

considerations underlying manufacturing processes are generally well treated, due attention being paid to physicochemical, thermochemical and thermodynamic relations—in many instances ably illustrated by appropriate diagrams.

There is much in these important volumes that the reviewer has not examined in detail, but even a cursory glance would reveal one outstanding defect—and it is indeed a serious one—a complete absence of documentation: there is not even a brief bibliography at the end of any chapter. Throughout these three thousand pages, though the names of investigators and of those prominent in chemical research and technology are mentioned in their appropriate places and with dates in many instances, chapter by chapter, nowhere is there a reference to any of their published papers or patents. It is hoped that the author may remedy this defect in any future edition. The addition of an author index would also be welcome: it might serve, during its compilation, to ensure more care in the spelling of proper names: some place names and authors' names, notably British and some American ones, are mis-spelled.

The volumes are copiously illustrated by nearly six hundred clear line-drawings, amply and carefully lettered, which greatly facilitate the reading of the text. It is a pleasure to record how well the volumes are printed and bound; despite the fact that the price to British readers will seem very high, the amount of matter available is of great value, though there is little information about developments of date later than 1947.

H. M. LANGTON

EMBRYOLOGY AND EVOLUTION

Embryos and Ancestors

By G. R. de Beer. (Monographs on Animal Biology.) Revised edition. Pp. xii+160. (Oxford: Clarendon Press; London: Oxford University Press, 1951.) 15s. net.

OTHER than standard texts, there are few biological books that have enjoyed so long and fruitful a life as Dr. G. R. de Beer's "Embryos and Ancestors". It first appeared in 1930 under the title of "Embryology and Evolution", and ten years later, in expanded form, under its new title. The present volume is thus the third embellishment of Dr. de Beer's theme—that variation in the order and rate of appearance of structures in successive ontogenies (heterochrony) can have a considerable influence on phylogeny. Some new passages have been added to the original fifteen chapters of the book, and a smaller number of old ones deleted. There are four new chapters, of which the first three (on the evolution of the coelenterates, on embryology and taxonomy, and on embryology and homology) are based on articles which Dr. de Beer has already published. The fourth, on the germ layers, is new.

Dr. de Beer cautions his reader that "it is characteristic of a slogan that it tends to be accepted uncritically and to die hard". Hence, he writes, schoolboys still incorrectly learn that during its life-history an animal "climbs up its family tree". His argument with the recapitulationists is, however, on a narrow issue; and, in his view, there would be no reason to disagree with them if only they "would abandon the assertion that that which is repeated is always the adult condition". Aware, therefore, that small matters can become the cause of much misunder-

standing, he points out in his preface that, when he writes that pædomorphosis (by which he means the appearance or retention, in the adult stage of the ontogeny of a 'descendant', of a structure characteristic of the young stage of an ancestral animal) "has resulted in this, that, or the other", he is merely saving time and space—and not implying the operation of some peculiar process. Schoolboys and their masters do not, however, always read prefaces. There is, therefore, a danger that the view that major evolutionary changes are due to the operation of something called pædomorphosis, a thesis which Dr. de Beer expounds, may, in spite of his warning, also become a new slogan.

Nevertheless, this book will continue to serve the very useful purpose of introducing the student to an argument that not only has a long history but also practically a vocabulary of its own. Dr. de Beer writes with imagination, and what he provides launches the reader into an interesting and exciting field of biological thought.

S. ZUCKERMAN

ANALYSIS BY DIFFUSION

Microdiffusion Analysis and Volumetric Error

By Prof. Edward J. Conway. Third revised edition. Pp. xxiv+391. (London: Crosby Lockwood and Son, Ltd., 1950.) 25s. net.

CONWAY'S influence on analytical chemistry has been twofold; it is a matter of temperament which one considers the more important. To some, in whose breasts the craft spirit still flutters, Conway's applications of his own elegant concept of micro-titration in the Conway unit with the Conway burette are a permanent source of pleasure, whether in using or even in just contemplating them. The methods of micro-diffusion analysis have had, and are still having, a widening application; the main, if not the only, limitation to their usefulness is that the analysand must take part in the production of a diffusible compound that can be absorbed by a reagent in a closed system and that the change resulting from this absorption can be accurately measured. Examples of reactive substances measured in the Conway diffusion unit are ammonia, from Kjeldahl digestion or urea hydrolysis, alcohol in blood, carbon dioxide from sugar fermentation or carbonates and bicarbonates in body fluids, and a number of other substances not easily to be separated or isolated in small amounts with the precision required especially in biochemical analysis.

This third edition of what has now become an essential part of most analysts' libraries includes a number of new applications, for estimating carbon monoxide, lactic, acetic or other volatile fatty acids and chloroform in blood, as well as a modification of Winnick's method for alcohol in blood.

In spite of the combined æsthetic and practical appeals of the method, it has still not replaced all others for certain analyses in which its advantages seem overwhelming. Thus its use for routine estimations of urea, especially in places where potent vegetable sources of urease are easily available, make all other procedures deserve to become obsolete: it is at least as precise and as accurate as the best of them and is much less demanding of labour, that is, of time and attention. Yet only recently a biochemical journal published still another version of a micro-