BOOK REVIEWS

COLLECTED WORKS OF PHILIP HALL

Edited by K. W. GRUENBERG and J. E. ROSEBLADE: 776 pp., £55.00,
ISBN 0 19 853254 7 (Clarendon Press, 1988).

This collection of Philip Hall's works was commissioned by the London Mathematical Society. As well as Hall's own works, the obituary written by J. A. Green, J. E. Roseblade and J. G. Thompson and published in the *Bulletin* [1] is reprinted in it; we begin by quoting the first few lines.

> Philip Hall, formerly Sadleirian Professor of Pure Mathematics in the University of Cambridge, was a mathematician of great influence and distinction. For many years he was the only algebraist working in England. He was pre-eminent as a group theorist and made many fundamental discoveries; the conspicuous growth of interest in group theory this century owes much to him. He was Honorary Secretary from 1938 to 1941 and 1945 to 1948, and President from 1955 to 1957 of the London Mathematical Society, and its De Morgan Medallist and Larmor Prizeman in 1965. He died on 30 December, 1982.

The obituary continues with a biographical sketch of Hall, written by Roseblade, who was closely acquainted with Hall during the later years of his life, and who makes clear the affection and respect felt for this remarkable man by his friends, and particularly by his research students. There are then short appreciations of his mathematical work, divided into three parts and written by Thompson (finite groups), Green (the algebra of partitions) and Roseblade (infinite groups).

Apart from this, no commentaries on his work are given. Hall's published papers are reproduced, in chronological order, just as they originally appeared. The well known and influential Edmonton Notes on Nilpotent Groups appear in print here for the first time, substantially as they first appeared in 1957, but with the incorporation of the revisions due to Learner, Stroud and Hall himself. It is remarkable how much ground Hall is able to cover in the 42 pages of these notes, without losing the clarity for which he was rightly famous, and while maintaining an almost conversational style. As well as the basic facts about central series, topics covered include isolators, basic commutators, Petresco words, rational dimension subgroups, verbal and marginal subgroups, and some basic facts about soluble linear groups and polycyclic groups. Although more encyclopaedic accounts of these matters are available nowadays, these notes have not been superseded as an enjoyable and wide-ranging introduction, as well as providing an object lesson in mathematical style.

No serious attempt will be made here to describe the contents of Hall's group-theoretical publications. As remarked above, a brief account is available in the obituary reprinted in the volume under review. A more substantial account is given in [2]. This book contains a collection of eight survey articles commissioned through the London Mathematical Society for a volume to have been published in honour of Hall's eightieth birthday. They describe the state of knowledge at the time in areas to

which Hall made significant contributions. Most practising group theorists will be familiar with at least some of Hall's papers, if not at first hand, though some of those familiar with his papers on finite p-groups and Hall subgroups may be less well acquainted with those on finitely generated soluble groups or non-strictly simple groups, and conversely. The originals are a pleasure for the reader. One may hazard a guess that many practising group theorists will be surprised to find here two papers on statistics. These were his first two papers, written in 1927 when he was working as research assistant to Karl Pearson in London, though he had already by then carried out unpublished work in group theory. A particular pleasure for the reviewer was to discover a short article, 'What modern algebra is about', written for *Eureka*, the journal of the Cambridge undergraduate mathematical society, in 1940. From these two and a half pages, the undergraduate of the time could pick up a feeling for the history, nature, applications and philosophy of abstract algebra, and the article is just as relevant to the serious undergraduate of today.

One cannot help but remark that this volume of some 775 pages seems remarkably little for the lifetime's output of a man whose influence on algebra was so profound, even accepting the fact that no words were wasted. But a great deal of that influence was disseminated through his lectures, personal contacts and letters, from all of which the reviewer was lucky enough to have extensively benefited. We find here no trace of universal algebra, while P. M. Cohn, in the preface to his book on that subject, acknowledges how much it owes to Hall's 'most lucid and stimulating lectures'. We find only 16 pages on the algebra of partitions, from the Canadian Mathematical Congress at Banff in 1957, to represent the enormous effect he exerted on that area, through the algebra and polynomials that bear his name. The Hall transfer theorem, 'the best result yet proved about the transfer map' [1], is not found here. To that extent, the term 'Collected Works' is something of a misnomer for what is here. It is the best available approximation, and if by association it causes our eyes to fall on papers we have not noticed before, then it fulfils an important function.

The economy and clarity of Hall's style is perhaps summed up by the 'advice of Poincaré' which he quotes in the article in *Eureka* mentioned above: 'Il faut triompher par la pensée et non par la calcul'.

References

1. J. A. GREEN, J. E. ROSEBLADE and J. G. THOMPSON, FRS, Obituary, Philip Hall, *Bull. London Math. Soc.* 16 (1984) 603–626.
2. K. W. GRUENBERG and J. E. ROSEBLADE (eds), *Group Theory. Essays for Philip Hall* (Academic Press, London, 1984).

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PERSPECTIVES ON THE HISTORY OF MATHEMATICAL LOGIC

Edited by T. DRUCKER: 195 pp., DM.128.–, ISBN 0 8176 3444 4 (Birkhäuser, 1991).

Most of the chapters in this book were given as papers in the AMS session on History of Logic in Chicago in 1985. But the material is well organised and has few of the defects of conference proceedings.

Amongst the earlier history, Judy Green deals with the problem of elimination in