary Lucy Cartwright (b. 1900), President 1951-52 brought to the office a range of academic experiences more impressive than that of perhaps any of its occupants before or since. After first coming down from Oxford she was for several years a schoolmistress. Then she returned to Oxford to do mathematical research with Hardy. She speedily became a leading member of a group of distinguished young mathematicians. She moved to Cambridge to Girton College and since the 1920s she has been accounted a Cambridge mathematical don, all the time a research mathematician, but undertaking other high responsibilities. During World War II she was commandant of a Cambridgeshire detachment of the British Red Cross. Directly after the war the Royal Society began to elect women fellows on the same terms as men.

https://doi.org/10.2307/3620323 Published online by Cambridge University Press

In 1947 Mary Cartwright became the first woman mathematician FRS. Then for close on two decades, from 1949 to 1968, she was Mistress of Girton College. Since retiring from that office she has had a large range of visiting appointments in mathematics in universities throughout Europe and North America.

T. A. A. Broadbent

The Association assuredly did well for itself in electing as President, amongst others, individuals of such outstanding capabilities as the three above. And after serving in that office such persons certainly retain interest in the Association's well-being. But, in order for this well-being to be preserved, there have to be members serving continuously all the time behind the scenes in all its other offices. In the context of this note we think in particular of the editing of publications, such as the *Gazette*, with an example of one who served in both manners.

Thomas Arthur Alan Broadbent (1903-1973) was Editor of the *Gazette* from 1931 to 1955 and President of the Association 1953-54. Venturing on a personal note, I recall that in the 1930s I began receiving notes from Broadbent asking me to write short book reviews. For some years, the only thing I knew about the Association was that it published the *Gazette*. I had never set eyes upon Broadbent. Being then a newcomer to the environment, I had never observed the phenomenon of anyone entering upon any office such as that of Editor so it was natural for me, on finding someone occupying an office, to proceed on the assumption that he had occupied it since time immemorial. So this Broadbent must be elderly. When I did eventually see a man who claimed to be Broadbent I was incredulous since he appeared not much older than I was.

At that time he was the senior lecturer in mathematics in the Royal Naval College at Greenwich. The head of his department was then Professor L. M. Milne-Thomson, the well-known hydrodynamicist and aerodynamicist. In due course Broadbent succeeded Milne-Thomson as Professor and Head of Department, so he was himself a mathematician of consequence in the country.

For me Broadbent as Editor has always first and foremost been a prototype of the unselfish long-serving dedicated individual upon whom any voluntary organization like the Mathematical Association up to his time was entirely dependent for its continuing existence. Nowadays the Assocation has modest office premises and office staff. In Broadbent's day, however, so far as I know, he never had the least secretarial assistance, and all his letters were handwritten in a small neat script*. It seems fair to claim that he and his predecessor set the style and scope that have served so well ever since.

With today's high technology it is quite realistic to suppose that any would-be reader could receive the whole of the present issue of the *Gazette*

* *Editor's Note*: The present editor's letters are handwritten in a large, untidy script. He has some secretarial assistance – from his wife, Barbara.

via a computer screen. Providing acceptable financial arrangements were devised, the same could be done in the case of any future issue of this or any other journal. At first, this might call for no great change in the character of the contents of a particular journal. But such a revolution in the means of information transfer might fairly soon be expected to react upon the nature of the information itself. However any fundamental change would be likely to come as something quite unexpected.

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Bill Richardson studied at the University of Manchester for five years from 1963 during which time he acquired his BSc, MSc and a teaching qualification. He taught at William Hulme's Grammar School in Manchester for five years until, in 1973, he moved to his present post as Principal Teacher of Mathematics at Elgin Academy. When he reached a 'certain age' he began taking Open University courses which led to a BA and (another) MSc. His active phase with the Association began in 1985. Apart from attempting to promote mathematics, his current interests also include duplicate bridge. He is very much looking forward to his year as President, 1996-1997, which he considers to be a great honour.

Mike Dampier received his BA from Cambridge in 1964 and his PhD from London in 1969. He has lectured at Leicester University since 1968, with particular interests in special relativity, the history of mathematics and nineteenth century mathematics journals. He is involved in adult education and Leicestershire Mathematics masterclasses. He joined the Association in 1971 and first contributed to the *Gazette* in 1972. A former President of Leicestershire Branch, he enjoys reading poetry and admits his personal failing is buying too many books.

Mary Bradburn took her BSc in 1938 at Royal Holloway College, moving to Edinburgh for her PhD. She lectured in Dundee and Edinburgh during the war years, returning to teach at Royal Holloway in 1945. She remained there, apart from a year spent at each of Harvard, Melbourne and York, Ontario, until her retirement in 1980. She joined the Association during the fifties and served as Chair of the Finance and General Purposes Committee from 1980 to 1986. She was elected President for 1994-1995.

Rapid braking or rapid breaking?

The procedure involves *Atlantis* manoeuvring between *Mir*, in orbit about 250 miles high, and the Earth and docking from underneath. Both craft are orbiting at about 17 500 mph. Once the shuttle is about 30ft away from docking, it will slow down using thrusters to about 0.1ft per second.

The Times 29 June 1995, sent in anonymously.

https://doi.org/10.2307/3620323 Published online by Cambridge University Press