

PREFACE.

I PROBABLY never should have ventured to engage in the composition and publication of a work like the present, had not that task been assigned me by my nomination as one of the writers of the series of Bridgewater Treatises, and had I not deeply felt the honour done me by that appointment, as well as the importance of the duty which it imposed. The hope, in which I have indulged, that my labours might eventually be useful, has been my chief support in this arduous undertaking; the progress of which has throughout been seriously impeded by the various interruptions incident to my profession, by long protracted anxieties and afflictions, and by the almost overwhelming pressure of domestic calamity.

The object of this treatise is to enforce the

great truths of Natural Theology, by adducing those evidences of the power, wisdom, and goodness of God, which are manifested in the living creation. The scientific knowledge of the phenomena of life, as they are exhibited under the infinitely varied forms of organization, constitutes what is usually termed *PHYSIOLOGY*, a science of vast and almost boundless extent, since it comprehends within its range all the animal and vegetable beings on the globe. This ample field of inquiry has, of late years, been cultivated with extraordinary diligence and success by the naturalists of every country ; and from their collective labours there has now been amassed an immense store of facts, and a rich harvest of valuable discoveries. But in the execution of my task this exuberance of materials was rather a source of difficulty ; for it created the necessity of more careful selection and of a more extended plan.

In conformity with the original purpose of the work, which I have all along endeavoured to keep steadfastly in view, I have excluded

from it all those particulars of the natural history both of animals and of plants, and all description of those structures, of which the relation to final causes cannot be distinctly traced; and have admitted only such facts as afford manifest evidences of design. These facts I have studied to arrange in that methodized order, and to unite in those comprehensive generalizations, which not only conduce to their more ready acquisition and retention in the memory, but tend also to enlarge our views of their mutual connexions, and of their subordination to the general plan of creation. My endeavours have been directed to give to the subject that unity of design, and that scientific form, which are generally wanting in books professedly treating of Natural Theology, published prior to the present series; not excepting even the unrivalled and immortal work of Paley. By furnishing those general principles, on which all accurate and extensive knowledge must substantially be founded, I am not without a hope that this compendium may prove a

useful introduction to the study of Natural History ; the pursuit of which will be found not only to supply inexhaustible sources of intellectual gratification, but also to furnish, to contemplative minds, a rich fountain of religious instruction. To render these benefits generally accessible, I have confined myself to such subjects as are adapted to every class of readers ; and, avoiding all unnecessary extension of the field of inquiry, have wholly abstained from entering into historical accounts of the progress of discovery ; contenting myself with an exposition of the present state of the science. I have also scrupulously refrained from treading in the paths, which have been prescribed to the other authors of these treatises ; and have accordingly omitted all consideration of the hand, the voice, the chemical theory of digestion, the habits and instincts of animals, and the structures of antediluvian races ; the extent of the field which remained, and which, with these few exceptions, embraces nearly the whole of the physiology of the two kingdoms of nature,

already affording ample occupation for a single labourer.

The catalogue of authors whose works have furnished me with the principal facts detailed in these volumes, is too long for insertion in this place. I have not encumbered the pages of the work by continual citations of authorities; but have given references to them only when they appeared to be particularly requisite, either as bearing testimony to facts not generally known, or as pointing out sources of more copious information. It may however be proper to mention, that I have more especially availed myself of the ample materials on Comparative Anatomy and Physiology contained in the works of Cuvier, Blumenbach, Carus, Home, Meckel, De Blainville, Latreille, and St. Hilaire, and in the volumes of the Philosophical Transactions, of the *Mémoires* and *Annales du Muséum*, and of the *Annales des Sciences Naturelles*. I should be ungrateful were I not also to acknowledge the instruction I have derived from my attendance on the lectures at the Royal

College of Surgeons, delivered successively, during many years, by the late Sir Everard Home, Sir Astley Cooper, Mr. Lawrence, Mr. Brodie, Mr. Green, and Sir Charles Bell; and also from those of Professor Grant, at the University of London.

I have likewise to return my thanks for the liberal manner in which the Board of Curators of the Hunterian Museum gave me permission to take such drawings of the preparations it contains, as I might want for the illustration of this work; and to Mr. Clift, the conservator, and Mr. Owen, the assistant conservator of the museum, for their obliging assistance on this occasion. Mere verbal description can never convey distinct ideas of the form and structure of parts, unless aided by figures; and these I have accordingly introduced very extensively in the course of the work.*

Being compelled, from the nature of my

* All the wood engravings have been executed by Mr. Byfield, and the drawings for them were, for the most part, made by Miss Catlow, whose assistance on this occasion has been most valuable to me.

subject, and in order to avoid tedious and fatiguing circumlocution, to employ many terms of science, I have been careful to explain the meaning of each when first introduced : but as it might frequently happen that, on a subsequent occurrence, their signification may have been forgotten, the reader will generally find in the index, which I have, with this view, made very copious, a reference to the passage where the term is explained.

I beg, in this place, to express my deep sense of the obligation conferred on me by Mr. Davies Gilbert, the late president of the Royal Society, to whose kindness I owe my being appointed to write this treatise.

I also take this opportunity of conveying my best thanks to my friend and colleague, Mr. Children, of the British Museum, for his kind assistance in revising the sheets while the work was printing, and for his many valuable suggestions during its progress through the press.

A catalogue of the wood engravings has been subjoined ; and also a tabular view of the

classification of animals adopted by Cuvier in his "Regne Animal," with familiar examples of animals included under each division ; both of which I conceived might prove useful for purposes of reference. The latter table is reprinted from that which I have given in my "Introductory Lecture on Human and Comparative Physiology," published in 1826, with only such alterations as were required to make it correspond with the second and improved edition of Cuvier's work.