

# ESSAYS UPON HEREDITY

AND KINDRED

## BIOLOGICAL PROBLEMS

BY

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## AUTHOR'S PREFACE TO SECOND VOLUME

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THE four essays which constitute this Second Volume supplement those of the First, by bringing forward new facts to support the earlier ideas, and by improving and completing the latter on the basis of the most recent discoveries.

The first two essays afford further support to the arguments in favour of the non-transmission of acquired characters, inasmuch as they attempt to prove that these arguments hold in certain cases which at first sight appear to refute them. The diminution of parts which are no longer used has been explained in an earlier essay as the result of the cessation of natural selection, i. e. of panmixia. The conception that every part of the organism is maintained at the level it has reached only by means of the continued activity of natural selection, and that any intermission of this activity leads to a gradual diminution, has passed through many minds. Darwin himself appears to have held this idea, and Romanes, and especially Seidlitz, have more or less clearly expressed it. But the thought first attained its full significance when we arrived at the definite conclusion that the Lamarckian principle of modification had no real existence, because acquired characters, and hence the decrease which organs suffer by disuse, are not inherited. Thus every explanation of the existence of disused parts in a rudimentary state fails, except panmixia; and the conclusion was unavoidable that the countless characters which enter into our conception of a species can only be maintained at their present level by the ceaseless activity of natural selection.

The Second Essay is concerned with the problem as to the origin of those higher mental powers of civilized races which have played no part in the struggle for existence, and the high cultivation of which has been entirely independent of natural selection. I have chosen the art of music as an example, because it presents so deceptive an appearance of improvement by the inheritance of the results of practice from one generation to another.

The Third Essay is an answer to the numerous objections which Prof. Vines of Oxford has advanced against many of my views. The reader of the First Volume will perhaps welcome it, as it elucidates some points upon which I have been frequently misunderstood.

The Fourth and last Essay is not only the longest, but the one to which I attach the chief importance, because my views as to the essential meaning of so-called sexual reproduction, and the allied process of conjugation in unicellular organisms reach their final form in it, having been reconstructed on the basis of various new discoveries. I believe that I have solved, at any rate as regards the main points, the problem of the enigmatical double extrusion of polar bodies from the animal egg, and have explained why only a single division of the nuclear substance does not take place. I hope, furthermore, that I have thus confirmed my views upon the general significance of so-called sexual reproduction,—as a means for producing hereditary individual variations, and for arranging these variations in ever fresh combinations.

My hypotheses have been at times severely handled when shown to be incorrect by the discovery of new facts,—even when these latter were themselves founded on my views. I freely admit that I have made many mistakes ;—my explanation of the formation of polar bodies by the egg was at first wrong, then only partially right, and claims to be correct only in the concluding essay. Let who will reproach me : I am not ashamed of this error ; on the contrary, I regard it with a certain satisfaction, for I believe it pointed the path to truth. I

have left it unchanged in the essays of the First Volume, not only for this reason, but chiefly because it is, I think, of great interest to trace the development of a scientific truth. Hypotheses, even when not absolutely right, may be of value in advancing our knowledge, if only they are relatively right, i. e. when they correspond with the state of existing knowledge. They are like the feelers which the short-sighted snail stretches forth on its darkened path, testing this way and that, and withdrawing them and altering its route as soon as they come across any obstacle; just as an unyielding fact may show that we are on a wrong road.

Rome was not built in a day, and no scientific truth is at once revealed without a prolonged previous history made up of mingled truth and error. The last word has not yet been spoken on the subject dealt with in these essays; but if we remember the complete obscurity which, only ten years ago, surrounded everything which is now clearly revealed in the final essay, we shall not be able to refrain from an inward feeling of satisfaction. Of course, much remains to be done in this department of biology; but a firm foundation has been laid on which much may be erected.

AUGUST WEISMANN.

FREIBURG I. B. :  
20 August, 1891.

# EDITORS' PREFACE TO SECOND VOLUME

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WE have wished to add a few words in order to thank those who have kindly helped us in rendering the last Essay on Amphimixis, which presented exceptional difficulties, accounting for the delay in the appearance of this volume. Early in the present year one of us had the opportunity of consulting Professor Weismann and bringing under his notice all the most difficult passages in the four essays. As a result of this, the English translation has been modified in some few respects, and, to this extent, represents Professor Weismann more accurately than the original German. We desire to express our warmest thanks to him and to Fräulein Diestel for the great trouble they have taken in assisting us.

In this country our chief thanks are due to Miss Lilian J. Gould, who not only translated the First Essay, but carefully read through the proof sheets of the Essay on Amphimixis, and made many valuable suggestions. We have also been helped on special points by Professors E. Ray Lankester, S. H. Vines, and F. Gotch, and by Mr. D. G. Ritchie. Other kind assistance has been acknowledged in our Preface to the Second Edition, in Volume I.

In conclusion, we venture to express the hope that these new essays may deepen the interest already aroused by Professor Weismann's earlier writings. If this be so, we shall always remember with pleasure the time and work which have been devoted to the production of these Essays in their present form.

E. B. P.

A. E. S.

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No further translations or abstracts have appeared.