Book Reviews

HALCYON DAYS

Rutherford and Boltwood

Letters on Radioactivity. Edited by Lawrence Badash. (Yale Studies in the History of Science and Medicine, No. 4.) Pp. xxii + 378. (Yale University Press: New Haven and London, November 1969.) \$12.50; 112s 6d.

PROFESSOR BADASH of California has prepared for publication and edited the letters that survive between Professor Boltwood, the inorganic chemist, of Yale, and Lord Rutherford in Montreal, Manchester and Cambridge. The correspondence extends from 1904, the year after the disintegration theory of radioactivity had been put forward, to 1927; but most of the letters and all the important ones for science were exchanged in the first ten years. During that period, Rutherford was doing his classical work on the α -particle, relating it to the β and γ -rays, and using it to unlock the secrets of his nuclear atom. Boltwood was discovering ionium and relating it to other members of the uranium series, keeping watchful eyes on thorium and its products, and wondering where actinium came in. By freely discussing by letter what was happening in their laboratories and going on in their minds, these two pioneers helped and encouraged each other very considerably. This book, with its careful editing and with its excellent introduction, gives the hard-worked generation of workers today a glimpse of the early, halcyon days of radioactivity when virgin territory lay open to be conquered.

Rutherford and Boltwood were warm friends and possessors of high spirits. Neither had trace of an inferiority complex. They were writing to each other off the record, "not for publication", and accordingly could unbend in fine style. Both loved honest work. Both loved life. These letters, accordingly, reveal the personalities of the two men in a way that ordinary scientific publication can never do. The chief subjects discussed are, of course, what was going forward in their laboratories, but there are long accounts of holidays, of university gossip and of the give and take of ordinary life. There is naturally some criticism of other workers in their fields and here there is a subtle difference between the two. When Rutherford criticizes another he realizes that even a researcher is one of God's creatures, and so to be pitied rather than censured. Boltwood, on the other hand, though rarely unfair, evidently enjoyed the dig at others. Soddy, he thought, was too aloof and at times pretentious, but it was Sir William Ramsay whom he criticized most. The latter's incursion into radioactivity was regarded as the amateur trying to teach the professional his job and, consequently, "pure cheek". Boltwood's oddest lapse, however, was with Mme Curie. He was annoyed that his own university, Yale, granted her an honorary degree. Clearly this was wrong: "What has she done since 1903?", he kept saying. He must have realized that if the good lady hadn't done something before 1903 on radium there would have been precious little for him to write about in the next two decades on radioactivity.

A word about the editing. Badash has evidently gone to great trouble to be accurate, and to make things plain to the reader when any mysterious reference occurs in a letter, but he has not overdone the annotation. Every worker mentioned in the letters has been identified and a small "Who's Who" is attached to his name. Badash shows some excellent photographs which include those of research workers at Montreal, Manchester and elsewhere, and

has successfully attached names to all the faces. The three radioactive series, the subject of much that is written about, are set out for ready reference in an appendix. Professor Otto Hahn, one of the earliest and greatest workers on the chemical side, has provided a characteristic introduction.

This is an excellent book and one that should be treasured now and in ages to come. A. S. RUSSELL

PEOPLE, NOT IDEAS

Factors in the Transfer of Technology

Edited by William H. Gruber and Donald G. Marquis. Pp. xii + 289. (MIT Press: Massachusetts and London, August 1969.) 117s.

THE rapid growth of expenditure on research and development has been accompanied by the phenomenon of "research into research" and by many books and articles on management of research and development, innovation and the like. Much of this writing has been either wisdom-based (for example, research managers giving their opinions) or case studies of outstanding and possibly untypical innovations. *Factors in the Transfer of Technology* is not just another high priced American book recording the obvious. It is a summary of some of the best research and conceptual analysis in this field.

The book originated in a conference in 1966 on "The Human Factor in the Transfer of Technology", a conference which, like the resulting book, was rather unusual. It is claimed that the views of the participants were changed by the conference and that authors revised their papers afterwards to produce a book which differs in scope from that of the original conference. Books consisting of papers delivered at a conference often suffer from a lack of coherence, but in this publication valiant attempts to provide an overall view have been made by the editors through the inclusion of comments, conclusions and an introduction which describes three models of the process of technology transfer.

The most quoted authors in the book are Donald A. Schon and D. J. de Solla Price. Price's writings on the growth of science are well known, but his paper on the relationship between science and technology which is reprinted in the book should be read by all who still think of technology as applied science. Price presents a study of the structures of publication in science and technology and claims that "the naive picture of technology as applied science simply will not fit all the facts . . . it is quite apparent that most technological advances derive immediately from those that precede them". Both Price and Schon make the point that the transfer of technology is one of agents, not agencies, of the moving of people among establishments rather than of the routing of information through communication systems. Tom Burns (Britain's only representative at the conference) claims that this finding contradicts many governmental and industrial policies which assume that the transfer of ideas is more important than the transfer of people.

Some of the recent American research described in the collected papers is familiar to people in Britain. That Project Hindsight, Roberts's study of entrepreneurial activity originating in MIT, and T. Allen's study of information channels are known about in England, reinforces the conclusion that the transfer of people is important, because people concerned with these studies have visited England. (Allen is currently on loan from MIT to the Manchester Business School.)

This book should be of interest not only to those carrying out "research into research", but also to research managers, people concerned with the allocation of public funds to R and D and anybody who is curious about the way ideas are developing in the United States.

JOHN LANGRISH