



[Alvin W. Boese Papers.](#)

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#### COMPOSITES

*Composite Materials*. Edited by L. Holliday. Published by Elsevier Publishing Co. Ltd. Pp. xiii + 540.

THE study of composite materials has recently become of great interest to fibre technologists. Fibres are used in many composite materials, including reinforced plastics and some of the new high-performance materials, bonded fibre fabrics and foambacked materials. In addition, the internal structures of fibres are themselves composite materials. By their nature, composite materials are complicated systems; and their understanding and best technological use requires the development of a scientific basis, resting on sound experimental and theoretical work. In the past much of the development has been empirical: the components have been mixed in the simplest way, and the product used for what was at once suitable. A moderate degree of improvement and development into the end-uses has been based largely on trial-and-error.

As the need for a more rational approach has developed, in order to achieve the best technology of fibrous composites, the sound scientific work has at last begun. But anyone starting such work wants to know whether there is any relevant work which has been done by the general theoreticians, whether treatment of other topics can be taken over, and whether there are useful lessons to be learnt from work on other quite different materials. It has been difficult to find this information, scattered as it is in many unlikely and specialised journals and books.

But now Leslie Holliday, director of Shell Chemical's Plastics Laboratory at Carrington, first chairman of the Materials Science Club, and an apostle both of the unity of materials science and of the value of learning lessons from other technologies, has given us an excellent book bringing together a wide variety of information on composite materials. As editor, he has been successful in giving more than the usual degree of unity in a book of 10 chapters, all by different contributors. His own introduction and a chapter by W. D. Briggs of the Engineering School at Cambridge set the scene with discussion of the basic approach to the problems of composite materials.

The remaining chapters take particular composite materials, in turn, describing their structure and physical properties, and then, according to the

state of development of the subject, discussing the relation between structure and properties. Of most *direct* interest to fibre technologists are the chapters on glass fibre systems, on paper, on rubber systems, and on thermoplastic systems, together with parts of the chapters on metals and ceramics dealing with fibre reinforcement. But, really, the whole book is valuable because what we need to do, and can now do effectively, is to search for the lessons to be learnt from other people's work. The wealth of references will give a lead into more detailed treatments of relevant work.

It is churlish to criticise so useful a book; but, wishing to spread the lessons of one's own science and technology, we can regret the absence of an account of textile materials, which in the traditional form are air-fibre composites and in non-woven fabrics are fibre binder systems.

J.W.S.H.

*Thermal analysis of high polymers.*  
*Journal of Polymer Science, Polymer*  
*Symposia, No. 6.* Edited by Bacon Ke.  
Published by John Wiley & Sons Ltd.  
Pp. 214.

THERMAL properties, such as specific heats, latent heats, cooling curves, degradation, conductivity, transitions, and mechanical changes have long been examined in the study of materials. But in the last few years new experimental techniques have been devised, giving more accurate and useful information; and these have been applied to polymers, and to some extent to textile fibres. The most notable new method is differential thermal analysis, a sensitive technique for detecting heat changes as materials are heated up and pass through major phase changes, secondary transitions, crystallisation, chemical degradation and so on. A majority of the papers in this symposium are concerned with this subject. For instance, the opening paper is by Schwenker and Tucearello on *Differential thermal analysis of synthetic fibres*; the second on the linear polyesters used in fibres; and the third on polyurethane elastomers. There are also papers on aspects of thermal behaviour of polypropylene. Among other topics, there are interesting papers on the effect of flame retardants on cellulose, on thermal conductivity, and on the use of torsional braid analysis as a means of studying the effect of temperature on mechanical properties. Altogether the book is a useful collection of information on a topical subject.

J.W.S.H.