

## REVIEWS

**MORPHOGENESIS.** An Essay on Development. J. T. Bonner. 1952 London : Oxford Univ. Press. Princeton, New Jersey : Univ. Press. Pp. i-vi+291. Price \$5.00.

This is a much-needed philosophic discussion of development in plants and animals. It is delightfully written and well illustrated (although not well indexed). It contains, however, an unresolved conflict between the ideas the author began with and those he reached at the end. Dr Bonner is governed by the classical points of view of embryology. But he asserts at the beginning a wise rule that large results must be explained in terms of small causes. The classical point of view he has thought out widely and well but he has not made the fresh start that he sees the need of making with the small causes within the cell and the nucleus. He does not, for example, seem to grasp the meaning of the interlocking events in the cleavage of the *Ascaris* egg. Nor does he realise that the pollen grain and the embryo-sac are developmentally the most significant and accessible parts of the plant. No writer in this field is better qualified to make use of such knowledge and it is to be hoped that Dr Bonner will continue to develop his ideas, and on an even deeper foundation. C. D. D.

**HETEROSIS.** Ed. J. W. Gowen. Iowa State College Press, Ames. 1952. Pp. 552.+ix Price \$5.75.

This volume comprises the thirty papers given during a five week conference on Heterosis held at the Iowa State College in the summer of 1950. As the preface points out, the State of Iowa has a direct and vested interest in heterosis, for its economy is based on hybrid corn. The conference was therefore organised with the aims of analysing the means by which this phenomenally successful development has been achieved, of considering the genetical systems on which it is based, and of exploring the possibilities of the future.

The organisers of the conference approached their task in no narrow spirit. The list of contributors does not merely call a roll of eminent maize breeders, but also includes many who are concerned with the understanding and use of heterosis in other species both domesticated and wild, and with the physiological, cytological and biochemical, as well as with the more formally genetical aspects of the problems. Some of the papers may seem to have little direct bearing on heterosis, but we can be grateful that they are included for they record work, such as that of Rhoades on peculiarities of chromosome behaviour leading to preferential segregation, which have a great interest in their own right.

Comment on each of the papers would be so demanding of space as to be out of the question, and to pick out for detailed discussion a few from the wealth that is offered to us would be invidious. The subject is approached from all points of view. The historical introduction by Zirkle, and Shull's own account of his early observations and experiments can hardly fail to be read with interest by anyone who seeks to learn the background of genetics as well as of plant breeding. Gene action is covered by several papers including an unusual and interesting discussion of seed development by Brink. Anderson and Brown, and P. Mangelsdorf consider the part played by hybridisation in the history of maize ; Irwin deals with