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1898

PREFACE.



I N course of the preparation of critical summaries, such as the articles "Reproduction" or "Sex," contributed by one of us to the "Encyclopædia Britannica," or the account of recent progress annually prepared for the *Zoological Record* by the other, we have not only naturally accumulated considerable material towards a general theory of the subject, but have come to take up an altered and unconventional view upon the general questions of biology, particularly upon that of the factors of organic evolution. Hence this little book has the difficult task of inviting the criticism of the biological student, although primarily addressing itself to the general reader or beginner. The specialist therefore must not expect exhaustiveness, despite a good deal of small type and bibliography, over which other readers (for whose sakes technicalities have also been kept down as much as possible) may lightly skim.

Our central thesis has been, in the first place, to present an outline of the main processes for the continuance of organic life with such unity as our present knowledge renders possible; and in the second, to point the way towards the interpretation of these processes in those ultimate biological terms which physiologists are already reaching as regards the functions of individual life,—those of the constructive and destructive changes (anabolism and katabolism) of living matter or protoplasm.

But while Books I. and II. are thus the more important, and such chapters as "Hermaphroditism," "Parthenogenesis," "Alternation of Generations," have only a subordinate and comparatively technical interest, it will be seen that our theme raises nearly all the burning questions of biology. Hence, for instance, a running discussion and criticism of the speculative views of Professor Weismann, to which their very recent introduction to English readers* has awakened so wide an interest. At once of less technical difficulty, and in some respects even wider issues, is the discussion of Mr Darwin's theory of sexual selection, reopened by the other leading contribution to the year's biological literature which we owe to Mr Alfred Russel Wallace.† Besides entering this controversy at the outset of the volume, we have in the sequel attempted to show that the view taken of the processes concerned with the maintenance of the species leads necessarily to a profound alteration of our views regarding its origin, although the vast problems thus raised necessarily remain open for fuller separate treatment. It is right, however, to say that the restatement of the theory of organic evolution, for which we here seek to prepare (that not of indefinite but definite variation, with progress and survival essentially through the subordination of individual struggle and development to species-maintaining ends), leads us frankly to face the responsibility of thus popularising a field of natural knowledge from which there are so many superficial reasons to shrink, and which knowledge and ignorance so commonly conspire to veil. For if not only the utmost degeneracy be manifestly connected with the continuance of organic species, but also the highest progress and blossoming of life in all its forms, of man or beast or flower, it becomes the first practical

* "Heredity." Oxford, 1889.

† "Darwinism." Lond. 1889.

application of biological science not only to investigate and map out these two paths of organic progress, but to illuminate them. Hence we have attempted to indicate the application of the general organic survey, which has been our main theme, to such questions as those of human population and progress, although here, more even than elsewhere, our treatment can be at best only suggestive, not exhaustive. While limits of space have made it impossible to give the botanical side of our subject its proportionate share of attention, our illustrations of the essential facts are sufficient to show the parallelism of the reproductive processes throughout nature.

It remains to express our thanks to Professor F. Jeffrey Bell for some valuable suggestions while the work was passing through the press; to Mr G. F. Scott-Elliot for assistance in summarising certain portions of the literature; and to our engravers, Messrs Harry S. Percy, F. V. M'Combie, and G. A. Morison, especially to the first-named, who has executed the great majority of our illustrations with much care and skill.

PATRICK GEDDES.
J. ARTHUR THOMSON.

ERRATUM.

On page 146, instead of present title of figure, read:—
“The Process of Fertilisation.—After Boveri.”

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