THOMAS ARTHUR ALAN BROADBENT

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Thomas Arthur Alan Broadbent was born in Consett, Co. Durham on 31 May, 1903, the elder son of George Thomas and Harriet Broadbent. His grandfather was a Methodist minister who died during a three year term of service in Consett, leaving his widow and family to spend the rest of their lives there. Alan attended the local Secondary School and always remembered his mathematics teacher John(ny) Moore with warmest regard. He had a great admiration also for another who taught him in his last years at school, G. W. Caunt a Lecturer at Armstrong College.

In October 1921 he entered St. John's College Cambridge as a Scholar and had a distinguished undergraduate career, taking a First Class in both Parts of the Tripos, with a star in Schedule B, and was awarded the Wrights Prize as well as a Senior Scholarship by his College in 1924. He remained at St. John's for a further two years, and started research under the supervision by J. E. Littlewood. Despite his undoubted ability in mathematics he came to believe that he lacked creativity and since it was not in his character to be satisfied with second-rate research he turned to teaching.

In 1926 he was appointed Assistant Lecturer, and then Lecturer, at the University of Reading, where he remained for nine years (and established Caunt's *Infinitesimal Calculus* as the standard student text book in the department). There he acquired the interests in literature, European history and bibliography which flourished for the rest of his life.

In 1930 he married Nita the sister of a Cambridge friend W. V. D. Hodge, later Professor Sir William Hodge, Master of Pembroke College, and in 1933 their son Dick was born followed by a daughter Frances in 1940.

In 1935 he was appointed Assistant Professor at the Royal Naval College, Greenwich, and on Milne-Thomson's retirement in 1956, he succeeded him as Professor of Mathematics, a position which he held until 1967. He followed Milne-Thomson also in the Gresham Chair of Geometry, the oldest mathematical chair in the country (founded in 1596), and retained this appointment from 1956 to 1968.

Throughout his 32 years of service at Greenwich, Broadbent's teaching was primarily concerned with the mathematics courses for entrants to the Royal Corps of Naval Constructors and he will be remembered with gratitude and affection by generations of Naval Constructors. Outside his academic work he played a full part in the general running of the College and his wise counsel was readily available to his colleagues not only in administrative matters but also on individual personal problems.

Broadbent gave distinguished service both to the London Mathematical Society and to the Mathematical Association. He was elected a member of the Society on 9 November, 1926 and served on the Council from November 1947 to November

1951; in his last year of office on the Council he was elected a Vice-President. In addition he served the Society as an Honorary Auditor for over twenty-five years from 1937 until the end of the 1963 session when professional auditors took over the accounts of the Society. He presented the annual statement of accounts with wholly characteristic urbanity, brevity and wit and no one listening to him could fail to appreciate the subtlety of his mind and his mastery of language.

It was however to the Mathematical Association that his most influential services were given. When W. J. Greenstreet gave up the Editorship of the *Mathematical Gazette* in 1930, the office was held temporarily by E. H. Neville, and then from 1931 onwards Broadbent became the Editor for a quarter of a century during which the name of Broadbent came to be wholly identified with the Journal. G. H. Hardy remarked in 1935 what pleasure he took in reading the *Gazette* now that it was edited by an able mathematician. Broadbent himself in his account of the history and aims of the *Gazette* (Math. Gaz. Vol. XXX, 1946, pp. 186–194) regarded the period 1900–1914 as the *Gazette's* golden age, quoting R. C. Archibald's judgement that during that period the *Gazette* stood without peer among the minor mathematical journals of the world, in no small measure thanks to the numerous reviews, notes and articles contributed by Hardy. But looking back now over the *Gazette's* long life it is impossible to doubt that during his years as Editor Broadbent brought the *Gazette* to a peak of reputation it is unlikely to achieve again, by the sheer professionalism of the production, the quality of the Editorial Notes, the judgement exercised in the selection of the articles and the authority of the reviews, many written by Broadbent himself. Broadbent performed single handed the task that was later undertaken by a team of Editors, and accomplished it all with the deceptive ease of a master of his art. In 1948 he published the three hundredth number which brought together a selection of earlier articles which were as important in their own right as they were in the history of the *Gazette* together with some new material he honoured by including in their company.

In 1953 Broadbent was elected President of the Association and held this high office while continuing as Editor. His Presidential Address, on *Printers' Ink and the Teacher* (Math. Gaz. XXXVIII, 1954, pp. 81–89) happily contrasts the roles of Editor and Teacher and culls from A. E. H. Love's Presidential Address to the London Mathematical Society in 1915 the quotation " an essential element in the equipment of an investigator is a literary education ", and from Harold Nicholson's review of Bertrand Russell's *History of Western Philosophy* the observation that Russell's *History* " was written in the clear English which nowadays only mathematicians seemed able to provide ".

Broadbent's first published paper was *A proof of Hardy's Convergence Theorem* (J. London Math. Soc. 3, 1928, pp. 242–43) in which he presents an elegant new proof of the theorem that if $a_n > 0$, $A_n = a_1 + \ldots + a_n$, $B_n = A_n/n$ and if $\Sigma a_n{}^k$ converges to S then $\Sigma B_n{}^k$, $\Sigma a_n B_n{}^{k-1}$ converge to V, T and $V \leqslant kT/(k-1) \leqslant \{k/(k-1)\}^k S$.

His first *Gazette* article (XV, 1930, pp. 5–11) was also on the subject of infinite series and discusses an early method for the summation of series found in Volume 1

of Hutton's *Tracts*.   Broadbent remarks that Hutton gave in 1780 the value 0·403652 for the sum of the series $1!-2!+3!-$. correcting Euler's result.

Broadbent contributed three Obituary Notices to the *Gazette*.   The first was of Charles Pendlebury (XXVl, pp. 1–2) and is a brief history of the Association as well as a record of the part Pendlebury played in it for half a century. The second was of E. H. Neville (XLVII, pp. 136–139), and concentrates upon Neville's remarkable contribution to the 1922 Geometry Report; the third was of William Hope Jones (XLIX, pp. 258–260) whom he names as the greatest personality in the Association for forty years.

The two papers which show Broadbent's style and breadth of knowledge best are the articles on George Boole (XLVIII, 373–378) and Frances William Newman (LIV, pp. 329–335); the article on Boole is a fine blend of insight into a man's life and an exposition of his work, and that on Frances Newman (the other Newman of the title), is a most lucid and valuable contribution to the history of mathematical analysis, and is Broadbent's most important publication.

Broadbent made many contributions to mathematics which do not appear under his own name. He read Neville's *Elliptic Functions* in manuscript and proof and Neville gladly acknowledged the value of the help he received. When Neville died he entrusted to Broadbent the manuscript of parts of a projected book on elliptic integrals. Broadbent revised and completed the material on structural schemes and published a joint paper under the title *Structural Schemes for Elliptic Integrals* (J. London Math. Soc. 2nd Series. 4, 1971, pp. 284–290).

Broadbent's gift of language and his wide reading were perhaps even better represented in his public lectures than in anything he committed to print, and the fortunate few who heard him speak, for instance, on the mathematics in *Alice in Wonderland* (many years before this became the fashionable topic it is today) will know how brilliantly he constructed and delivered his lectures.

Broadbent suffered a heart-attack while on holiday last summer, but soon appeared to be making an excellent recovery and in a letter dated 16 October he speaks with gratitude of his wife's help in making his enforced idleness endurable. The recovery however was short lived and in the early hours of Saturday, 27 January he suffered a second attack and died very suddenly. He is survived by his wife and two children.