

junctions, fusions and substituents to be accurately ciphered and it is to be noted that Dyson numbering of familiar rings differs greatly from conventional numbering. It is impossible here to go further into detail but a few examples may be given. Thus, C₄ is *n*-butane; C₄.C,2 is isopentane; C₄.E,1,3 is 1,3-butadiene (E represents a double bond, attached to the first and third carbon of butane); C₂.Q is ethyl alcohol (Q is oxygen, to avoid confusion with zero); B₆ is naphthalene (two benzene rings, B₆, fused); B₆ZN is pyridine (Z indicates substitution, in this case of one C in benzene by N). Such examples are simple, but complexities soon arise in ciphering structures containing several rings, bridged rings, mixed assemblages of rings and chains and so on, and new rules and conventions have to be devised for these. Among the wonderful ciphers quoted is that for oxytocin, a complex polypeptide, which contains (I counted them) 179 signs and symbols, including full stops and commas, each of which is significant. Deciphering comes to resemble working out a jigsaw puzzle since, with a cipher starting with a number of rings, one has for some time no idea how these are going to be connected in the final structure. Nevertheless, it has been shown that ciphering can be done and the ciphers printed (proof correcting must be a nightmare).

The questions arise, when and how are the ciphers to be used? A few suggestions are made, for example, to use them for differentiating compounds in the major divisions of a formula index. No doubt Dr. Dyson and his colleagues are studying this aspect and will eventually publish their detailed proposals. Ciphering and deciphering will probably be a specialized task in libraries and information centres. The summit of achievement would be an electronic brain to relieve human effort.

E. H. RODD

NEW BIOCHEMISTRY

Annual Review of Biochemistry

Vol. 27. Edited by J. Murray Luck, in association with Frank W. Allen and Gordon Mackinney. Pp. vii+775. (Palo Alto, Calif.: Annual Reviews, Inc., 1958.) 7 dollars.

PROBLEMS that arise from the spate of scientific literature in the world, and in particular in biochemistry, are very real; but at the present time no comprehensive treatment of the problem can be foreseen. Nevertheless the volumes of "Annual Reviews" which appear each year make a sturdy attempt to make a real contribution to the solution of the problem of the digestion of knowledge. As biochemistry draws its pabulum from an ever-widening field of activity the efforts of a reviewer are attended by increasing frustration. The "Annual Review of Biochemistry" is the oldest of the "Annual Reviews" published in California. This twenty-seventh annual volume manages to fashion the torrent of publications in nearly twenty different aspects of the subject into some sort of smooth-flowing stream. Clearly it is not possible to please all the readers all the time, and the specialist can always find material to criticize; but there can be no doubt whatever that the "Annual Review of Biochemistry" is of the greatest importance to biochemists all over the world.

In the present volume, apart from chapters dealing with vitamins, hormones, and the metabolism of

protein, fat, and nucleic acids, there are sections concerned with the "Biochemistry of Viruses" (G. Schramm), "Biochemistry of Cancer" (H. E. Skipper and L. L. Bennett, jun.), "Chemistry and Biochemistry of Antibiotics" (E. B. Chain), "Biochemistry of Fishes" (H. L. A. Tarr), "Metabolic Antagonists" (W. Shrive and C. G. Skinner), "Enzymatic Metabolism of Drugs and other Foreign Compounds" (B. B. Brodie, J. R. Gillette, and B. N. La Du). J. A. Stekol again reviews "Biochemistry in the U.S.S.R."

There is a prefatory chapter, entitled "Impressions of an Organic Chemist in Biochemistry" by Hans T. Clarke, in which the importance of chemistry as a background to biochemistry is particularly emphasized. As an illustration of this thesis one can refer to the review of "Proteolytic Enzymes" by G. H. Dixon, Hans Neurath, and J.-F. Pechère in this volume, which has the conciseness and clarity that one expects from Dr. Neurath and his colleagues. The fact that one is now able to illustrate the activation of trypsinogen and chymotrypsinogen in terms of chemical structures, and can formulate processes which occur at the active centre of proteolytic enzymes by reactions of a chemical type, well illustrates the advances in this aspect of biochemistry. On the other hand, the discussion of "Newer Developments in Relation to Protein Biosynthesis" by H. Chantrenne is one that is at the heart of the dynamic aspects of biochemistry and as yet contains little that can be formulated in purely chemical terms. At heart a biological subject, biochemistry can snatch from the rapidly moving stream of life, systems, bits of tissue, organelles and subcellular particles of all sorts which in their behaviour seem initially to be far from the sort of chemistry that can be discussed in terms of known processes. But the biochemist reduces to manageable proportions the number of the uncontrolled features of the system, and although the processes which ultimately emerge for analysis may be complex they can be treated in terms of chemical reactions. To many, however, the most exciting part of the line of development lies in the early stages. But whichever stage of development is the primary interest of the reader, he will find much to take his attention in this volume of the "Annual Review of Biochemistry".

F. G. YOUNG

FURTHER ADVANCES IN ENZYMOLOGY

Advances in Enzymology and Related Subjects of Biochemistry

Vol. 20. Edited by F. F. Nord. Pp. vii+488. (New York: Interscience Publishers, Inc.; London: Interscience Publishers, Ltd., 1958.) 12.50 dollars.

ANOTHER excellent volume of "Advances in Enzymology" contains articles by biochemists from Australia, the United States, Britain, the U.S.S.R., The Netherlands, Sweden and Switzerland; fourteen enzymes are reviewed in some detail, and a number of general topics are also discussed.

There are two reviews on single enzymes by workers who have been personally responsible for much of the recent research described: by Prof. H. Theorell on "Liver Alcohol Dehydrogenase", and by Dr. A. Gottschalk on "Neuraminidase". The first describes some recent kinetic studies, particularly those using fluorimetry, a technique which is critically discussed