

physics which, owing to its overwhelming use of mathematics, is a misleading case. He has to confess also that the special nature of mathematical reasoning has to be left reluctantly as an outstanding, unsolved difficulty. We believe, nevertheless, that it is in the light of higher principles and beliefs that mathematics finds its value and ultimate purpose.

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The Natural Sugars

The Carbohydrates. By Dr. E. F. Armstrong and K. F. Armstrong. (Monographs on Biochemistry.) Fifth edition. Pp. vii+252. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1934.) 15s. net.

WITH the publication of the volume under review, the revision of "The Simple Carbohydrates and the Glucosides" is completed. In the present fifth edition of this well-known work, the original material has been divided into two volumes, one of which, "The Glycosides", was published in 1931 and reviewed in these columns in that same year. More fundamental aspects of sugar chemistry are now dealt with in "The Carbohydrates". In the preparation of both parts of this edition, Dr. E. F. Armstrong has had the collaboration of his son—Mr. K. F. Armstrong—whose recent lamentable death in the Tyrol has cut short a career of great promise. We take here this opportunity of offering to his distinguished father and grandfather an all too inadequate expression of our deepest sympathy.

"The Carbohydrates" deals only with the natural sugars and their derivatives; but even with this restriction the field is obviously a wide one, even when, as the authors state in their preface, "we have . . . restricted as much as possible the discussion of intricate structural problems". The reviewer is possibly unduly attracted by these same structural problems; and possibly it is this that leads him to regret somewhat the absence of a fuller historical account of the development of the important structural conceptions introduced by the first-suggested pyranose (amyleno-oxidic) structures advanced in 1923 for xylose and galactose. In view, too, of the prominent part played by the open-chain aldehyde formula in the earlier developments of carbohydrate structure, some more extensive data might have been included concerning the authentic pentamethyl aldehydic hexoses and similar compounds now known. These may, however, be judged minor points. Within the 250 pages of "The Carbohydrates" and within the limits already mentioned, there is presented a very well-

balanced survey of the present position of the sugar group.

During the decade which has elapsed since the appearance of the fourth edition the advances then foreshadowed have become co-ordinated, and the appearance of the new edition is well-timed. Obviously much had to be omitted and the authors have selected well, and in the wide field afforded by the sugars selection is not an easy matter. To quote again the authors' preface, "the sugars have attracted workers of every nationality . . . Emil Fischer would have been well pleased to see that there had been no loss of interest in his favourite theme and satisfied that his own work has stood the test of time". The extensive developments of Fischer's work which have resulted from this international activity may readily be appreciated by comparing the chapter headings of the present edition with those of previous editions of the same work—expansion of old fields and the development of entirely new ones are there very well shown.

"The Carbohydrates" as a whole will be of great interest and service alike to the sugar specialist and to workers in other fields. The biochemist will probably find the last two chapters especially interesting. These cover the relation between configuration and biological behaviour, and the problem of the synthesis of carbohydrates in the plant.

Quantum Mechanics

Elementary Quantum Mechanics. By Dr. R. W. Gurney. Pp. vi+160. (Cambridge: At the University Press, 1934.) 8s. 6d. net.

THERE is now a number of volumes of an introductory character on the new quantum theory, and in reading them one is struck by the diversity in the methods adopted for introducing the beginner to this subject. Some begin with matrix analysis, some with generalised dynamics and others mingle philosophy with physics. This diversity is largely due to the fact that there is, as yet, no accepted formal method of approach, nor has it been decided what previous knowledge is to be assumed on the part of the student of the new developments. The particular method of teaching the subject will vary according to whether stress is to be laid upon its mathematical or experimental aspect. It would appear that many physicists regard the subject as almost exclusively suited to those with a considerable degree of mathematical training and ability. They will be agreeably surprised to find from this volume that it can be easily studied from the experimental physicist's point of view.