

BOOK REVIEWS

Life from Elements

Origins of Life II. Cosmic Evolution, Abundance and Distribution of Biologically Important Elements. Edited by Lynn Margulis. (Proceedings of Second Conference on Origins of Life.) Pp. vii+238. (Gordon and Breach: New York and London, 1972.) £12.30. (Published for the Interdisciplinary Communications Program.)

IN 1965 the Interdisciplinary Communications Program planned five annual conferences on the "Origins of Life". In the event, only four were held before funds were cut off: this volume reports the second of these four conferences, held in 1968 in Princeton. The ICP have been trying to relieve one of the bottlenecks of scientific communication. Exponential growth has vitiated the usefulness of both current scientific literature and attendance at international conferences. There is too much literature to read, there are too many conferences to go to, and there are too many people there when you get to them. The ICP have attempted something new; they have organized really small round-table conferences, limited strictly to twenty-five participants. They have encouraged informal, probing conversation, and they have attempted to bring the benefit of the ensuing cut-and-thrust debate to the scientific world at large by publishing a verbatim version. The success or failure of their attempt rests squarely on the shoulders of the editor, who in this case is again Lynn Margulis. This time she has had a more difficult task. Nine of the participants had also attended the first conference (see *Nature*, 235, 404; 1971), but of the sixteen new recruits, two (Edward Anders and Preston Cloud) did not seem to approve of the proceedings; at any rate they insisted that all their contributions should be deleted. This is much to be regretted, for they are both of them prodigious workers, they have been particularly active in the fields under discussion, and they are both outstanding in any controversy. The volume cannot but be poorer for their defection. Nevertheless, there are still parts that make exciting reading.

The first conference introduced a section on "The Fossil Record" by a short but stimulating debate on the evolution of the atmosphere. The present volume is devoted to an expansion of that debate. The composition of the panel was therefore chosen differently. There were more astronomers and physicists, fewer organic chemists. Not only the Earth's atmosphere was considered, but that of other planets, especially Venus and Mars.

The book is divided into three sections. The first deals with cosmic abundances, and the earlier discussion during this section was dominated by H. S. Brown, H. E. Suess, and A. G. W. Cameron. Brown's exposition of the planetary compositional hierarchy was exciting but it did not give rise to a debate; instead, Cameron introduced a particular model for planetary evolution that led to an unprofitable discussion, and terminated with the conclusion that it is highly improbable that life ever did originate. Subsequently others of the team joined in a more general debate, but as presented, with Anders's contributions deleted, it lacks cohesion. This section of the book is not a success.

The second section is devoted to the evolution of the Earth's atmosphere. This again starts badly, with disjointed fragments resulting from the deletion of Cloud's contributions. But then Margulis comes in with a lucid account of the physiological needs of procaryotes and eucaryotes—a potted version of her own book on the *Origin of Eucaryotic Cells*—and she is followed by H. D. Holland, L. G. Sillen, A. E. Ringwood and D. L. Anderson, who each develop models for different controlling parameters. The discussion is summarized by Carl Sagan. This section forms the most satisfactory part of the book. Indeed, if it could be extracted it would make a fine introduction to a course on the evolution of the atmosphere.

In the third section R. M. Goody, S. I. Rasool and L. D. Kaplan talk about the atmosphere of Venus, and B. C. Murray about that of Mars. There is a lively discussion, with most of the team joining in, but (as one might expect) the debate on Venus seems to

have little relevance to the origin of life, and that on Mars is too inconclusive to excite much interest.

This second conference was meant to make good the deficiencies that became evident during the first. The book is worth reading, but it does not really succeed in its object. Some of the ideas propounded in the first volume may have been wild, but at least they were fun. Heavy documentation does not mix well with off-the-cuff discussion. This book is too much of a compromise.

P. C. SYLVESTER-BRADLEY

Powell's Papers

Selected Papers of Cecil Frank Powell, Nobel Laureate, FRS. Edited by E. H. S. Burhop, W. O. Lock and M. G. K. Menon. With a tribute by Victor F. Weisskopf. Pp. xiii+455. (North-Holland: Amsterdam and London, 1972.) Dfl. 80; \$23.50.

CECIL POWELL, who died suddenly a short time after his retirement from the University of Bristol in 1969, was known to his friends and colleagues in many roles. There was the pioneer of early research on elementary particles, the leader of later research programmes in the same field, the tireless committee chairman and pillar of the university, the senior scientist increasingly concerned with major world problems and using his influence in the search for their solutions, and there was the storyteller with his unrivalled tales of early life.

In this volume we have a collection of papers reflecting these varied roles, presented in accordance with Powell's own high standards of literary and technical perfection. A tribute by V. F. Weisskopf, former Director-General of CERN, is followed by the unfinished autobiography on which Powell was working as retirement approached. The later chapters are reprints of published papers, on his early work in Cambridge and Bristol, especially on the mobility of ions in gases, on the development in Bristol of the photographic emulsion technique for the study of elementary particles, and on the successful exploita-