

and he is not going to find this by looking at ref. 40. This becomes particularly confusing in the section dealing with menthone and the menthols. For instance, the structural formulas on p. 79 for menthone and isomenthone are misleading (absolute configurational representations being used for the racemates) since they imply an inversion of the configuration of the methyl rather than the isopropyl group. It would have been much simpler to combine this with a discussion of the absolute configurations of these compounds using the appropriate antipodes, which would demonstrate the stereochemical relationships existing in this class (e.g., (+)-menthone being related to (-)-isomenthone, etc.) and this would also have clarified the situation among the menthols (p. 81); these are ambiguous in the absence of absolute configurational assignments. The sections dealing with the cinenic acid rearrangement (p. 68) and umbellulone (p. 108) would have gained appreciably by inclusion of more recent work by Meinwald and by Eastman.

The sesquiterpenoid chapters are excellent, especially the last one dealing with more recent studies in which all physical methods are employed to their fullest. From a pedagogic viewpoint, this is the type of work that will most effectively stimulate interest on the part of the "non-terpene" chemist: the total synthesis of cedrene, the transannular reactions of caryophyllene, etc. Here again, improved up-to-dateness by only one year would have made quite some difference. The more recent cyclization studies by Eschenmoser, the latest photochemical studies in the santonin series, the complete structure proof and absolute configuration of iresin, the structure of drimenol (by one of Dr. de Mayo's colleagues)—all these and several other pertinent investigations culminated between 1957-1958 and could have been included. Finally, more extensive mention of absolute configurational assignments among sesquiterpenoids would also have been justified, but this is admittedly a matter of opinion. Clearly, a book of this size cannot include everything and the ultimate choice must rest upon the author, who has really done amazingly well in the space of 300 pages.

Volume III attempts to cover the enormous field of di- and triterpenes. The diterpene chapter is rather successful in this respect, most of the deficiencies again being due to the long publication interval. Thus, the most recent studies on dextro- and isodextro-pimaric acids could have been included, the correct structure (CXXII on p. 51) for cafestol (rather than CXXIII on p. 53) appeared in early 1958, the structure of gibberellic acid could have been illustrated and so on. The last omission is unfortunate as well as the lack of any mention of the diterpenoid alkaloids (also absent from Vol. I).

The triterpenes are discussed in three chapters of which the first (largely tetracyclic triterpenes) is the best and also includes a great deal of the recent stereochemical correlations. To this reviewer, the second chapter has been the most disappointing one. As mentioned by de Mayo in the preface, "the *parvenu* triterpenoids (are considered by the student as) really too complex and bizarre to be of interest to any but the specialist." This is an unfortunate state of affairs, which is not greatly changed by this chapter. This criticism applies particularly to the discussion of the β -amyrin class of triterpenes.

All but three pages of this section are occupied with the structure proof and stereochemistry of β -amyrin and oleanolic acid. This is comparable to writing a modern book on steroids and discussing largely cholesterol and cholic acid. Historically, this work is of the utmost importance and represents the basis on which the rest was built. However, in a book of this type which cannot possibly be exhaustive, would it not be preferable to illustrate to the student how the structure of a triterpene would be established in say, 1957, rather than ten years ago? Nowadays, this means largely recognition—by suitably chosen reactions—of the unknown substance's membership in a given class of triterpenes, followed by interrelationship with a known member (e.g., β -amyrin or oleanolic acid). The processes—intellectual as well as experimental—are of extreme interest and de Mayo could have been the perfect author for a personal telling of this fascinating story, since so much of it has been performed by him and other collaborators of Barton. For instance, if the structural portion of β -amyrin chemistry had been relegated to fewer pages, it would have been possible to spend a correspondingly

larger part on illustrating this type of work. Many examples come to mind, but one which encompasses a great deal of interesting chemistry as well as a number of diverse triterpenes could have been the sequence oleanolic acid—echinocystic acid—maniladiol—icterogenin—rehmannic acid—machaeric acid.

The last chapter deals separately with biogenetic relationships, thus emphasizing correctly what may well be the most impressive justification for work in the terpene field. It would be unfair, as well as repetitious, to indicate that the value of this section might have been greater if it had been prepared in September, 1958 (and thus still appearing in early 1959 under a reasonable publication schedule), since the enormous amount of active research in this area will make any book out-dated within a very short period of time. Nevertheless, two subjects might have added to the value of this chapter. One is the structure elucidation of hydroxyhopanone—another prophetic triumph of the biogenetic isoprene rule—and the other, more recent detailed information at the stage of the five-carbon fragment.

The various minor reservations brought out in the above paragraphs should probably not be taken very seriously; they simply illustrate that books of this type cannot satisfy everybody in every respect, largely because they cannot be exhaustive. On the whole, Dr. de Mayo has performed a noble deed and these two books should be bought by many students as well as professors. There is no doubt that they fill an important gap in the chemical literature and they constitute convincing proof that de Mayo has real talent for the king's English—so rare among authors of technical books. One can only hope that many other books will follow from his pen, and in that connection only one piece of advice seems pertinent: the next time, select another publisher or insist on a reasonable publication schedule.

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Structure Reports. Supplementary Volume and Cumulative Index for 1940-1950. Volume 14. General Editor, A. J. C. WILSON; Section Editors, N. C. BAENZIGER and C. S. BARRETT (Metals); J. M. BIJVOET and J. WYART (Inorganic Compounds); and J. MONTEATH ROBERTSON (Organic Compounds). Assistant Editor, O. EISNER. N. V. A. Oosthoek's Uitgevers Mij., Domstraat 1-3, Utrecht, The Netherlands. 1959. viii + 215 pp. 16.5 X 25 cm. Price, \$9.50.

Roughly 75% of this volume represents a cumulative index to Vols. 8-13, "Structure Reports" covering the years 1940-1950. Otherwise, there are some 35 pages of reports to repair omissions for structural investigations dating from this period, and 15 pages of detailed corrigenda to Vols. 8-13. Granting also a thorough job during revision and the result is an index which adds up to substantially more than the sum of the parts earlier published. A report on any particular study should be readily found on the basis of author, of subject, or of pertinent formula. An additional index for organic compounds, grouped according to the number of carbon atoms, provides an unnecessary but highly convenient touch of luxury. For anyone who cannot afford the complete "Structure Reports," the present volume must still seem an attractive investment.

Although virtually indispensable, the "Structure Reports" must often be supplemented by careful examination of the paper(s) abstracted. Doubtless this will always be so when one takes more than cursory interest in the accuracy, method and background material of the structural investigation. It is rare for any gross inconsistency or error in an original paper to be reproduced unchallenged in "Structure Reports." However, in the report on biphenyl (p. 50) it is certainly not true that . . . "The space-group symmetry requires a planar molecule." Presumably what is meant is that the required molecular symmetry, $\bar{1}$, does not allow an assumed planar configuration to be distorted in the most obviously significant fashion, a rotational twist about the bond joining the two phenyl groups.

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