

pensable for the minute study which is to be our portion in the not very distant future." (Doubtless Dr. Sharpe is not unaware that these important factors have already received much attention in some quarters, having in fact been uppermost in the minds of many American students for the last two decades at least.)

Dr. Sharpe then proceeds to develop and illustrate his own ideas of the classification of birds and their arrangement by means of his "ideal museum," in elaborating which he has frequent recourse to habits, manner of nesting, character of the eggs, mode of roosting, the character of the nestling in respect to clothing, etc., in deciding points of affinity and relationship as well as to strictly anatomical characters. Each leading group of the non-Passerine birds is in turn reviewed and located; the Passeres, having been recently treated by him in a special paper, are briefly disposed of by the correction of the position of a few genera and families in the light of later discoveries. His views of the relationships of the various subdivisions of the Oscines is, however, diagrammatically expressed in Plate XI.

Then follows in linear sequence a tabular list of the higher groups and their families, with diagnoses in footnotes, illustrated by a diagram showing comparatively the system of the author and those of Fürbringer and Seebohm. He puts forward his scheme as of course a tentative one, in the hope of being able to renew the attack at some future time. It differs at many points from any of its predecessors, whether for the better or for the worse is beyond the scope of the present notice to inquire. The number of orders is 34, and of suborders 78. He concludes this masterly address — in which throughout he skilfully imparts a certain charm to a strictly technical subject — with a few personal reminiscences of interest to the systematic ornithologist. — J. A. A.

Hornaday's Handbook of Taxidermy and Zoölogical Collecting.* — Taxidermy, the handmaid of Zoölogy, has already become one of the fine arts, requiring the skill and other qualities of both the sculptor and the painter, and capable of yielding results comparable with the masterpieces of either. The expert collector, and still more the skilled taxidermist, is the indispensable ally of the professional naturalist and the museum-builder. On the intelligence and alertness of the former and

*Taxidermy | and | Zoological Collecting | A Complete Handbook for the Amateur Taxidermist, | Collector, Osteologist, Museum Builder, | Sportsman and Traveller | By | William T. Hornaday | For eight years Chief Taxidermist of the U. S. National Museum; for seven years | Zoological Collector and Taxidermist for Ward's Natural Science Establish- | ment; late Superintendent of the National Zoological Park; | author of 'Two Years in the Jungle,' etc. | With Chapters on | Collecting and Preserving Insects | By W. J. Holland, Ph.D., D.D. | Chancellor Western University of Pennsylvania; . . . [= 3 lines titles.] | Illustrated by Charles Bradford Hudson | and other Artists | 24 Plates and 85 Text Illustrations | New York | Charles Scribner's Sons | 1891.—8 vo. pp. xix+362.

the skill of the latter depend much of our progress in systematic zoölogy and the very existence of creditable museums of natural history.

Mr. Hornaday's work is evidently, as he says, 'an affair of the heart.' Mr. Hornaday, as a taxidermist, has ever been an enthusiast of high aims, a leader in the field of what may be termed the 'New Taxidermy.' Evidences of his exceptional skill and talent have long graced our leading museums, notably the National Museum at Washington, where for eight years he was in charge of the Department of Taxidermy. In placing before the public, in the form of a 'manual,' the results of his long experience, both in the field and in the work-shop, he has conferred a boon not alone upon collectors and taxidermists, but upon zoölogical science in general. No work, it is safe to say, in any sense comparable with this, has ever been written; and the impulse it must give to intelligent field work and scientific taxidermy is almost beyond estimate. It certainly must fill, as few works ever do, the proverbial 'long-felt want' in this particular field. The book is tersely and vigorously written, and here and there the author displays much cleverness in his way of 'putting things.'

The 'Manual' consists of six Parts as follows: 'Part I, Collecting and Preserving.' This contains eleven chapters, treating of the following subjects: (1) 'The Worker, and the Work to be Done'; (2) 'Outfits, and Hints on Hunting'; (3) 'How to Select and Study Fresh Specimens'; (4) 'Treatment of the Skins of Small Mammals'; (5) 'Collecting and Preserving the Skins of Large Mammals'; (6 and 7) 'Collecting Skins of Birds'; (8) 'Collecting Reptiles'; (9) 'Collecting Fishes'; (10) 'Collecting Marine Invertebrates'; (11) 'Collecting Birds' Eggs and Nests.'

'Part II,' constituting the main body of the work (pp. 99-257), is devoted to 'Taxidermy,' and treats in detail the technique of the subject in all its branches. 'Part III' treats of 'Making Casts' of mammals, fishes and reptiles. 'Part IV' is devoted to 'Osteology,' and gives detailed directions for collecting, macerating, cleaning and mounting.

'Part V' (pp. 305-338), on 'The Collection and Preservation of Insects,' is by Dr. W. J. Holland, the well-known lepidopterist. 'Part VI, General Information,' treats, among other things, of 'Insect Pests, and Poisoning,' with also a chapter on 'The Best Books of Reference.'

The illustrations, numbering 23 plates and 104 cuts in the text, render clear many of the obscurer details of the subject, from skinning mammals and birds and making up the skins, to the preparation of a manakin for a bison or tiger, the 'internal structure' of a mounted bird, or the preservation of nests and eggs.

The amount of detailed information here given — much of it never before consigned to print — is seemingly sufficient to help any bright collector or amateur taxidermist over most of the many difficulties that lie in his path. Not a little practical and healthful advice is given, *passim*, on a variety of pertinent topics, from the "postage-stamp style of collecting by boys who have no real love for natural history" (which is severely condemned), to the important subject of labels, measurements of speci-

mens and field notes. The importance of care and thoroughness in relation to gathering, preserving and labelling is at all times dwelt upon with emphasis. Too truly, as Mr. Hornaday observes, "The lives of hundreds of thousands of wild birds have been sacrificed to no purpose by persons claiming to be ornithological collectors, and yet who had not the knowledge, skill, or industry to make up good bird skins. . . . The ability to make up fine, clean, shapely, well-preserved skins, and make them rapidly also, is a prime requisite in any one who aspires to be sent off to interesting 'foreign parts' to shoot, collect, and see the world—at the expense of some one else." We are glad to see that in the matter of bird skins the best modern methods of 'making up' are described and fully illustrated with cuts; and that proper directions are given for insuring the highest scientific value of all kinds of bird specimens. We wish we could extend this statement to include all the author says about mammals as well, but sad experience leads us to make use of the present opportunity to put in an earnest protest against the "salt-and-alum baths," so unreservedly recommended for the preservation of mammal skins for mounting. "In only two or three instances," says Mr. Hornaday, "have I ever known it to change the color of the hair in the least." Our experience, on the contrary, has been widely different, even when the bath was compounded in accordance with Mr. Hornaday's own recipe. The skins of many small mammals, such as red squirrels, ground squirrels, spermophiles, kangaroo rats and mice, and deer mice, quickly change in color from immersion in it, to such an extent as to be wholly unrecognizable by their coloration, and hence worthless for any scientific purpose, yellowish, rufous, and pale browns becoming dull red. On the other hand, some colors appear to be not in the least affected. But in many foreign mammals it would be impossible to tell whether or not there had been a change of color. Should the change be not detected, as may readily happen, the 'salt-and-alum bath' may yet prove a prolific species maker, as it has already narrowly escaped being in several instances well known to the present writer. Ordinary alcohol, as commonly used, is not always to be trusted where the question of color is at stake, while the so-called 'wood alcohol,' or methyllic spirits, is absolutely ruinous, being worse even than the salt-and-alum bath. Fortunately birds are not often preserved in antiseptic solutions, except for strictly anatomical purposes; besides, their colors are, as a rule, less liable to change from such treatment than those of mammals.

Beyond question, Mr. Hornaday's book marks the beginning of a new era in the history of both natural history field work and taxidermy, and naturalists cannot be too grateful for his admirable manual of 'Taxidermy and Zoölogical Collecting.'—J. A. A.

Butler's Birds of Indiana *—This excellent catalogue of the Birds of

*The Birds of Indiana, with Illustrations of Many of the Species. Prepared for the Indiana Horticultural Society, and Originally Published in its Transactions for 1890. By Amos W. Butler, of Brookville. 8vo, pp. 135.