

be given to the outstanding difficulties. Peace-keeping operations in the future will not always be agreed by everyone, and when some members have an objection to a particular operation, it is absurd and impractical to insist that they should be financially responsible for it. Moreover, while from time to time proposals will no doubt be advanced like those recently made for a world centre for medical research or an administrative staff college, which are of dubious merit on professional grounds, it should always be remembered that success in one place or field will lead to demands to use the United Nations and its agencies for others. All countries should be wary of squandering on dubious projects their resources and especially those of the United Nations, but where the effort is worth while, their response should be wholehearted, imaginative and sustained. That is the road to peace.

NATURALLY OCCURRING PHENOLIC COMPOUNDS

Biochemistry of Phenolic Compounds

Edited by J. B. Harborne. Pp. xi+618. (London: Academic Press, Inc. (London), Ltd.; New York: Academic Press, Inc., 1964.) 126s.

BIOCHEMISTRY of *Phenolic Compounds* is a literary symposium which enjoys the advantages, and suffers the defects, of the type. It has been possible to gather together contributions from experts in their respective fields, hailing chiefly from the United States and the United Kingdom, with two Australian authors. But these are of unequal merit, ranging from a rather scrappy and ill-arranged selection of examples to well-ordered short monographs. For this reason the work is unlikely to be read *in toto* by students, though it must prove of the greatest value to research workers in any of the special fields discussed.

Few recent extensions of the organic chemistry and biochemistry of natural products have been more surprising than those recorded in relation to plant phenolics. Perhaps it was too readily assumed that these regions had been rather fully explored and that, in any event, their inhabitants were not particularly interesting. If so, both assumptions were quite incorrect. The variety and significance of phenolic substances is now seen to be great indeed.

This change of attitude is primarily due to the introduction of new techniques, particularly the chromatographic separations, which have injected a new precision into descriptive subjects such as those treated under anthoxanthins and anthocyanins. The results of surveys made with the use of these clearer glasses have given us not only a more accurate idea of composition, but have also provided taxonomic data and helped notably with certain genetic problems.

Chapters of fundamental importance to the worker in the chemistry of natural products are those of Margaret K. Seikel on the isolation and identification of phenolic compounds in biological materials, of J. B. Harborne and N. W. Simmonds on the natural distribution of phenolic aglycones, and of J. B. Harborne on the natural distribution of phenolic glycosides.

The first-mentioned covers the topic from *A* to *Z* and is an admirable account of it. The only useful tip, known to me, and not here mentioned, is the formation of good crystalline derivatives by combination of polyhydric phenols with *N*-methylstrychnine or *N*-methylbrucine.

The two chapters of which the editor is author and part-author are central to the theme, since without them the edifice could not have been constructed. The brilliant

pioneering work of Bate-Smith at Cambridge must be recalled in this connexion. An example among the anthocyanins will serve to show the kind of progress made. Many of these pigments are well-characterized by their properties, including habit of crystallization. This is the case with chrysanthemins and pelargonin, to take two clear examples. But mecocyanin, isolated by Willstätter and Weil (1917) from flowers of *Papaver rhoeas* L., is by no means so well defined. Its discoverers showed that it hydrolyses with formation of cyanidin and two molecules of glucose. When chrysanthemins was synthesized, it became clear that mecocyanin must be a cyanidin 3-bioside, because its colour reactions were as near as possible identical with those of chrysanthemins (cyanidin 3-glucoside). Accordingly in 1934 the 3-cellobioside, maltoside, lactoside and gentiobioside were synthesized. These pigments closely resembled each other but showed slightly different distribution ratios between partially miscible solvents. The gentiobioside and mecocyanin came closest. But later the chromatography of carefully hydrolysed mecocyanin showed that the sugar was sophorose, that is 2-glucosidylglucose instead of the 6-derivative. Sophorose was first isolated in 1940.

The advances in chromatographic technique led at once to their application to genetic problems and, as R. E. Alston shows, the increase of visibility on the road, while clearing the way, has opened up fresh vistas. It cannot, however, be claimed that much progress has been made towards a real understanding of the basis of heredity in these fields. The facts have been clarified and arranged and this is an important preliminary to future generalization.

Useful summaries of what is known are also contained in two chapters on the metabolism of phenolics. This is, however, a part of general biochemistry and it seems somewhat artificial to concentrate on the phenolic group in all cases.

More specific to the subject-matter are the four highly interesting chapters on aspects of the biosynthesis of phenolic substances. The major pathways, recorded by A. C. Neish, are those starting from acetate (malonate), shikimic acid (or both) and the isopentane route. The part played by each is evaluated as the result of application of various experimental methods, of which the most important is the use of isotopic tracers. The general reader as well as the specialist will be fascinated by the tale that is unfolded. S. A. Brown describes the use of these and other methods to elucidate the biosynthesis of tannins and lignin. The work mentioned has not only solved the problem set but also has reflected light on the structure of these important substances themselves.

The final chapters on phenolics in relation to their pharmacology, physiology, pathology, and even taste are doubtless of high interest but look as if they had been added for the sake of completeness.

This compendium, with some faults and many virtues, is primarily of interest to chemists and biochemists and will be a standard work of reference for them for many years to come. Its production reaches the high standard which we have been led to expect from the publishers. There are few errors, the structural formulae being especially clear and accurate. ROBERT ROBINSON

HIGH-PRESSURE PHYSICS

Physics of High Pressures and the Condensed Phase
Edited by A. van Itterbeek. Pp. xv+598. (Amsterdam: North-Holland Publishing Company, 1965.) 140s.

THE growing interest in high-pressure studies has been reflected in recent years in a number of books, but there is no text dealing in such detail with the particular aspect chosen in this collection of articles by different