Natural and Synthetic Polymers: An Introduction. By Henry I. Bolker. Pp. xiv +688. (Dekker: New York, November 1974.) $29.75.

THE great increase in the number and type of synthetic polymers during the 25 years since the publication of K. H. Meyer's book under almost the same title as this one, and the great deal more that we now know about both synthetic and natural polymers, would make it a daunting task for anyone to follow precisely in Meyer's footsteps. Dr Bolker does not attempt to do so. Instead, he maintains wide coverage by making only brief statements about many of the polymers with which he deals, each of which could often be expanded into a whole book in itself; though, with his commendable conciseness, he manages to pack a surprisingly large amount of information into a small space.

His account differs from others I have read in basing the sequence in which the polymers are considered, not upon their chemistry or function, but upon the molecular geometry of their structure, passing from linear through branched to cross-linked architectures and, therefore, from simple to complex. This gives some natural polymers somewhat awkward neighbours but it has a logic about it which is appealing, which leads students gently by the hand (and this is why the book was written), and has a great advantage in bringing together in a unified way matter normally taught separately by 'natural product' chemists, by polymer chemists and by biologists. The upshot is a very readable book.

Linear polymers are dealt with in four chapters of which the longest (and the longest in the book) is the first, dealing with cellulose as the type linear homopolymer upon which polymer chemistry was for so long based. The discussion of branched polymers, also covered in four chapters, includes considerations of heteropolysaccharides and nucleic acids as well as the multitudinous synthetic copolymers. Cross-linked polymers include proteins (and the genetic code) and lignin. For each group of polymers, attention is paid to structure, to properties, to synthesis or biosynthesis, and to the use by man or the function in nature. Each chapter carries its own reference list and many of the great names of polymer science will be found here though the almost completely chemical approach has meant that some of the non-chemists are, sadly, not mentioned.

In the sections covering those aspects about which I know best the book is not up-to-date—the explosion of knowledge of polysaccharide structure during recent years, for instance, is hardly touched upon—but it would be surprising if every part of a book with such wide coverage could be 'stop press'. I personally would have been happier to have had more diagrams of the ball-and-spoke type rather than chemical formulae; they give a better appreciation of the three-dimensional geometry. And some of the diagrams could have been drawn more tidily. These are, however, minor criticisms of a book which skilfully takes students through a complex series of discoveries, which turns a maze into a garden path. It is to be recommended strongly to students not only of polymer chemistry but of physics and biology, and indeed mature scientists in these disciplines might profit from reading it. I have certainly profited myself. **R. D. Preston**

Polymers

Ionic Polymers. (Materials Science Series.) Pp. xii+416. Edited by L. Holliday. (Applied Science: London, 1975.) £14.00.

AFTER reading this book I not only share the editor's view that materials like the inorganic borates, phosphates and silicates should be regarded as polymers of a particular (ionic) type, I feel that the very existence of the book will make it impossible for authors of future texts on polymer chemistry to resist the inclusion of these inorganic compounds in what is clearly their proper context. The text, taken in order, gradually passes from comparatively orthodox—in polymer science terms—discussion of the synthesis and properties of certain predominantly organic macromolecules to descriptions of the sheet-like and three-dimensional structures of the inorganic polymers. I am left with more than a sneaking suspicion that if history had permitted organic polymer chemistry to precede the study of the silicates, the intentional preparation of the latter would have been hailed as a substantial achievement in polymer synthesis.

The eight chapters, taken together, give a pretty comprehensive view of ionomers, from detailed structural studies of the group to their commercial utilisation. The first chapter provides a general discussion, dealing with nomenclature and general properties. After that the text covers ionomers of the thermoplastic and elastomeric types and moves on through a range of materials of increasing ionic content to the longer standing polyelectrolytes and inorganic silicates, and so on. In the middle range, cements and soil-conditioning materials are found together with the metal dicarboxylates, for which the name 'halatopolymers' is coined—are they salts or polymers, or both?

Naturally, the various articles vary in approach but the important thing is the book as a whole: it not only fills a void in the literature of polymers, it also teaches a valuable lesson which should leave its mark on all future contributions. **A. D. Jenkins**

Molecular Behaviour and the Development of Polymeric Materials. Edited by A. Ledwith and A. M. North. Pp. 553. (Chapman and Hall: London, February 1975. Distributed in the USA by Halsted Press.) £12.00.

AT the research level a large proportion of new books consist of collections of review chapters, contributed by different authors. Where such collections are aimed at the specialist in a particular discipline, they are easily judged by the standards of that specialist. The present volume is more difficult to judge, since it has a different motivation, being compiled as a richly deserved tribute to Professor C. E. H. Bawn, on his retirement from the University of Liverpool. The review articles which form the book have been written by friends and former colleagues of Professor Bawn and their only other unifying theme is that they all lie within the boundaries of polymer science. The result is a somewhat heterogeneous book with topics that cover a very wide range of interests.

The 14 chapters comprise three reviews of polymerisation mechanisms, four broad reviews of specific polymer types (polybutadienes, other elastomers, polyolefins and polyurethanes), two reviews on the chemical reactions of polymers and five reviews on the structure and physical properties of polymers. All of the chapters have been written to a high standard and editorial monitoring has been good. I found the chapter by Small, on polyolefins, and the chapter by Ledwith and Sherrington, on polymers as catalysts, especially interesting, the former for its critical discussion of why so few polyolefins are commercially successful and the latter for its treatment of an underdeveloped area of great potential.

This is a book which is unlikely to be read by the specialist looking for new insight into his own discipline. Certainly in those areas where I can claim expertise, there is little which has not already appeared elsewhere. But for those wishing to get a feel for what is going on in a selection of other areas of polymer science this volume will provide much of interest. At the price (which is high but not excessive) few individuals will find enough of sufficiently urgent interest to wish to buy a personal copy but the book can be highly recommended as a library purchase. **N. C. Billingham**