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Structure, Functions, and Classification of Animals, Volume 1

John Fleming

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The Philosophy of Zoology

John Fleming (1785–1857) was a minister of the Church of Scotland, but in his time at the University of Edinburgh he had also studied geology and zoology. In the tradition of the country parson who was also a talented and knowledgeable naturalist, he published his first works on the geology of the Shetland Islands while serving there as a minister. His subsequent works led to his being offered the chair of natural philosophy at the University of Aberdeen, and subsequently at the newly created chair of natural history at the Free Church College in Edinburgh. The two-volume *Philosophy of Zoology* was published in 1822, and the young Charles Darwin is recorded as borrowing it from the library of Edinburgh University in 1825/6. His intention in the book was to 'collect the truths of Zoology within a small compass, and to render them more intelligible, by a systematical arrangement'.

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VOLUME 1

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THE
PHILOSOPHY
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ZOOLOGY;
OR
A GENERAL VIEW OF THE
STRUCTURE, FUNCTIONS, AND CLASSIFICATION
OF ANIMALS.

By JOHN FLEMING, D. D.
MINISTER OF FLISK, FIFESHIRE,
FELLOW OF THE ROYAL SOCIETY OF EDINBURGH, OF THE WERNERIAN
NATURAL HISTORY SOCIETY, &c.

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P R E F A C E.



IN preparing this work for the public, the writer was chiefly influenced by a desire to collect the truths of Zoology within a small compass, and to render them more intelligible, by a systematical arrangement. He is not aware that there exists any work in the English language, in which the subject, in its different bearings, has been illustrated in a philosophical manner, or to which a student of Zoology could be referred, as a suitable introduction to the science. There are not wanting, it is true, many disquisitions of great value, on particular departments of the physiology and classification of Animals; for who can enumerate the names of TYSON, LISTER, WILLOUGHBY, RAY, ELLIS, HUNTER, PENNANT, MONRO, and MONTAGU, among the dead, and HOME, KIRBY, and LEACH, among the living zoologists of Britain, without

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regarding them as extensive benefactors of the science. But the writings of these naturalists, and others which have been noticed in the body of the work, are not only rare, but expensive; so that the task of investigating the facts which have been established, or the theories which have been proposed, can scarcely, in ordinary circumstances, be entered upon. The want, indeed, of such an introduction to the study of the Animal Kingdom, as should serve as an index to the doctrines on which the classification is founded, has frequently been the subject of regret, and may probably be considered as the origin of that indifference to the science which is but too apparent in this country. Botany and Mineralogy have been illustrated by a variety of introductory works, full of enlarged and philosophical views, and professorships have been instituted to accelerate the progress of these sciences: but Zoology has experienced no such fostering care. It has been abandoned to its fate, and suffered to languish under the pernicious influence of peculiar external circumstances.

Among those circumstances which have directly retarded the progress of Zoology in Britain, there is one which has been conspicuously hurtful,—the

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influence of the dogmas of the Linnean School. There have not been wanting naturalists in this country, who have regarded the twelfth edition of the “*Systema Naturæ*” as the standard of all excellence in this branch of Natural History, and who have considered the classes, orders, and genera therein established, as sufficient to embrace all the species on the globe. Every attempt to employ characters different from those made use of by LINNÆUS, has been stigmatized as presumptuous innovation; the establishment of a new genus has been condemned as an unnecessary burden imposed on the memory; the new species have been crowded into the established categories, though destitute of the prescribed claims of admission; and all that is valuable in the history of an animal, has been considered capable of being expressed in its trivial name and specific character. Though such has been the practice of the devoted admirers of LINNÆUS, it is not conformable to those principles which regulated the conduct of that enlightened naturalist himself. He examined with the greatest freedom the opinions of his predecessors, and did not suffer the methods which they had employed to regulate the construction of his own divisions. He exhibited the most convincing proofs of the ne-

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cessity of frequent changes in the arrangement, to keep pace with the progress of science. Within the space of thirty years, his system passed through twelve editions, the greater number of which were revised by himself: these in succession, by the numerous alterations made in the characters, number and distribution of the genera, evinced the depreciated value of those which preceded, and predicted the temporary excellence of all that should follow. The blind adherence of British naturalists to the systematical arrangement of animals which LINNÆUS recommended, which led them to neglect the important services of LISTER and RAY, and reject the methods which these illustrious observers had proposed, and their hostility to every reformation, appear the more remarkable, when it is considered that his Mineralogical System was arrested in its progress by the feeble barriers which WOODWARD and DACOSTA had raised up. Perhaps a part of this influence may be traced to the purchase of the Linnean cabinet by its present illustrious possessor Sir JAMES EDWARD SMITH, and the interest in favour of its former owner which this circumstance could not fail to excite in this country. At all events, there is reason to rejoice that this influence, once so powerful, is on the decline; and to hope that the

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activity of the present cultivators of the science will atone for the last forty years of zoological listlessness.

In order to form a correct estimate of the zoological merits of LINNÆUS, the “*Systema Naturæ*” must be regarded as the index, merely, of the names of the different animals, not as the exposition of their history; and the “*Amœnitates Academicæ*” must be studied, as containing numerous examples of those efforts which can alone add dignity to this department of knowledge.

It will be fortunate for the interests of science, if, in rejecting what is obsolete in the system of LINNÆUS, zoologists do not, at the same time, undervalue that precision in method at which he aimed. This observation appears the more necessary, as there is now much declamation about the worthlessness of Artificial Systems, and the excellence of Natural Methods. But this excellence is more apparent than real. Many of those natural groups which are so much praised are ill defined, and it is even acknowledged by their admirers, that precise limits cannot be assigned to them. Hence it frequently happens, that the definition of the group is

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applicable to a few genera only, which are considered as its type, and does not embrace other genera which are regarded as belonging to it, but beginning to assume the characters of some of the other neighbouring groups. There is here the use of a method, where there is no precision, and a boasting that the plan of Nature is followed, when that plan is confessedly incomprehensible. Indeed, it often happens, that the admired natural method of one zoologist differs from the censured artificial method of another, merely in the circumstance that different systems of organs have been made choice of as the basis of the respective classifications. Unless zoologists, in the formation of their primary groups, endeavour to determine those characters which all the members possess in common, admitting only such marks into the definition, and practise the same method with all the subordinate divisions, the progress of the science will be unsteady, the student will be startled at its contradictions, and the revolutions in nomenclature become as frequent as the cultivators of the science are numerous.

The ridicule too often thrown out against some of the departments of Zoology, by persons who pretend to considerable intellectual acquirements,

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may have been prejudicial in its effects, by preventing many from entering upon the study, and by restraining the efforts of others. The Animal Kingdom is considered by many persons as furnishing a delightful field of rational enquiry, but they feel disposed to bestow all their praise on certain subjects of that kingdom which happen to be favourites, and they are ready to stigmatize the remainder as comparatively worthless. They would applaud the student inclined to investigate the instincts of the elephant, but would censure him, as engaging in degrading pursuits, were he detected in examining the habits of a spider, or the structure of a worm. Do such persons consider the wisdom of the plan of Providence as discoverable without an acquaintance with the relation of the particular parts, or a partial view as sufficient to enable them to comprehend the whole? To such judges of Nature, a sneer would perhaps be the most suitable reply; but, as they are numerous, it may be worth while to attempt to teach them sounder views. Much of their error may be traced to the importance which they attach to *size*, without perhaps reflecting, that, if this is to be considered as the best test of the dignity of an animal, the horse must be regarded as more excellent than his rider. Besides, were ani-

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mals useful to man in proportion to their size, would the worm-like leech ever have been resorted to as a blood-letter, or the insect coccus employed as a dye? On no occasion can the *argumentum ad verecundiam* be employed with more effect, than when addressed to the despisers of the humbler tribes of animated beings. By whose power were the meanest creatures formed? By whose wisdom were all their organs arranged to fit them for the place they occupy? By whose will do they live? By whose bounty is their life sustained? Know, that HE, who, in the beginning, created the Heaven and the Earth, said, “ Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the earth after his kind: and it was so.” Is it, then, to be considered as a degrading employment for man to examine those creatures which were formed by GOD?

In collecting the materials of the present work, and preparing it for publication, the author experienced unavoidable difficulties, arising from his remote situation. It was sometimes not in his power, from his time being occupied by other important duties, to consult rare and costly works on Natural History; and the slow progress of his task,

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which has occupied him for more than three years, has prevented him from quoting some authors, whose publications are already known to the public. The Chapters, for example, on the Organs of Perception, and the Faculties of the Mind, were prepared for the press several months before the publication of the “Physiology of the Mind” by the late Dr BROWN. Had this not been the case, the author would have availed himself of several acute remarks of that discriminating philosopher. Should the reader detect the slightest coincidence of opinion in the two publications, it can only be attributed to the analytical operations having been performed on similar subjects. Another work has appeared more recently, which the author regrets was not before him in the whole course of his enquiries. He refers to Dr BARCLAY’S Treatise on Life and Organization. It should be perused with care by every student of Anatomy and Natural History, as an effectual preservative against the doctrines of Materialism, and deserves a place as well in the library of the Divine as in that of the Physiologist.

In the distribution of the subjects of the following work, it was considered more useful to classify

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the different organs of animals, and determine the functions which are executed, previous to the systematical arrangement of the species, than to unfold the peculiarities of the various organs as they occur in succession in the different classes. By this method, the student is made acquainted with the varieties of organization and function, and proceeds to the details of methodical distribution, with his mind prepared by general views for conducting the particular investigations. In the distribution of the various groups, the author, after the plan of the “Regne Animal” of M. CUVIER, the most valuable of modern systematical arrangements, begins with the perfect animals, and terminates with those which exhibit the most simple organisation. Suppose an opposite plan to be pursued, many difficulties must present themselves in the course of the arrangement. As the observer ascends in the scale, new organs develop themselves. These are at first so obscure, that he can neither unfold their structure nor guess at their functions, without being guided by his knowledge of the organs of the higher tribes; hence it happens, that the boasted analytical method becomes, in fact, synthetical; and the very terms which are employed to express the characters intimate a knowledge of the peculiarities of the higher divisions.

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It was originally intended to have added to each genus in the Vertebral and Molluscou Tribes at least, a list of all the species which have been discovered as natives of the British Isles. But soon perceiving the impossibility of doing this, without exceeding greatly the prescribed limits, the writer relinquished the plan. He has, however, resolved to supply the defect in a separate publication, (for which he has been collecting materials during many years); in which work, he will confine himself to the determination of the specific characters and descriptions of BRITISH ANIMALS. The propriety of attempting such a publication, must be acknowledged by every one acquainted with the present chaotic state of the British Fauna.

The Plates which have been added to the present work, consist of figures relating exclusively to British animals. They are not gaudy, but they are correct delineations from nature, for which he is indebted to the pencil of his wife.

With regard to the style, it may be proper to mention, that brevity and perspicuity have been chiefly aimed at. That there are several errors in the composition is readily acknowledged. Those

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which seem to injure the sense, have been taken notice of in the list of *corrigenda*.

Before concluding, the author embraces this opportunity of expressing his gratitude for the kind assistance he has experienced in prosecuting the work. He must particularly mention the name of Professor JAMESON, who has added so much to the reputation of the University of Edinburgh, as an eminent teacher of Natural History, and to whose exertions the public is indebted for that splendid collection of ANIMALS which adorns the Edinburgh Museum. The work, indeed, was begun in consequence of his recommendation, and he has contributed to its progress by many kind offices.

TO PATRICK NEILL, Esq. the author has been under particular obligations; for many valuable hints and sound criticisms, dictated equally by the ties of friendship and attachment to the science

After all his exertions, the writer is aware that much more might be done, to give this treatise stronger claims to public favour, and to render it better deserving of the title which, for the sake of discrimination, he has, perhaps presumptuously,

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ventured to adopt; and he would only recommend it to the student of Zoology, until a more complete work shall appear, which would be perused by no one with greater eagerness than himself.

The analytical Table of Contents exhibits so fully the method which has been followed, and the subjects which have been treated of, as to supersede the necessity of an Alphabetical Index.

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