completely prevent the chlorination of cyclopentane, 2,3-dimethylbutane, toluene, and ethylbenzene.

These results strongly suggest some sort of interaction or complex formation between the alkoxy radical and olefin,[8] leading to a species which decomposes rather than attacking usually reactive substrates. Why the phenomenon is particularly marked for this alkoxy radical is obscure, but may be related to the relatively large resonance stabilization of the benzyl radical produced in the decomposition.[9] We are investigating these reactions further, but, in the meantime our results indicate not only a striking "solvent effect" in a radical reaction, but also the need for caution in interpreting the results of competitions between reactions 1–3 in studying radical processes.

[8] Small solvent effects in alkoxy radical reactions have been reported previously, cf. ref. 6, also G. L. Russell, *J. Org. Chem.*, **24**, 300 (1959). However, they have been much smaller than that reported here.

[9] Association of a radical with solvent (since it must involve some stabilization of the system) would be expected to favor those subsequent reactions of the radical having the lowest activation energy. Decomposition of *t*-butoxy radicals has an activation energy several kcal. larger than typical hydrogen abstraction. Here, resonance stabilization of the benzyl radical should greatly reduce (or even reverse) this difference.

[10] University Fellow, 1961–2.

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BOOK REVIEWS

Recent Developments in the Chemistry of Natural Phenolic Compounds. Proceedings of the Plant Phenolics Group Symposium. Edited by W. D. OLLIS, Department of Organic Chemistry, University of Bristol. Pergamon Press, Ltd., Headington Hill Hall, Oxford, England. 1961. viii + 237 pp. 16 × 23.5 cm. Price, $12.00

As the title suggests, this volume is the record of a symposium, in this case the Plant Phenolics Group Symposium held in England in April, 1960. It deserves, however, to be considered as a more basic monograph than this implies, partly since no other basic work covering this field of natural products exists and partly since the contributions here have been expanded with the apparent intent of filling this lacuna. It has only been in recent years, with the rising acceptance of their common biogenetic origin from acetate, that the plant phenolics have been considered as a unit, and the Plant Phenolics Group, which offers this symposium, was organized only five years ago. The present volume should go far toward focusing recognition on this large and important field of natural products, previously dealt with only in isolated fragments, and it is accordingly commendable that this symposium represents many of the foremost authorities in the field.

The book is roughly divided into two parts, dealing with biosynthesis and structure determination, respectively. Of the chapters on biosynthesis, those by Grisebach on isoflavone biosynthesis and Hassall and Scott on oxidative coupling and its laboratory simulation represent excellent, thorough coverages of these fields by their most active practitioners, while the editor has provided an exhaustive and lucid survey, generously larded with formulas, of the origin of isoprenoid units attached to phenolic skeleta. The chapters by Rickards on the work of the Manchester school confirming acetate biosynthesis by tracers and by Whalley on biogenetic relationships deduced from structures are, however, unfortunately both cursory and fragmentary; the material of these two chapters deserves to be considered together, as it is complementary, and to be covered with a thoroughness commensurate with its importance since it has several times previously been treated in this same cavalier fashion.

Of three chapters on the structures of tannin compounds, two (by Haworth and Haslam) are only brief summaries of the corresponding lectures with the explanation that the work is awaiting publication; the reader may well question whether they might not reasonably have been included here in full nonetheless.

The remaining chapters deal with recent structure work which reveals several new families of natural compounds. These areas are covered in detail with clarity, although the chapters (on biflavonyls and the "mycinone" antibiotics) by the editor and his Bristol colleagues occasionally suggest more involvement with establishment of priority than facts. Hörhammer and Wagner have surveyed well the interesting new area of C-glycosides while Dreiding has presented an account of the betacyanins, a complex and still but dimly understood class of plant pigments on which surprisingly little chemical work has apparently been done.

On the whole the book is free of error and the format and formulas are clear and readable. Despite the several cavils above, this volume is a very valuable addition to the book shelf of any natural products chemist.

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Solid State Physics. Advances in Research and Applications. Volume 12. Editors, FREDERICK SEITZ, Department of Physics, University of Illinois, Urbana, Illinois, and DAVID TURNBULL, General Electric Research Laboratory, Schenectady, New York. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1961. xv + 459 pp. 16 × 23.5 cm. Price, $16.00.

This is the twelfth volume of a very distinguished series which features key review articles written by top-experts on a wide variety of topics involved in solid state physics. The present issue contains five articles:

I. Group Theory and Crystal Field Theory by C. M. Herzfeld and P. H. Meijer. This article is exceptionally well written. It contains a concise presentation of group theory liberally laced with interesting applications. It will be especially helpful to chemists interested in ligand field theory.

II. Electrical Conductivity of Organic Semiconductors by H. Inokuchi and H. Akamatu. This article summarizes all the information, both theory and experiment, which is not listed as "company secret" on a topic of great interest to both industrial and university chemists. Indeed, there is considerable speculation that semiconductor properties of organic molecules may also play an important role in biochemistry.

III. Hydrothermal Crystal Growth by R. A. Laudise and J. W. Nielsen. The term "hydrothermal" is used to describe reactions taking place at high temperatures and high pressures in the presence of water. Thus, Laudise and Nielsen describe how geophysicists are performing experiments in the laboratory that mother nature carried on in the earth's crust. The unravelling of complicated thermody-