

OBITUARY

H. W. Turnbull, F.R.S.

With the notable exception of the late Sir Edmund Whittaker no one contributed more to giving our Society the status and esteem it possesses in the mathematical world than Herbert Westren Turnbull. He was born at Tettenhall, Staffordshire on 31st August, 1885, his father, W. P. Turnbull, being himself a mathematician of repute and one of Her Majesty's Inspectors of Schools. Turnbull was educated at Sheffield Grammar School and was a Scholar of Trinity College, Cambridge at a time when Herman, Whittaker, Whitehead, Barnes and Hardy were members of the college staff. He was Second Wrangler in 1907 (as was his father in 1864), obtained a First in Part II of the 1908 Tripos and shared a Smith's Prize with G. N. Watson in 1909. After holding teaching posts for short periods at Cambridge and Liverpool Universities, he took up an appointment as lecturer in Hong Kong University, where he became Warden of the Church Missionary Society Hostel. Before going to the Far East he had married Ella Drummond, daughter of Canon H. D. Williamson. Throughout their married life the Turnbulls devoted themselves to using their many talents to aid the less fortunate of this world and it was with great regret that they were obliged for health reasons to relinquish the work in Hong Kong.

On his return to England Turnbull taught at Repton School and then followed his father's footsteps as an Inspector of Schools. In 1919 he was elected Fereday Fellow of St John's College, Oxford. In 1921, Turnbull was appointed to the Regius Chair of Mathematics in St Andrews which had fallen vacant by the death of Sir Peter Redford Scott Lang. It is difficult nowadays to realise how meagre was the mathematical syllabus in St Andrews and indeed in many other British Universities when Turnbull was appointed. In St Andrews at that time the usual degree was an M.A. in Mathematics and Natural Philosophy which involved only a three year course in each of these subjects together with three other first year subjects. Since the first year course in Mathematics was then a repetition of school work little time was left for studying higher Mathematics. In the light of this it is not surprising that in those days the best Honours graduates were encouraged to take a second first degree at Cambridge. Turnbull, however, quickly instituted reforms, extended the Mathematics course to four years and introduced undergraduate courses in higher algebra and other advanced topics. It is difficult to realise today that in the mid-nineteen twenties even the elements of matrix theory were quite unknown to the great majority of British mathematicians. The parallel developments in Edinburgh and St

Andrews introduced these branches of study to British undergraduates for the first time. In Berlin and some other continental universities the situation was very different; nevertheless this was by no means uniformly so as is evidenced by the story that Heisenberg did not recognise the relationship between his quantum mechanical operators and matrices.

When Turnbull gave a lecture on the then novel subject of matrices to the Mathematical Subsection of the Leeds meeting of the British Association in 1927 a questioner, whilst expressing his great pleasure in the interesting talk, complained that the lecturer had forgotten to explain how one found the value of a matrix! Today elementary matrix theory is about to appear in the new A level syllabus for Scottish schools. It is worth pondering on how such a change comes about. A mathematical theory can remain for decades the interest of a few specialists till an enthusiast, in this case Turnbull, comes along and spreads the gospel in colloquia and gatherings of specialists. The next stage is the translation into the vernacular of recondite articles from learned journals, that is to say the publication of a text book comprehensible by undergraduates. Turnbull's *The Theory of Determinants, Matrices and Invariants*, published in 1928, and Turnbull and Aitken's *Introduction to the Theory of Canonical Matrices*, published in 1932, performed this function for the English speaking world. In the course of time it is discovered that the subject is easier than had at first been thought and it eventually works its way down from post-graduate level to pass degree level and eventually to schools. The writer maintains that had Turnbull been an analyst instead of an algebraist, the introduction of matrix theory to schools would have been delayed by at least a decade.

It was Turnbull's enthusiasm and drive which led to the first St Andrews Colloquium of the Edinburgh Mathematical Society in 1926 and its successful successors at four yearly intervals. These were the first gatherings of their kind in the United Kingdom and drew distinguished mathematicians from the world over. Amongst these one might mention G. D. Birkhoff, H. F. Baker, E. T. Whittaker, W. de Sitter and T. Levi Civita. By his innovations Turnbull put St Andrews on the mathematical map and gave the Regius chair a distinction that it had not possessed since it was occupied by James Gregory.

It was under Turnbull's editorship that the second series of the Proceedings of our Society was begun in 1927 and it was largely due to his efforts that the second series became a mathematical journal of repute.

Turnbull's impressive output of papers on the theory of invariants deserves special mention. His interest in this subject never faded. It is true that the subject was considered by some mathematicians as played out just as Turnbull was coming to the height of his powers but it was he who realised that many of the limitations of the accepted theory as expounded by J. H. Grace, Alfred Young and E. B. Elliott were removable in the light of discoveries by E. Study and by R. Weitzenböck. This gave the subject a new lease of life, and in his hands and those of Weitzenböck the theory of invariants remained a vital

subject for another two decades. This subject suited Turnbull particularly well since it gave scope both to his interest in geometry and to his algebraic powers.

His influence on his colleagues and research students was profound and many of them profited greatly from his kindly encouragement and advice. Amongst these one might mention the late Professor J. Williamson, Vaidyanathaswami, W. W. Saddler, P. N. das Gupta, W. Ledermann, T. Scott and A. H. Wallace. The writer is perhaps the most indebted of all.

Throughout his occupancy of the Regius Chair, Turnbull had considerable interest in the lives of mathematicians of the past and it was his custom to widen the horizons of all first year students with his course on the History of Mathematics. This course crystallised into his booklet *The Great Mathematicians* which was published in 1929 and is still a best seller. Though himself an Englishman he became an authority on Scottish mathematicians, in particular on James Gregory and Colin Maclaurin whose correspondence and writings he closely studied. No one who actually watched him decipher the spidery Latin in which John Collins communicated mathematical discoveries to James Gregory could doubt that Turnbull was a master at this work. These researches culminated in the publication of the James Gregory Tercentenary Memorial Volume which Turnbull edited.

Many mathematicians retire to a life of leisure but Turnbull retired in 1950 to edit, on behalf of the Royal Society, *The Correspondence of Isaac Newton*. He devoted enormous energy to this task, combing the libraries of America as well as those of St Andrews, Edinburgh and the British Museum. The first two volumes were published during his lifetime but the third appeared posthumously.

Only brief mention can be made of Turnbull's many other interests, his versatility being indeed uncommon. He said frequently that his interests were the 3 Ms, Mathematics, Music and Mountains but he was a competent cricketer and played an occasional game of golf and tennis. He would sail across St Andrews Bay in what seemed to others a very collapsible canoe. He would swim out to a precipitous rock from the May Island so that he could experience the thrill of climbing it; and he could hold his own with most at chess. Herbert Turnbull was a staunch Christian, and Mrs Turnbull and he gave concrete expression to their beliefs by assisting others, in particular refugees from Hitler's oppression. Furthermore, he frequently proclaimed his faith and on occasion preached in College Chapel.

His taste in music was catholic, ranging from Bach to Debussy, and the recitals, both formal and informal, of piano duets which he gave with Mrs Turnbull were an education to many a student. For some years he acted as organist in College Chapel. He was a President of the Scottish Mountaineering Club and a member of the Alpine Club, and many of his climbs are recorded in the Scottish Mountaineering Club's Handbooks.

In 1952 the University of St Andrews honoured him with the degree of LL.D. but his merits had been already recognised by the Royal Society of

Edinburgh which awarded him the Keith Prize and the Gunning Victoria Jubilee Prize. He was elected a Fellow of the Royal Society in 1932. On his retirement he went to live in the Lake District to enjoy its more congenial climate and to be near the hills.

Some lines extracted from the poem by Robert Fergusson on the death of Turnbull's predecessor, David Gregory, are remarkably apposite:

Now mourn, ye college masters a'!
 And frae your een a tear let fa';
 The skaith ye've met wi's nae that sma'.

The students too, will miss him sair;
 To school them weel his eident care;
 Now they may mourn for ever mair.

In Algebra weel skill'd he was,
 And kent fu' weel Proportion's laws:
 He could mak clear baith B's and A's.

Great 'casion hae we a' to weep,
 And cleed our skins in mourning deep,
 He'll till the resurrection sleep.

Herbert Turnbull died at Grasmere on 4th May, 1961. He is survived by his wife and their son, Derwent, who is an Instructor-Commander in Mathematics in the Royal Navy. A list of his publications is to be found in the Biographical Memoirs of Fellows of the Royal Society, Volume 8 (1962).

D. E. RUTHERFORD.