

As the book is written from a religious point of view, it may be well to add two, more theological, criticisms: Dr. Clark nowhere seems to realize that creation, if "the ever-working God" and not "a master-magician" is the Creator, must be a process and not an act and that the study of evolution is the study of that process; nor does he explain how if, as he perpetually insists, the universe is subject to a law of disorder, it can be the creation of a God who is both orderly and loving.

C. E. RAVEN

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BEGINNINGS OF DEVELOPMENT IN THE EMBRYO

Recherches sur le déterminisme de la symétrie bilatérale dans l'œuf des amphibiens

Par Prof. P. AnceI et P. Vintemberger. (Bulletin biologique de France et de Belgique, Supplément 31.) Pp. iii+182+4 plates. (Paris: Laboratoire d'évolution des êtres organisés, 1948.) n.p.

THE determination of the plane of bilateral symmetry is one of the most important events in embryonic development, since it sets the framework of that essential cytoplasmic heterogeneity which alone makes it possible for one and the same genotype to control the differentiation of many types of tissue. In some eggs (of which insects provide clear-cut examples), the bilateral structure is built into the ovum during its maturation within the ovary. In others, among them apparently all vertebrate ova, bilaterality does not become visible until after fertilization, and much research has naturally been directed to discovering the factors to which it is due. The Amphibia have, here as in so much of experimental embryology, provided the most favourable material for study. A long series of observations and experiments on this group by Prof. P. AnceI and P. Vintemberger, which have now been brought together in book form, seems to go far towards providing at least an interim conclusion, which may last some time before it is superseded.

The main technical innovation which the authors have made is the use of small localized electrolytic marks on the egg cortex. By the observation of the movements of such marks, they have shown that the appearance of a visibly bilateral structure (signalized by the formation of a 'grey crescent') is always preceded by a rotation of the cortex, particularly of the upper pigmented region, around a horizontal axis. This so-called 'rotation of fecundation' is so directed that the side towards which the pigmented cap moves becomes the ventral side. The axis of the rotation, and its direction, is affected not by one but by a series of pre-conditioning factors, the most important of which are the position of entry of the spermatozoon, the inclination of the egg if any, the direction of the 'rotation of orientation' which occurs soon after fertilization, and the compression of the egg. These co-operate to produce a preliminary concentration of pigmented cortex on the ventral side, which becomes accentuated when the 'rotation of fecundation' occurs.

Such a point of view clears up many of the divergences of opinion which have been a feature of the previous literature on the subject, and the two authors are able to support it with the evidence of a large body of new relevant experiments.

C. H. WADDINGTON

A TEXT-BOOK OF FERMENTATION

Micro-Organisms and Fermentation

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By the late Alfred Jørgensen. Rewritten by Albert Hansen. Pp. 551+23 plates. (London: Charles Griffin and Co., Ltd., 1948.) 60s. net.

IN preparing a new fifteenth edition in English of the late Alfred Jørgensen's famous text-book on fermentation, the present director of Jørgensen's Laboratory in Copenhagen chose wisely to rewrite the work. By so doing, new facts have been incorporated, and the work, viewed as a whole, reflects modern ideas. However, the plan of the book is still that of Jørgensen and follows that of the 1939 edition with only minor changes.

The early chapters are devoted to general microbiology. The chapters are of exceptional value in that they meet a specific need of the fermentologist, namely, a groundwork of the subject written from his own particular point of view. The main substance of the book is dealt with in three succeeding chapters devoted respectively to moulds, yeasts and yeast-like organisms, and bacteria. Each of these groups is discussed in general, and detailed descriptions are given of individual species, studied both as species and from the point of view of their technological importance. The chapter on the yeasts has been brought up to date with an account of yeast genetics, as elucidated by Winge and also by Lindgren. Consideration is given to both top and bottom varieties of brewer's yeasts, to wine yeasts, wild yeasts and yeast-like fungi. An important section is devoted to the practical employment of yeasts in the brewing, wine and pressed-yeast industries.

Of the bacteria, the acetic and lactic acid organisms are treated in considerable detail, both in relation to their industrial use and also in their capacity as undesirable contaminants. It is to be noted that, in referring to the lactic acid bacteria, Orla-Jensen's nomenclature is used, rather than that given in Bergey's "Manual". Shorter sections are devoted to the propionic acid bacteria, *Micrococcus* and *Sarcina*, the *coli-aerogenes* group, the aerobic putrefiers and the spore-formers, in so far as these organisms interest the fermentologist. A new section on tobacco fermentation has been added. This chapter is of no less value to the microbiologist dealing with dairy products than it is to the brewer of beer, wine or vinegar.

This volume was "... prepared with a special view to the teaching of Fermentology and technical Bacteriology at the Alfred Jørgensen Laboratory ...", so that British fermentologists interested in top fermentation brewing may find an emphasis on the bottom-fermentation process. Perhaps, also, more consideration of the work of J. L. Shimwell on the systematization of the bacteriology of brewing would have been welcomed from similar quarters. One omission of a different nature is also noticeable, namely, that no space is given to the large-scale production of antibiotics by moulds.

These criticisms can, however, detract but little from the merit of this unique text-book, which will be indispensable to the student and teacher of fermentology, to the microbiologist in industry, to the mycologist and general bacteriologist alike. A final word of praise is due in recognition of the high quality of book production manifest in this volume, which is excellently printed on good paper and handsomely bound.

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