

several spheres and with matured authority, to lay down the law for ordinary men and women.

C. D. DARLINGTON.

VERERBUNGSLEHRE : Methoden und Resultate. By Arne Müntzing. Translated by D. V. Wettstein. Stuttgart : Gustav Fischer Verlag. 1958. Pp. xi+303. DM 42.

Professor Müntzing's Swedish work of 1953 has now been translated into German. As a text-book it is calculated to serve the purposes of university teaching. It is arranged in twenty-seven chapters. It covers a wide range of problems and reveals a great breadth of experience.

The method of treatment is historical and practical rather than theoretical and the result has advantages for the student who is beginning. It also has advantages for teachers who find theory difficult. It does, however, lead to some lack of connectedness. For example, continuous variation is a problem connected with many aspects of biology. Müntzing considers the views of Nilsson-Ehle and Mather on it in one place (p. 73), those of Baur in another place (p. 128) and those of Darwin in various places. And the different considerations are not connected. Nor, of course, are they entirely consistent.

Some disconnectedness also appears in the discussion of inbreeding. One old story told here ought not to be repeated any longer. Müntzing says that Cleopatra was the result of repeated ("wiederholter") brother-sister mating (p. 170). This implies in genetics successive matings with cumulative effect. The Ptolemies, however, or so it is believed, had incest only in alternate generations and the effect, therefore, was not cumulative. It would, however, be more important to explain to the reader the general breeding systems of man rather than to refer to such exceptions. For man (as it now appears) is genetically the most significant of all animals and the results of his breeding are continually before our eyes.

Connectedness is one of the gifts of genetics to biology. Providing a framework and a method is another. In this book we are told (p. 116) that Renner in 1917 has *proved* (bewiesen) that the hybrid species of *Cenothera* were complex heterozygotes. But this kind of statement misses the opportunity of helping the reader to understand scientific method in genetics. What Renner did was to propose a hypothesis, to invent a name for it and to advance evidence in favour of it. All this prodigiously advanced our understanding of genetics. But it did not precisely prove anything. The distinctions between these processes are the most important we learn from the study of genetics. They are the reasons why some kinds of biologists find genetics interesting, others find it difficult, and others again merely useful.

There is one respect in which the author does too little justice to his own book. The illustrations are numerous and many of them are valuable. It is from them that the reader will wish to turn to the original papers, sometimes to extend his study, sometimes to correct it. But there is no means of doing so. The origins quoted are often second hand and never fully stated. Some like Karper (fig. 21) and Böhnert (fig. 119) seem to be *nomina nuda*. This is unfair to the original author as well as the reader. And when percentages do not add up to a hundred (fig. 93) or when magnifications are said to be the same which cannot be the same (fig. 126i) the result disturbs the serious reader.

There are, not one way, but a great variety of ways of writing a book on

genetics that will serve a useful purpose. Although the present work seems to have some shortcomings it will meet a need in a German translation, as indeed it might well do in an English translation also. C. D. D.

GENETISCHES UND CYTOGENETISCHES WÖRTERBUCH. Second Edition. By R. Rieger and A. Michaelis. Berlin : Springer-Verlag. 1958. Pp. 648. DM 49.60.

A dictionary may be designed for the expert or for the student. This work, however, is an encyclopædia rather than a dictionary and will be useful for all stages of study. It is comprehensive and impartial rather than selective and discriminating. This means that there is a great deal of matter of merely historic interest. But as the history of genetics becomes of greater importance the use will increase. It is already worth knowing that Wallace invented "Darwinism" and Punnett "Mendelism".

The English equivalents of the German terms are usually given but of course the reciprocal is not true. English-speaking students who expect variegation in plants to be mentioned under "variegation" will be disappointed. Again some German words, like "Prävalenz" have never been translated into English since their use is pre-empted by other meanings. It may well be, therefore, that only an English translation of this book could reap the full reward of the work. It is indeed time that something on this level was attempted in English.

The 149 diagrams are mostly clear and helpful, although fig. 26*b* seems to be wrong, and fig. 136 doubtful. No doubt the authors will be grateful for correspondents who point out the omissions or correct the few misspellings, post-datings and other mutations which occur among their 1500 references. Altogether they are to be thanked for their devoted labours.

C. D. D.

NATÜRLICHE UND KÜNSTLICHE ERBÄNDERUNGEN : Probleme der Mutationsforschung. By Hans Marquardt. Hamburg : Rowohlt. 1957. Pp. 177. DM 1.90.

This is an attempt to popularise genetics and its use in understanding natural and induced mutation. The attempt is praiseworthy but the author has not understood certain needs of popularisation.

Fig. 29*a* provides an example of Dr Marquardt's method. It is a diagram, not a very clear diagram, introducing breakage and reunion of chromosomes. It represents not two breaks, however, but three. It shows a broken terminal segment becoming an intercalary segment. But this is something which is not supposed to happen after breakage. And the author describes the process in a compound sentence of seven lines.

Dr Marquardt's text seems to include much that is unnecessary to the argument. It also leaves out the large questions of population genetics, cell physiology and gene evolution without which no conclusion can be drawn.

C. D. D.

EVOLUTION OF GENETIC SYSTEMS. Second Edition. By C. D. Darlington. Edinburgh : Oliver and Boyd. 1958. Pp. 265+xii. 21s.

In his preface the author tells us that "This book was first intended to show how helpful genetics could be to other sciences, and also how helpful other sciences could be to genetics. Whether or not the argument was justified the book has proved to be of use in introducing the subject to beginners. I have therefore brought it up to date in a new edition." In so introducing the new edition, Professor Darlington is over-modest. True,