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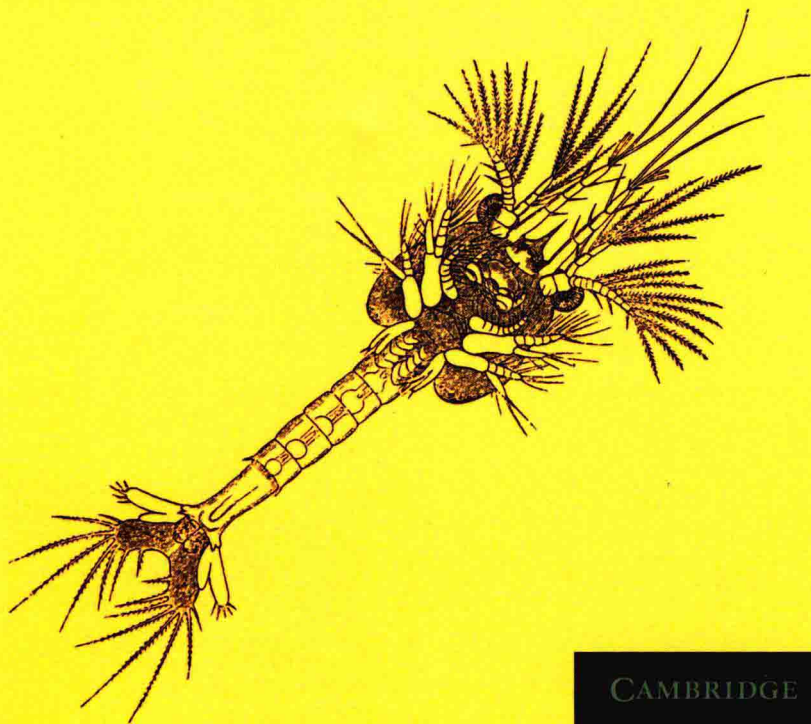
TS AND
ARGUMENTS
FOR DARWIN

WITH ADDITIONS BY THE AUTHOR

FRITZ MÜLLER

TRANSLATED BY

WILLIAM SWEETLAND DALLAS



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Facts and Arguments for Darwin

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Facts and Arguments for Darwin

Known for developing the concept of Müllerian mimicry, whereby poisonous species with a common predator display similar warning signals, the naturalist Johann Friedrich Theodor (Fritz) Müller (1821–97) spent most of his working life in Brazil. Having emigrated from Germany, owing partly to his radical atheism, he became a strong early supporter of Darwinism. Drawing on his studies of crustaceans, he originally published this work in German as *Für Darwin* (1864), and sent the great naturalist a copy. Müller became a regular correspondent, and Darwin supported the translation of Müller's work, firstly for his personal use and also in the published 1869 version that is reissued here, rendered into English by the naturalist William Sweetland Dallas (1824–90), with several updates by Müller. Using case studies of crustaceans to provide evidence for certain aspects of Darwinian theory, Müller draws up evolutionary classifications of the various species examined.

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FACTS AND ARGUMENTS

FOR

DARWIN.

BY FRITZ MÜLLER.

WITH ADDITIONS BY THE AUTHOR.

TRANSLATED FROM THE GERMAN

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ASSISTANT SECRETARY TO THE GEOLOGICAL SOCIETY OF LONDON.

WITH ILLUSTRATIONS.

LONDON:

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1869.

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## TRANSLATOR'S PREFACE.

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My principal reason for undertaking the translation of Dr. Fritz Müller's admirable work on the Crustacea, entitled 'Für Darwin,' was that it was still, although published as long ago as 1864, and highly esteemed by the author's scientific countrymen, absolutely unknown to a great number of English naturalists, including some who have occupied themselves more or less specially with the subjects of which it treats. It possesses a value quite independent of its reference to Darwinism, due to the number of highly interesting and important facts in the natural history and particularly the developmental history of the Crustacea, which its distinguished author, himself an unwearied and original investigator of these matters, has brought together in it. To a considerable section of English naturalists the tone adopted by the author in speaking of one of the greatest of their number will be a source of much gratification.

In granting his permission for the translation of his little book, Dr. Fritz Müller kindly offered to send some emendations and additions to certain parts of it. His notes included many corrections of printers' errors, some of which would have proved unintelligible without his aid, some small additions and notes which



have been inserted in their proper places, and two longer pieces, one forming a foot-note near the close of Chap. XI. (p. 119), the other at the end of Chap. XII. (pp. 135-140), describing the probable mode of evolution of the Rhizocephala from the Cirripedia.

Of the execution of the translation I will say but little. My chief object in this, as in other cases, has been to furnish, as nearly as possible, a literal version of the original, regarding mere elegance of expression as of secondary importance in a scientific work. As much of Dr. Müller's German does not submit itself to such treatment very readily, I must beg his and the reader's indulgence for any imperfections arising from this cause.

W. S. D.

LONDON, 15th Feb, 1869.

## AUTHOR'S PREFACE.

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IT is not the purpose of the following pages to discuss once more the arguments adduced for and against Darwin's theory of the origin of species, or to weigh them one against the other. Their object is simply to indicate a few facts favourable to this theory, collected upon the same South American ground, on which, as Darwin tells us, the idea first occurred to him of devoting his attention to "the origin of species,—that mystery of mysteries."

It is only by the accumulation of new and valuable material that the controversy will gradually be brought into a state fit for final decision, and this appears to be for the present of more importance than a repeated analysis of what is already before us. Moreover, it is but fair to leave it to Darwin himself at first to beat off the attacks of his opponents from the splendid structure which he has raised with such a master-hand.

F. M.

DESTERRO, 7th Sept., 1863.

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# HISTORY OF CRUSTACEA.

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## CHAPTER I.

### INTRODUCTORY.

WHEN I had read Charles Darwin's book 'On the Origin of Species,' it seemed to me that there was one mode, and that perhaps the most certain, of testing the correctness of the views developed in it, namely, to attempt to apply them as specially as possible to some particular group of animals. Such an attempt to establish a genealogical tree, whether for the families of a class, the genera of a large family, or for the species of an extensive genus, and to produce pictures as complete and intelligible as possible of the common ancestors of the various smaller and larger circles, might furnish a result in three different ways.

1. In the first place, Darwin's suppositions when thus applied might lead to irreconcilable and contradictory conclusions, from which the erroneousness of the suppositions might be inferred. If Darwin's opinions are false, it was to be expected that contradictions would accompany their detailed application at every step, and

that these, by their cumulative force, would entirely destroy the suppositions from which they proceeded, even though the deductions derived from each particular case might possess little of the unconditional nature of mathematical proof.

2. Secondly, the attempt might be successful to a greater or less extent. If it was possible upon the foundation and with the aid of the Darwinian theory, to show in what sequence the various smaller and larger circles had separated from the common fundamental form and from each other, in what sequence they had acquired the peculiarities which now characterise them, and what transformations they had undergone in the lapse of ages,—if the establishment of such a genealogical tree, of a primitive history of the group under consideration, free from internal contradictions, was possible,—then this conception, the more completely it took up all the species within itself, and the more deeply it enabled us to descend into the details of their structure, must in the same proportion bear in itself the warrant of its truth, and the more convincingly prove that the foundation upon which it is built is no loose sand, and that it is more than merely “an intellectual dream.”

3. In the third place, however, it was possible, and this could not but appear, *primâ facie*, the most probable case, that the attempt might be frustrated by the difficulties standing in its way, without settling the question, either way, in a perfectly satisfactory manner. But if it were only possible in this way to arrive for

oneself at a moderately certain independent judgment upon a matter affecting the highest questions so deeply, even this alone could not but be esteemed a great gain.

Having determined to make the attempt, I had in the first place to decide upon some particular class. The choice was necessarily limited to those the chief forms of which were easily to be obtained alive in some abundance. The Crabs and Macrurous Crustacea, the Stomapoda, the Diastylidæ, the Amphipoda and Isopoda, the Ostracoda and Daphnidæ, the Copepoda and Parasita, the Cirripedes and Rhizocephala of our coast, representing the class of Crustacea with the deficiency only of the Phyllopoda and Xiphosura, furnished a long and varied, and at the same time intimately connected series, such as was at my command in no other class. But even independently of this circumstance the selection of the Crustacea could hardly have been doubtful. Nowhere else, as has already been indicated by various writers, is the temptation stronger to give to the expressions "relationship, production from a common fundamental form," and the like, more than a mere figurative signification, than in the case of the lower Crustacea. Among the parasitic Crustacea, especially, everybody has long been accustomed to speak, in a manner scarcely admitting of a figurative meaning, of their arrest of development by parasitism, as if the transformation of species were a matter of course. It would certainly never appear to any one to be a pastime worthy of the Deity, to amuse himself with the contrivance of these

marvellous crippings, and so they were supposed to have fallen by their own fault, like Adam, from their previous state of perfection.

That a great part of the larger and smaller groups into which this class is divided, might be regarded as satisfactorily established, was a further advantage not to be undervalued; whilst in two other classes with which I was familiar, namely, the Annelida and Acalephæ, all the attempted arrangements could only be considered preliminary revisions. These undisplaceable groups, like the sharply marked forms of the hard, many-jointed dermal framework, were not only important as safe starting points and supports, but were also of the highest value as inflexible barriers in a problem in which, from its very nature, fancy must freely unfold her wings.

When I thus began to study our Crustacea more closely from this new stand-point of the Darwinian theory,—when I attempted to bring their arrangements into the form of a genealogical tree, and to form some idea of the probable structure of their ancestors,—I speedily saw (as indeed I expected) that it would require years of preliminary work before the essential problem could be seriously handled. The extant systematic works generally laid more weight upon the characters separating the genera, families and orders, than upon those which unite the members of each group, and consequently often furnished but little employable material. But above all things a thorough knowledge of development was indispensable, and every one knows how im-

perfect is our present knowledge of this subject. The existing deficiencies were the more difficult to supply, because, as Van Beneden remarks with regard to the Decapoda, from the often incredible difference in the development of the most nearly allied forms, these must be separately studied—usually family by family, and frequently genus by genus—nay, sometimes, as in the case of *Penæus*, even species by species; and because these investigations, in themselves troublesome and tedious, often depend for their success upon a lucky chance.

But although the satisfactory completion of the “Genealogical tree of the Crustacea” appeared to be an undertaking for which the strength and life of an individual would hardly suffice, even under more favourable circumstances than could be presented by a distant island, far removed from the great market of scientific life, far from libraries and museums—nevertheless its practicability became daily less doubtful in my eyes, and fresh observations daily made me more favourably inclined towards the Darwinian theory.

In determining to state the arguments which I derived from the consideration of our Crustacea in favour of Darwin’s views, and which (together with more general considerations and observations in other departments), essentially aided in making the correctness of those views seem more and more palpable to me, I am chiefly influenced by an expression of Darwin’s: “Whoever,” says he (*‘Origin of Species,’* p. 482), “is led to believe that species are mutable, will do a good service by conscientiously expressing his conviction.” To the



desire expressed in these words I respond, for my own part, with the more pleasure, as this furnishes me with an opportunity of publicly giving expression in words to the thanks which I feel most deeply to be due from me to Darwin for the instructions and suggestions for which I am so deeply indebted to his book. Accordingly I throw this sand-grain with confidence into the scale against "the load of prejudice by which this subject is overwhelmed," without troubling myself as to whether the priests of orthodox science will reckon me amongst dreamers and children in knowledge of the laws of nature.