BOOK REVIEWS

THE CHEMISTRY OF PENICILLIN, edited by Hans T. Clarke, John R. Johnson and Sir Robert Robinson. Pp. 1042 and Appendix. Princeton University Press, New Jersey (London: Geoffrey Cumberlege) 1949, £9 9s. 0d.

Many of the successful results achieved by scientific workers during the war are now known to the general public, and many are aware that chemists in this country and the U.S.A. working together under the auspices of the Medical Research Council and the Office of Scientific Research and Development respectively, determined the probable constitution of penicillin but failed to discover a commercial method of synthesising it. Because the results were not of immediate practical value, there may have been a tendency to dismiss them as of little importance and to regard the effort and money spent on this project—and there was a considerable expenditure of both—as having been wasted.

It was, of course, disappointing that no practical synthesis of penicillin was forthcoming and that none of the simple synthetic compounds related to penicillin had therapeutic properties of any value, but it was important to know this in order that due weight might be given to improving the fermentation process for making penicillin and, in fact, a knowledge of the structure of penicillin helped to improve very materially the amount produced by the mould.

The complete results obtained in this collaborative investigation have now been published. During the 2½ years in which nearly 40 teams on both sides of the Atlantic collaborated, about 700 reports, officially classified as secret, were prepared and circulated. Although these served their immediate purpose of informing other workers of the progress made by any particular group, they were not suitable as a permanent record, and, when the time came for the results to be made public, it was decided to correlate the observations of all the groups and present them systematically and in detail in a separate monograph instead of in the scientific journals as originally proposed. The result is this well-produced volume, similar in page size and format to the *Journal of the American Chemical Society*. In each chapter, a description of the results obtained and the conclusions reached is given in ordinary type and is followed by the relevant experimental details in smaller type. The book is equipped with a good index.

The first chapter, containing a brief outline of the chemistry of penicillin, has already been published *verbatim* in *Nature* and *Science*. Of the other 28 chapters, the first three describe the results obtained prior to 1943 when collaboration commenced. The others deal with the chemistry of particular penicillin degradation products or of groups of substances related in one way or another to the penicillin molecule; with the infra-red absorption spectra of penicillin and related substances; with the application of X-ray analysis and other physical methods to the elucidation of chemical structure; with the biosynthesis of the penicillins; with chemical modifications of the penicillin molecule; with methods of assay; and with the various methods used to synthesise penicillin, most of which were so strikingly unsuccessful!

It is important that all concerned with chemical work in the pharmaceutical field should appreciate the uniqueness of this book. It is not a text-book in which existing knowledge is summarised and critically assessed, but a genuine source book containing information not available elsewhere. It has therefore the same status as the journal of a learned society and will

presumably be abstracted in the same way so that its contents may become known to those who have not ready access to the book itself.

"The Chemistry of Penicillin" covers a far wider field than its title implies. Chapters 21, 25 and 26, for example, contain probably most of what is known of the chemistry of oxazoles and oxazolones, thiazolidines and β-lactams, and subsequent work in these fields will doubtless contain many references to what may familiarly become known as *Chem. Pen.* Again, chapters 11 and 12 give an account of a new and extremely important method of determining the disposition of atoms within a complex molecule, that will doubtless be used increasingly in future work, whilst chapter 13 contains much fundamental data on the infra-red absorption spectra of penicillin, its degradation products, related compounds and simpler substances examined for purposes of comparison.

It is impossible in the space available to give more than this brief outline of the volume under review. It is a book that should be added to every scientific library of importance, especially as its price must put it beyond the reach of the individual chemist, and a book that every organic chemist interested in chemotherapy should browse through in order to familiarise himself with its contents: for it contains much unexpected information that may be of value in other fields.

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ABSTRACTS (*Continued from Page* 633)

close agreement, with the possible and inexplicable exception of digoxin tablets. Results differed from those of the cat method by less than 10 per cent. in the majority of the samples. For the whole leaf products the maximum difference was found to be 19·9 per cent. Pigeons were less variable than cats for the assays reported and as a result fewer pigeons are required to meet the present U.S.P. requirement. G. R. K.

Insulin, Potentiation of, by Sulphones. A. B. Macallum. (*Canad. J. Res.*, 1948, **26E**, 232.) Sulphones in trace quantities combined with a diet rich in fresh vegetables were shown to produce in rabbits an increased sensitivity to insulin, both in the rate of fall of blood sugar levels and maintenance of hypoglycæmia. In order to relate the molar concentration of sulphone to the unit value of insulin, 1 ml. of a 0·01 M sulphone solution was used in conjunction with 1 unit of insulin. In the case of less soluble solutions more dilute solutions were used but the volume of the dose increased to keep the amount of sulphone in relation to the amount of insulin constant. The sulphone solutions were injected hypodermically into the side of the animal opposite the site of insulin administration in order to avoid formation of possible insulin-sulphone complexes. In the case of simple sulphones the potentiation did not appear until sulphamide was used, and the maximum effect in this group was attained with phthalyl tauramide. In the case of the sulphonamides the potency was least with sulphanilamide, but increased in the succeeding members of this series (sulphathiazole, sulphaguanidine, sulphadiazine), the last, No. 307, a disulphone under experimental trial, being the most effective. The benzenesulphonic derivatives (ethyl benzenesulphonate, saccharin, benzenesulphonamide) were the most active of all the sulphones investigated. The sensitivity is not contingent on the presence of sulphone compounds, since it may persist for several

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