

PREFACE.

DR. GÜNTHER observes, "This volume concludes the Catalogue of Fishes. Most of the Collections whence the specimens therein described have been obtained are mentioned in the preceding volumes, so that I have to refer to the following only:—

" 1. Typical specimens of East-Indian Murænoïds, Lophobranchs, Plectognaths, and Plagiostomes described by Dr. Bleeker.

" 2. Several collections from the Seychelle Islands made by Lieut.-Col. Playfair, Swinburne Ward, Esq., and Prof. E. Perceval Wright.

" 3. Several collections made at St. Helena by J. C. Melliss, Esq.

" 4. Several collections of freshwater and marine species from Algiers, made by Lieut.-Col. Playfair, H.M. Consul-General at Algiers.

" 5. Typical specimens of the Sharks from the coast of Portugal, described and presented by Dr. B. du Bocage, Director of the Lisbon Museum.

" 6. A Collection of Marine Fishes from Tasmania. Purchased.

" 7. Several desiderata, presented by Prof. Kölliker.

" At the conclusion of this work I think it right to add a few remarks on the extent of our ichthyological knowledge generally, and on the present state of the Collection in the British Museum especially.

" It is of some interest to learn how many species of Fishes are

known to exist. In the attempt to give an estimate I can only approach the truth, as in numerous cases it is impossible to decide from imperfect accounts whether an author has described a distinct species or one previously known. Again, the views of ichthyologists on species diverge so much that one will give a number several times as great as another*. I consider a species to be well established only when it is founded on characters which, from an examination of numerous examples, are found to be permanent, not subject to *gradual* variation, and not dependent on season, sex, or age—or which are known to be so from the examination of allied forms. A character of this kind is in general constantly accompanied by another, which would appear to be insignificant by itself. By this principle I have been guided throughout the work, and in naming the species of the Collection of the Museum; and this should be borne in mind in comparing the numbers of species given by me with the estimates prepared by other naturalists.

“In the present work 6843 species are regarded as well established and described, whilst 1682 others are doubtful and referred to by name only. Assuming, then, that about one half of the latter will be ultimately admitted into the system, and that, since the publication of the volumes of this work, about 1000 species have been described elsewhere, *we may put the total number of fishes known at present as about 9000.*

“At the respective dates of the preparation of the eight volumes of the present work 4219 species were available for autoptical examination. To these were afterwards added 958 species which were received too late for insertion; *so that the Collection of the British*

* “Prof. Agassiz states, in Sillim. Amer. Journ. 1854, xvii. p. 360, that he knows at least 20 North-American species of *Lepidosteus*; I can distinguish three or four only. In Prof. Kaup’s ‘Catalogue of Apodal Fishes’ the two European Eels admitted by me are split into 20 species. Prof. Duméril, finally, has published the names of some 80 Sturgeons distinguished by him (Nouv. Arch. Mus. d’Hist. Nat. iii. 1867); I cannot recognize more than twenty. Such nominal species rarely survive their author; but, before they are merged again in the synonymy, they are the cause of much unnecessary trouble, and, being founded on slight individual peculiarities, they are frequently mistaken, rarely recognized.”

Museum contains at the present time altogether 5177 species, represented by 29,275 examples.*

“ Rich as this Collection is in the possession of rare and frequently unique types, and however well merited its claim to take the first rank among ichthyological collections, it must be admitted that, containing not two-thirds of the known species, and on an average scarcely six examples of each species, it is capable of considerable enlargement and improvement. A species to which no particular interest is attached ought to be represented by at least three specimens, as a certain number of examples are necessary to fix specific characters. But there are a number of other fishes which cannot be perfectly understood without a much greater number of examples. Such are those which undergo with age changes so considerable that the stages of development have been described as different genera, or those which exhibit most extraordinary sexual differences, or are so subject to variation as to have given rise to the creation of numerous nominal species, or those which have a wide geographical distribution. Take, for instance, the Herring. Numerous as the specimens are in the Collection, they only exemplify the various stages of growth of the Herring of the south coast of England and of the Firth of Forth; they offer evidence as regards the truth or imperfection of the accounts left to us by Yarrell and Parnell; they indicate that the Herring attains somewhere (probably in the north) to the size of a large Mackerel (15 inches), whilst it exists in a degenerated condition in the Baltic; they also give us the means of showing the identity of the English Herring with that of North-Eastern America. But there are no specimens exemplifying the various kinds distinguished by professional herring-fishers, none to show the extent of its distribution towards the north or south,

* “The species and examples are distributed among the eight volumes thus:—

Vol.	Specimens		Species	
	enumerated.	since added.	in Brit. Mus.	since added.
I. (1859)	2508	1779	475	211
II. (1860)	3178	1269	531	198
III. (1861)	2625	1051	536	133
IV. (1862)	2877	1119	651	174
V. (1864)	1811	535	492	151
VI. (1866)	2173	278	268	34
VII. (1868)	3328	283	583	57
VIII. (1870)	4461	0	683	0”

none from the North Pacific or from the Arctic regions of either hemisphere, where we know that a Herring exists equally useful and perhaps identical with the European species. Thus, for the illustration of a single species, we may require a hundred specimens; and not one of them will be superfluous. Again, we know, at present, that at least some 140 different species of Sharks exist, a group of fishes which has always claimed a full share of attention in a seafaring nation, the oil and fins of which form a valuable article of trade, which, finally, from a scientific point of view, are those of all living fishes in which the palæontologist takes the greatest interest. Yet, with the imperfect state of all collections of Sharks and Rays, our knowledge of them remains equally incomplete. Being compelled to limit, in most cases, our examinations to the foetus or to examples not far removed from that stage, or to parts of old individuals which can be determined in a general manner only, we cannot follow the changes which their dentition undergoes with age; and the palæontologist, who chiefly depends on this character, is unable to connect and interpret his fragmentary materials satisfactorily, unless supplied by the zoologist with the information which is accessible to the latter only. This information cannot be obtained without a collection requiring much space. Some Sharks exceed a length of 30 feet; and it is no exaggeration to ascribe an average length of 5 feet to each of the 140 species known.

“After having pointed out imperfections of the collection as they are apparent with regard to the present state of science, I have to urge the necessity of keeping pace with the rapid progress of ichthyology resulting from the efforts in other countries. Since the period marked by the publication of the Ichthyology of the ‘Beagle,’ ‘Erebus and Terror,’ ‘Sulphur,’ and ‘Samarang,’ the National Collection has been left entirely to its own resources, and has been dependent on the booty of private collectors. One of the chief sources, the navy, which assisted Sir J. Richardson in bringing together the magnificent collection at Haslar Hospital, now transferred to the British Museum, has failed entirely* since the great

* “With the exception of the Magellan-Straits Expedition, to which Dr. Cunningham was attached as naturalist. This gentleman made considerable collections, part of which were deposited in the British Museum. The number of specimens of fishes obtained from this source is 78.”

English ichthyologist withdrew from active life. Meanwhile the expeditions fitted out by Austria and Prussia, each accompanied by a staff of naturalists, brought large collections of fishes to the Berlin and Vienna Museums; in St. Petersburg collections made in North-eastern Asia are accumulating; Dr. Bleeker, who has made us acquainted with the astonishing variety of fishes in the East-Indian archipelago, could not have succeeded so well without the cordial cooperation of the officials residing in the various islands; Messrs. Godeffroy, wealthy merchants of Hamburg, have founded, merely by the assistance of the captains of their own ships and of two or three collectors, a private museum which supplies now annually other public collections with a great number of rare or quite new forms from the various parts of the Pacific; in the United States each exploring expedition was and still is accompanied by naturalist collectors, employed solely for the benefit of public museums; and, finally, Prof. Agassiz himself has explored the ichthyology of the River Amazons, and returned with a booty the richness of which is great, though not yet exactly defined.

“Thus there cannot be any doubt with regard to the activity put forth in the field of ichthyology; and it is a fact that the foremost men in science have devoted a great proportion of their researches to this branch,—and justly so. No other class of vertebrates offers a similar gradation of development of the most important systems and organs, rendering its systematic arrangement one of the most difficult problems of zoology. Infinite are those modifications of organs which may be brought into connexion with the variations of their mode of life and with the widely different physical conditions under which fishes live. There is no fresh water, no sea, no part of the sea which is not inhabited by fishes, some kinds being restricted to an insignificant pool, whilst others roam over the whole extent of the various oceans, or are organized to exist under the pressure of great depths, the same species living in the Atlantic, North Pacific, and Antarctic. The freshwater forms being limited to the river- or lake-systems which they inhabit, and being less exposed to the disturbances affecting the terrestrial animals, are singularly adapted for the elucidation of the original geographical distribution of the animals of the present creation. No other class of the vertebrates is of equal importance to the geologist and palæonto-

logist, the materials for comparing the living with past creations being so numerous and diversified that we cannot help thinking that the question of the relations of the various epochs to one another will be solved in the field of ichthyology. Although fishes are mostly hidden by the element in which they live, so that the knife of the anatomist generally first reveals new facts connected with their life, we have sufficient evidence to show that the phenomena of life are more varied in their different groups than in any of the higher Vertebrata, and that their study will form a solid basis for the solution of those general biological questions which, perhaps rather prematurely, agitate the minds of many zoologists.

“An interest in Ichthyology is generally diffused in England; but its study is much neglected. Nor could it be otherwise. Where is it taught? Of the teachers of zoology in the numerous German, Scandinavian, Russian, Italian, and Portuguese universities, there is scarcely one who has not been an author in Ichthyology; and consequently he takes care that this branch shall not be neglected in his course of lectures. In Paris there exists a separate chair for Ichthyology and Herpetology. In the United States Ichthyology is taught by the author of the ‘*Recherches sur les Poissons Fossiles*’ and his pupils. In England I have met with many struggling hard to obtain ichthyological knowledge, with not one who was assisted in it by a teacher.

“Of course this state of things is in immediate connexion with the defective system of scientific education; but it must appear very anomalous indeed when we consider that the public of the mother country, as well as of the colonies, have the liveliest interest in ichthyology, as is proved by the daily requests for information, sometimes accompanied by collections made at considerable personal sacrifice, expressly with the object of diffusing scientific knowledge and of increasing the resources derived from this class of animals.

“Finally, it may be asked in what way ichthyology has been advanced by the publication of the present work? In the first place, then, the entire collection in the British Museum has been named, arranged, and described, so that, with the assistance of the Catalogue, every species and every individual specimen may be as easily found as a book in a well-arranged library, and has been rendered accessible to students and foreign visitors. Nearly 800 species have

been regarded as new, many of them types of distinct genera. But it would have been a work rather of local interest if it had been confined to the objects in the British Museum; besides, to determine species satisfactorily, a general study of all the allied species is necessary. Therefore its scope was extended to describing also those species which at present are not represented in the British Museum. In this form (that of a Handbook containing descriptions of, or references to, all the species known) it promised to be particularly useful to the student of ichthyology, the traveller, and collector. The last general works were that of Lacépède and Schneider's edition of Bloch, published at the beginning of this century, and containing between 1400 and 1500 species, of which about 1100 are still recognized. The great work by Cuvier and Valenciennes remained incomplete.

“The species and genera have been critically examined; and I have come to the conclusion, after the study of long series of examples, or after autoptical comparison of typical specimens, that it was necessary to eliminate from the system a great number of species, as well as genera, established on insufficient grounds. Zoological science is never advanced by general works compiled mechanically and without critical discernment. In the descriptions, I have been satisfied with giving the most important characters, without entering into a complete account of the organization, as this necessarily would have been, for the most part, merely a reproduction of the labours of others; these, however, are conscientiously referred to. But whenever I thought an observation made by me new and original I have added it. I have paid particular attention to the formation of more natural families, in which endeavour I have laid greater stress upon the structure of the vertical fins and of the skeleton as family characters than my predecessors. Still thinking that the subclasses proposed by Müller are most expressive of the fundamental differences in the organization of fishes, I found myself compelled, on the other hand, to abandon the order of Pharyngognaths, on establishing which he had bestowed so much labour.

“I am well aware of the many imperfections of this work; many have been already corrected by others; but if it should form the basis for the future development of a collection at present unrivalled

—if it should assist my fellow labourers and enlist others—if it should contribute to the advancement of truth, I shall not repent having devoted the best years of my life to its execution. During all this time I have had the great advantage of the assistance and experience of Mr. Edward Gerrard, to whom is due the excellent state in which I found the collection, and who has relieved me from the work connected with its registration and preservation. If circumstances permit, the numerous recent additions to the collection and to the literature generally, with a general Index, will be embodied in a supplementary volume. It may also be hoped that the illustrations alluded to in the first volume will soon be added.”

JOHN EDWARD GRAY.

British Museum,
May 20, 1870.