

## SCHIÖLER'S 'BIRDS OF DENMARK.'

BY GLOVER M. ALLEN.

THIS splendid quarto volume<sup>1</sup> is the first of a projected series of eight, to appear at yearly intervals, in which the author proposes to give a careful summary of our knowledge of the birds of Denmark, and to include as well, those of the Faroe Islands, Iceland and Greenland. Since the A. O. U. 'Check-list' includes Greenland, the present work is of particular interest to American ornithologists, not only because it treats of Greenland birds from a European viewpoint, but also because it brings forward much new material accumulated from Greenland in recent decades in Danish collections, particularly those of the author and of the Zoological Museum at Copenhagen. Moreover, many Danish species are of holarctic distribution, so that a consideration of their habits on the eastern side of the Atlantic is of general interest.

Lest its cost and the fact that it is written in a somewhat unfamiliar tongue should prevent its being as well known to American ornithologists as its importance deserves, a résumé of its contents is here given.

The plan of the work includes, first, a brief survey of Danish ornithological literature; then follows a short general account of avian anatomy, well illustrated with original figures; and in a third chapter a summary list of the birds of Denmark with a brief statement of the occurrence of each in that country. A valuable part of this chapter is supplied by the late Herluf Winge in a review of the species found as fossils or (more especially) those whose remains occur in artificial deposits of prehistoric times. With Chapter IV begins the detailed account of the species. Following the general sequence of Gadow and of Fürbringer, the author commences with the Anseriformes, and in the present volume treats of the

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<sup>1</sup> Danmarks Fugle med Henblik paa de i Grønland, paa Færøerne og i Kongeriget Island forekommende Arter. By E. Lehn Schiöler. Bind I. Indledning og Andefugle (Anseriformes). Gyldendalske Boghandel, Nordisk Forlag, København, 1925. 37.5 × 28 cm., pp. 1-552, pls. 1-98 (50 colored), 159 text-figs., and many unnumbered cuts. Price 250 Kroner (about \$62.00) a volume.

surface-feeding Ducks, the Swans, Sheldrakes, and Geese, leaving the diving Ducks and the Mergansers for the succeeding volume.

In the chapter on literature a synopsis of the more important publications by Danish writers on birds is presented, which, with the author's pertinent comment, comprises nearly 190 pages and really constitutes an historical review of the progress of ornithology in northwestern Europe. Danish ornithology may be said to have begun with Caspar Bartholini, his son Thomas, and his brother-in-law Ole Worm, who with others at the Royal University early in the seventeenth century founded the first "Natural-Theater" or museum of natural-history in Denmark. This was largely an anatomical collection with little of birds beyond various crania, sterna and beaks, as well as eggs of Swan and Ostrich. Sundry articles by Thomas Bartholini in these early days aimed to clear away the mists of ignorance and superstition from popular beliefs about birds. One gives an account of the examination of a supposed oviparous cock, another exposes the fallacy of foretelling the severity of a coming winter from the color of a Goose's breast-bone, while a third disproves the belief, then widely current, as to the origin of certain Geese from barnacles by showing that nests and eggs of these birds were discovered by Barenz in Spitzbergen. Most of the ornithological papers of this period were anatomical and helped to lay a foundation for a knowledge of avian structure. Most famous, however, is the book, 'Museum Wormianum', 1655, describing the private collection of Ole Worm, and embracing many interesting notes on birds. Wormius was the first to publish a figure of a Bird-of-Paradise showing its feet, and thus exploded the popular belief in its 'apodal' nature, for the specimens that first reached Europe from the Far East were trade-skins, native-made, with the feet quite removed, which gave rise to the notion that the birds spent their lives on the wing, never coming to rest on a perch. A Great Auk mounted in this collection was figured with a narrow white ring about the neck, which it seems was really a bright metal band, and not, as some later writers supposed, a peculiarity of plumage. Apparently the first list of Danish birds is found in a manuscript of Peter Syv, preserved in the University Library at Copenhagen and dating from about the end of the seventeenth century. With the eighteenth century (the Linnéan period) clas-

sification and the discrimination of species claimed their share of attention as well as anatomy. The names of sundry Danish naturalists are prominent in the development of ornithology in these times, as Brünnich and Pontoppidan. The latter had a large collection of mounted birds, and in his 'Danske Atlas' (1763) published the first printed list of Danish birds, comprising 180 species, listed by their common names. It was perhaps really prepared by Brünnich whose 'Ornithologia Borealis' appeared in the following year (1764). Other important works of the period include O. F. Müller's 'Prodromus of Danish Zoology,' and Forskål's works on his expedition to the Near East. Of well-known authors of later times, the writings of Fischer, Reinhardt, Steenstrup, Kjær-bölling, the brothers Winge, of Andersen and Mortensen are given brief review; and finally a list of titles pertaining to Danish birds to the close of 1923, brings the subject to date, with a mention of the founding, in 1906, of the Danish Ornithological Union, which has done much to forward interest in the study and protection of the local species.

Of the excellent chapter on avian anatomy little need be said beyond pointing out the large contribution of the author in the way of new and original figures, carefully drawn from Danish specimens, representing skeletal parts, tongues, tracheæ, and other details of superficial and internal anatomy of many species. Each figure is taken from a particular specimen, the data for which are given, and many are reproduced in color. One important point brought out by the author may, however, be emphasized as an interesting and apparently new contribution, namely, the correlation between the development of the supraorbital glands and the habit of feeding in salt water by diving or at least immersing the head. These glands, which form a dark-brown, more or less crescent-shaped mass over each eye in many water-birds, are exposed upon removing the skin of the head, and are found to be best developed in those that feed by diving or dipping in salt water. They are larger, for example, in sea Ducks than in fresh-water species, and are very well developed in Loons and Auks, and to a certain degree among shore-birds. The duct from these glandular masses leads into the nasal chamber and the probable function of their secretion would seem to be the formation of a film that would

exclude water from the bird's nostrils when the head or bill is immersed. An apparent exception is found in the Gannet in which the glands are small, but in this group it is recalled that the nostrils are closed over in the adult.

Chapter III, with its summary and analysis of Denmark's Ornithology, includes a brief sketch of the geology since the Ice Age, but one misses an account of its present topography and main floral features which would have helped to an understanding of the distribution of the birds. From the Danish peninsula 324 species and subspecies are at present known, which compares well with the list for the British Isles, of 475. Of the Danish birds, 178 are known to have bred in the country within historic times, though of these some 15 are nearly or quite gone as breeding species. Four species (Great Auk, Pelican, Capercaillie and Great Black Woodpecker) undoubtedly bred in the Stone Age but are now extirpated. Of special interest is the list of casual visitors. It includes 14 species that have come presumably from the west and southwest (America, the Atlantic, British Isles, and Holland), 43 of southern or southeastern derivation (Mediterranean region, southern Russia), and 26 of northern, northeastern or eastern origin. Five American species come in the first category, namely, Blue-winged Teal, Bartramian Sandpiper, Dowitcher, Sparrowhawk, and Yellow-headed Blackbird; in the second are such southern birds as the Egyptian Vulture (*Neophron*), the Bee-eater and *Pastor roseus*, while in the third are, in addition to purely Arctic species, sundry birds of China and Siberia. Here belong also the Long-billed Nutcracker and Pallas's Sand-grouse, whose periodic invasions reach western Europe. With passing years the list of such occasional visitors increases, until, as the author remarks, it seems that there is no quarter of the globe so remote but that it might not eventually be represented in Denmark, for "birds have wings and use them without regard to rules of zoögeography." From the collection of records of such sporadic occurrences and invasions over a long course of years, we may eventually be able to tell what "the rôle of the accidental" (to quote Dr. Grinnell) really is, in the matter of colonizing or of extending a species' range.

The portion of Chapter III, by H. Winge, on the fossil and prehistoric bird remains of Denmark, brings out many interesting

points in the history of the fauna. Beyond the remains of Eider, Old-squaw and Ptarmigan in post-tertiary beds (the last not known since glacial times), the species discussed are those whose bones are found in kitchen-middens of human origin. These deposits, from the artifacts contained, may be approximately dated as of Old or New Stone Age, Bronze Age, and Iron Age to historic times. The Old Stone Age may date back 5-6000 years B.C. In accumulations of this period were found bones of 49 species of birds, including 9 of Ducks, 2 of Swans, 2 of Geese and Grebes, 2 Loons, a Pelican, Crane, Gulls, the Great Auk, 5 kinds of Hawks or Eagles, besides an Owl, the Capercaillie, the Great Black Woodpecker and a few smaller species. The evidence of the Capercaillie and the Black Woodpecker (species long extinct in Denmark) indicates that in former times, when the land was more elevated than now, there were evergreen forests in which these species found a congenial home, but which have given way to mixed or deciduous forests, typical of lower elevations. The bones of the Great Auk from kitchen-middens of these days were in some cases of birds so immature that they may have been bred at no great distance. In accumulations of the Newer Stone Age (2500-1500 B.C.) bones of domestic animals appear. The bird bones comprise much the same species, but the Great Auk is not included, nor does it occur in the still later middens of the Bronze Age (1500-400 B.C.).

With Chapter IV, begins the systematic treatment of the species, with original definitions and keys for the major groups as well as for the species of each. For each genus the author points out the anatomical characters and illustrates these by original figures, carefully drawn, of skulls, sterna, tracheæ or other details. The great worth of these discussions is that he has considered anew the value of these characters, bearing in mind the opinions of other recent workers, so that his conclusions, based on ample material, have more than ordinary weight. Thus, he does not agree with Hartert and Phillips in placing all the palæarctic surface-feeding Ducks except *Spatula*, in the single genus *Anas*, though acknowledging that their relationships are very close. He would recognize *Mareca*, characterized by the short, high, and narrow bill, as well as *Nettion* and *Dafila*, though all are closely related to *Anas*. The three last differ considerably, as he shows, in the conformation of

the bones forming the roof of the mouth in the ethmoid region. The Gadwall he retains in a special genus, *Chaulelasmus*, while *Querquedula* he shows is very like *Spatula* in its cranial characters, though both he considers distinct genera, chiefly on the basis of the great development of bill and tongue in the latter.

In the particular account of each species are given: first (in smaller type), a brief synonymy, then the common names, Danish, Swedish, Norse, Icelandic, Faroese, English, French and German; then follows a diagnosis of the species and a short statement of its manner of occurrence in Denmark, in the Faroe Islands, Iceland and Greenland. In larger type, follows a detailed discussion of the various plumages, and, beginning with the downy young, the changes are followed through for each sex till maturity. A noteworthy feature of these careful descriptions is that they are based upon individual specimens, the ages of which are approximately known from a study of the bones and genitalia. Extensive series of measurements, from specimens of comparable age, are summarized in tables and the various plumages are very fully illustrated by plates in color and in black-and-white half-tone, representing many of the actual specimens described. It may safely be said that no such series of careful measurements and detailed plumage descriptions and illustrations has yet been published. The general distribution, migration, courtship, nesting, food and other habits are then discussed, with particular reference to Denmark, and the addition of pertinent comment and occasional sketches of courting postures. A freer use of side-headings would often have been helpful to the reader in finding particular subjects in this portion of the book.

A few points of special interest to American ornithologists may be mentioned.

The occurrence of the American Green-winged Teal is shown to be on the western, not the eastern side of Greenland, in correction of published statements. Schiøler regards this as a subspecies of *Nettion crecca*, following Winge, Hartert, and others, and brings forward new evidence based on a large series of specimens, to indicate that intergradation occurs in the color characters generally used to define the two forms.

Among some ten specimens of Pintail from Greenland, only one

tallies fairly well with the description of the supposed American subspecies, *tzitzihoa*, the others appearing to be typical *Dafla acuta*. Although the author feels that his American material is insufficient to permit of a final decision, he suggests that a more thorough study as to the validity of this race is highly desirable.

Of the Mallard, no less than four races are recognized as occurring in the Danish possessions: (1) the typical form which is found, in Denmark, both as a migrant and as a breeding bird; (2) the large Northeastern Mallard (*archiboschas*) of the White Sea region, a winter resident in Denmark; (3) the Iceland race (*subboschas*), resident in Iceland; and (4) the Greenland Mallard (*conboschas*). The characters of these races, external as well as anatomical, are pointed out on the basis of so large a series of carefully collected birds, that the author's opinion as to their validity must be given more than usual weight. The account of the Greenland Mallard (the only race recognized by Dr. Phillips in his recent monograph) is undoubtedly the best in print concerning this well-marked subspecies. Its plumages are carefully analyzed and average measurements of over 150 specimens are tabulated. The cranial characters are very distinctive, for in addition to the large size, the skull is extremely narrow between the orbits in correlation with the greater development of the supraorbital glands, which in turn are more prominent in this race since, as a resident bird, it spends so much of the year in salt water coastwise. A series of plates illustrates most satisfactorily the cranial, sternal, and color differences in these races.

Of the American Blue-winged Teal there is one Danish record (1886) and two for Greenland. The American Widgeon is also once recorded from Greenland (May, 1898).

Three species of Swan occur in Denmark, of which Bewick's and the Whooping Swan are regular winter residents and the Mute Swan a breeding as well as a winter bird. Of the Whooper, the author recognizes a smaller race on Iceland, of which some are resident while others reach Danish waters as winter visitors. It is this race, *Cygnus cygnus islandicus* (Brehm), that is occasionally found in Greenland. Measurements are given of seven Greenland birds, all of which, although in white plumage, were with a single exception, inactive sexually, as appeared from dissection. The

plumages and soft parts of all these species of Swan are well shown in color.

The Geese are treated in the same thorough manner. No less than ten forms of *Anser* and four of *Branta* are included, in addition to the Swan-goose, *Cygnopsis*, an eastern species, of which two females, apparently wild birds, were taken January 12, 1918, at Kalvebod Strand.

Schiøler regards all the White-fronted Geese that breed in Greenland as belonging to the large race *gambeli* and gives a series of average measurements based on many birds taken on both coasts of that country as well as figures of the cranium of this and typical *albifrons*. The race *gambeli* occurs on migration in the Faroes and, in some numbers, in Iceland but has not been identified in Danish waters where only the typical form is as yet known, and then but seldom as a migrant.

The Pink-footed Goose (*Anser brachyrhynchus*), is included in the A. O. U. 'Check-list' as accidental on the east coast of Greenland, doubtless on the strength of Winge's record of 1892. But more details indicate that it is a regular breeding bird there. Thus, on Scoresby Sound, flocks undoubtedly of this species were seen as late as August 18 and 27 in 1891, and in June of the following year others, at the same place, one of which was secured and sent to the Zoological Museum at Copenhagen. Thereafter the species was seen there every year, and on July 25 two goslings were shot and in late July adult birds with moulted flight feathers. In recent years a number of birds from this part of Greenland, especially Carlshavn (about 74° north latitude), have been sent back to Denmark by the East Greenland Company, some in breeding condition. A comparison of these with typical Pink-footed Geese reveals no racial differences.

The status of the Snow Geese (which the author refers to the genus *Anser*) is still uncertain as far as Greenland is concerned. According to the measurements given by Winge for two adult and two immature birds, the recorded specimens seem referable to typical *hyperboreus* (the Lesser Snow Goose). More recently, however, the Zoological Museum has received two specimens that seem undoubtedly of the larger race, *nivalis*. The first was shot with three young at Cape York, August 24, 1911; the other, an



adult male, was killed in the Umának district on September 10, 1919. The skull of the former is figured.

The supposed occurrence of the typical Canada Goose in Greenland is based on the record by Winge of a bird taken at Disco in 1864. This specimen is still preserved in the Zoological Museum, and has been reexamined, together with a pair in the same collection collected June 10, 1914, in the Umának district. All these are said to be unquestionably of the small race, *hutchinsii*, which is thus to be considered the breeding bird of Greenland, where, however, it is rare.

The Barnacle Goose is now known to breed regularly on the east coast of Greenland, though in the southern part of that country it appears as a migrant only. Descriptions and measurements are given of the fine series in the Zoological Museum.

Concerning Brant, the author has much original matter to contribute. Typical *Branta bernicla bernicla* is common on migration and as a winter resident in Denmark, rarely occurring on passage in the Faroes. The form commonly found in the latter islands is the white-bellied race, which likewise is the one that occurs as a migrant in Iceland and is the breeding bird of Greenland. He differs from Jourdain in the recognition of the races of this Goose, and regards the breeding ground of the typical form as northern Asia from Taimyr to Nova Zembla. In Kolguev, the breeding birds are intermediate in respect to dark and light belly, but all those from the breeding grounds on the east and west coasts of northern Greenland are the White-bellied Brant. The technical name of this race, should be, according to Schiøler, following Lönnberg, *Branta bernicla hrota* (O. F. Müller). The birds of this type occurring as migrants in Iceland and the Faroes, and as winter residents on the Danish coasts, are presumably from Greenland. In Denmark they are outnumbered by the wintering birds of the typical race.

These are but a few of the many interesting details given in this work. The volume itself is beautifully printed and artistically finished. Although the large page and the weight of a coated paper render it somewhat heavy, they have given the means of reproducing its wealth of illustrations in a sumptuous and satisfactory manner. The latter are the work of Danish artists,

Larsen, Heilmann and Scheel. The many text-figures of skulls and other anatomical details are beautifully drawn and mostly of natural size allowing of close comparison with specimens in hand (though in no case is the actual scale given). The colored plates, reproduced by a three-color half-tone process, are large enough to include several figures each, so that illustrations of different plumage-phases may be readily contrasted. No attempt is made in these to reproduce a background of picturesque surroundings with the figures of birds, but the latter gain in clarity thereby and their poses are for the most part altogether natural. The half-tone plates in black-and-white are beautiful examples of printing.

Not least in point of interest is the glimpse given in the publisher's prospectus of the modest author himself, seated in the comfortable study of his private museum, surrounded by his books and collections. The extent of the latter, gathered through many years of unremitting effort, may be judged when we learn that the material brought together for the critical study of races and plumages of Anseriformes, includes such enormous series as 100 Swans, 1100 Eiders, 400 Teal, often with the skeletons as well as the skins. Of the present volume it is safe to say that no other single work of like scope has yet appeared in which each species has received such thorough and critical treatment based on the painstaking study of adequate series, well illustrated, as this on the Avifauna of Denmark. The work when completed will stand as a splendid monument to the industry and learning of its author and is one that must be taken into careful consideration in any review of American birds.

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