B. C. Saunders then discusses the stability of the carbon–fluorine bond and gives examples of circumstances when it is in fact cleaved, sometimes very simply; for example, from fluoroacetate by boiling with 30% NaOH. Finally, in the topical subjects of ecology and environmental pollution, J. L. Shupe describes fluoride toxicity in animals resulting from the ingestion of fluoride-contaminated pastures and exposure to industrial pollution.

The book is well produced and does not contain many errors although there are a few minor mistakes in some of the references. Two which must be corrected (p. 70) are those of: Marais [which should be *Onderstepoort, J. Vet. Sci. Anim. Ind.* **20,** 67 (1944)] and Singer and Armstrong [which should be *Anal. Chem.* **26,** 904 (1954)]. Also, the level of fluoroacetate in some of the Australian plants is printed as being as high as 12 500 μg/g of dry tissue when 2500 μg/g is more correct. Again, the view is expressed that most soils contain a few thousands of parts per million of total fluoride and that those in which carbon–fluorine containing plants grow are very rich in fluoride. This is not really so. Whilst some arable soils and clays do contain large amounts of fluoride (occasionally nearly 10 000 μg/g), the range of 200–500 μg/g of air dry material is considered usual and the recently reported analyses of the soils growing twelve species of these toxic tropical plants has revealed the highest total fluorine content to be little more than 200 μg/g and one soil contained as little as 11 μg/g indicating that the plants are true fluorine accumulators [*New Phytologist* **71,** 839, 855 (1972)]. Furthermore, it is generally thought that these particular plants have extroardinarily deep root systems, especially the African Dichapetalaceae, the tap roots of which may be as much as 30 m deep; however, from the work of A. C. Léemann [*Bull. Soc. Bot. Genêve* **29,** 72 (1938)] and A. O. D. Mogg [*S. Afr. J. Sci.* **27,** 368 (1930)], it would seem that in fact the roots normally penetrate the soil to a depth of only approximately 3 m and, exceptionally, to 12 m but they may spread *laterally* 30 m or more. Finally, one other observation worth making is that fluorine has *never* been reported to occur in nature in its free elemental state (as one contributor suggests) and its electronegativeness and reactivity should certainly preclude such a possibility.

The book will be of interest to anyone involved in the biochemical aspects of fluorine, whether in animal or plant physiology, and it is predicted that it will be found in the laboratories of many research workers.

Newcastle-upon-Tyne R. J. HALL

Recent Advances in Phytochemistry, Vol. 4: edited by V. C. RUNECKLES and J. E. WATKIN Appleton–Century–Crofts, New York, 1972. ix + 317 pp. $24.95.

THE VOLUME under review constitutes a collection of lectures given at the Ninth Annual Symposium of The Phytochemical Society of North America in 1969. Collections such as this vary greatly in style and quality and the present one is no exception. The subject of the Symposium was plant phenolics and the content of the Lectures covered simple phenols to lignin, from a chemical, biochemical and physiological angle. The final chapter (by Tom J. Mabry) renders an authoritative and readable account of recent progress in areas of

phytochemical research with a grand finale of his and other views of 'The Shape of Things to Come'.

Aromatic amino acids—phenylalanine, tyrosine, DOPA—as precursors are discussed in Chapter 1, and the exploitation of their metabolic pathways for the synthesis of compounds of known physiological and biochemical significance is considered. The authors (G. H. N. Towers and P. V. Subba Rao) usefully point out many unsolved problems and areas lacking clarification. The chapter dealing with mechanism and molecular structure of L-phenylalanine ammonia-lyase is clear and concise. Chapter 3 (M. H. Zenk and G. G. Gross) handles the reduction of cinnamic acid in fungal systems and in Chapter 4, Harborne reviews comprehensively the major sequences in the evolution of flavonoids and again the question is asked 'do all plants produce these type compounds by identical biosynthetic sequences?'. The article on biosynthesis of furanocoumarins is now obsolescent in the light of the more recent studies of S. A. Brown and D. E. Games and their co-workers.

Van Sumere and co-workers give a very detailed and complete chapter on biochemical studies in relation to the possible germination regulatory role of naturally occurring coumarin and phenolics. The article is well illustrated and data tabulated.

The complex molecule, lignin, is studied in two chapters. In one, consideration of habit, habitat, gravitational-mechanical stress are related to the process of lignification. C. Steelink, using the reactions of the hindered monohydric phenol, has ably reviewed the one electron oxidation that results in coupling, polymerization, disproportionation, quinone formation, etc. He points to the use of ESR as a monitor for these oxidations.

These specialist articles will appeal most to individual research workers, but some of the chapters do not carry complete references in the specific fields. The book is well produced. The structural formulae in the chapters should be standardised. This book should find a place in most libraries. However, the price for value is rather high for the individual.

University College, Dublin DERVILLA M. X. DONNELLY

Pharmacognosy, 10th Edn: by G. E. TREASE and W. C. EVANS, Bailliere Tindall, London, 1972. 795 pp. £6.80.

WHAT CAN one say of the tenth edition of any popular treatise? Obviously the call for a new edition after a lapse of only six years means that this textbook well serves its purpose and must be recommended by many teachers in pharmacognosy. A glance through the present edition, or indeed the previous one, soon indicates why. The authors have set out to expand Professor Trease's original work to give due emphasis to the modern developments in phytochemical techniques and associated subjects which have made pharmacognosy one of the most catholic of all scientific disciplines. Are all these subjects treated adequately within the compass of an 800 page book? I think the answer is a qualified yes. Qualified, because I believe that the one section which is of direct interest to readers of *Phytochemistry*, that on phytochemistry, is out-of-date both in treatment and coverage. This starts in the very first chapter of the section where the 'types of plant constituent' are listed. This looks like something out of a pre-1930 organic text book, and is often misleading or untrue. For