

**LIFE HISTORIES OF NORTH
AMERICAN DIVING BIRDS;
ORDER PYGOPODES**

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Life histories of North American diving birds; order Pygopodes by Arthur Cleveland Bent

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ARTHUR CLEVELAND BENT

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This is an unrevised reprint of
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entitled
LIFE HISTORIES OF NORTH AMERICAN DIVING BIRDS
by

ARTHUR CLEVELAND BENT,
of Taunton, Massachusetts.

It is published with the consent of the
Smithsonian Institution and the author.

Life Histories
OF
North American
Diving Birds

ORDER PYGOPODES

BY
ARTHUR CLEVELAND BENT
Of Taunton Massachusetts

WITH ILLUSTRATIONS

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INTRODUCTION

The monumental work undertaken and so ably begun by Maj. Charles E. Bendire has remained unfinished, and no additional volumes have been published since his death. In 1910 the author undertook to continue the work and began to gather material for it with the cooperation of American ornithologists. The following well-known ornithologists offered to help in gathering material from their several sections of the country: Harold H. Bailey, Walter B. Barrows, Allan Brooks, Earle A. Brooks, William L. Finley, Benjamin T. Gault, A. Brazier Howell, Lynds Jones, Elmer T. Judd, Charles R. Keyes, Arthur H. Norton, Putnam B. Peabody, T. Gilbert Pearson, Charles J. Pennock, Walter W. Perrett, Samuel F. Rathbun, Thomas S. Roberts, Aretas A. Saunders, William E. Saunders, Witmer Stone, Myron H. Swenk, Charles W. Townsend, Edward R. Warren, and Arthur T. Wayne.

The Biological Survey of the Department of Agriculture, at Washington, very kindly placed at my disposal its matchless bibliographical index to published material on North American birds, and a mass of references were carefully copied by Mr. Edward A. Preble. With this and the author's private index as guides nearly every publication of importance relating to North American birds has been consulted.

While the scope of the work was originally intended to cover substantially the same ground covered by Maj. Bendire's work and in practically the same manner, it has since seemed best to somewhat enlarge its scope and to cover more ground, with the different phases of the life histories arranged in a more definite and uniform sequence, so that the reader may more readily find the parts in which he is interested.

The classification and nomenclature adopted by the American Ornithologists' Union in its Check List have been strictly followed, regardless of the author's views on the status of certain species and subspecies; as this is not a work on systematic ornithology, it has seemed best to merely refer to these views briefly in the text and not attempt to discuss them fully.

The main breeding and winter ranges are as accurately outlined as limited space will permit; the normal migrations are given in sufficient detail to indicate the usual movements of each species; it is obviously impossible to give, in a general work of such large scope, all records of occurrence and all dates and no pretense at perfection in this direction is claimed. Many published records,

impossible to either verify or disprove, have been accepted if they are apparently within the known limits of ranges.

The nesting dates are the condensed results of a mass of records accumulated from the data in over 60 of the largest egg collections in the country, as well as from contributed field notes and from many published sources. They indicate the dates on which eggs have been actually found in one or more portions of the breeding range of the species, showing the earliest and latest dates and the limits between which at least half of the dates fall. The names of colors, when in quotation marks, are taken from Ridgway's *Color Standards and Nomenclature* (1912 edition) and the terms used to designate the shapes of eggs, when in quotation marks, are taken from Ridgway's *Nomenclature of Colors* (1886 edition). The italic figures in the measurements of eggs indicate the four extremes of measurement.

After a few introductory remarks where these seem desirable, the life history of each species is written in substantially the following sequence: Spring migration, courtship, nesting habits, eggs, young, sequence of plumages to maturity, seasonal molts, feeding habits, flight, swimming and diving habits, vocal powers, behavior, enemies, fall migration, and winter habits. An attempt has been made to avoid repetition in dealing with subspecies.

Although preference has been given to original unpublished material, so little of this has been received that it has seemed best to quote freely from published material whenever the life history could be improved by so doing. The author does not guarantee the correctness of any statements quoted, but has selected only such as seem to be reliable. Quotations from or references to published matter are indicated by a date in parentheses after the author's name and the reference may be found by turning to the bibliographical index at the end of each part.

Acknowledgments are due to many who have helped to make the work a success, by contributions and by sympathetic encouragement. Dr. Louis B. Bishop has contributed many hours of careful work in collecting from published material and other sources a mass of data needed for the distributional part of this work and has helped to tabulate and arrange it. He has also been very helpful to the author in his studies of plumages and has helped and encouraged him in many ways. Dr. Charles W. Townsend has furnished a lot of original contributions, has read over and corrected much of the manuscript and has written the entire life histories of the puffin and the great auk, in this part, and a number of others to be published in subsequent parts. Rev. F. C. R. Jourdain has sent us a valuable lot of egg measurements collected from eggs in the British Museum and in other foreign collections. Mr. J. H. Fleming has carefully

revised and made valuable additions to the distributional part of the work. Miss Marie H. Manseau rendered much valuable assistance in the preliminary work of reading and indexing published matter and in copying manuscript.

The following American collectors have sent measurements of eggs in their collections: G. A. Abbott, R. M. Barnes, J. L. Childs, W. L. Dawson, C. S. Day, D. R. Dickey, C. E. Doe, J. H. Flanagan, F. S. Hersey, A. B. Howell, A. M. Ingersoll, Lieut. G. R. Meyer, J. P. Norris, jr., L. G. Peyton, J. H. Riley, R. P. Sharples, J. E. Thayer, and F. C. Willard.

A great mass of nesting data has been contributed by practically all of those in the foregoing list and the following: E. Arnold; Egbert Bagg; L. B. Bishop; B. S. Bowdish; J. H. Bowles; W. C. Bradbury; A. W. Brockway; D. E. Brown; F. L. Burns; E. A. Butler; V. Burtch; J. P. Callender; H. W. Carriger; W. L. Chambers; D. A. Cohen; F. M. Dille; H. F. Duprey; O. Durfee; E. R. Ford; N. A. Francis; B. T. Gault; Geological Survey of Canada; I. C. Hall; H. S. Hathaway; R. G. Hazard; L. M. Huey; H. K. Job; E. M. Kenworthy; C. R. Keyes; J. and J. W. Mailliard; T. E. McMullen; Museum of History, Science, and Art, Los Angeles, California; A. H. Norton; T. D. Perry; P. B. Philipp; E. F. Pope; A. E. Price; A. G. Prill; Provincial Museum, Victoria, British Columbia; J. B. Purdy; S. F. Rathbun; M. S. Ray; R. B. Rockwell; G. R. Rossignol, jr.; D. I. Shepardson; W. E. Snyder; F. Stephens; C. F. Stone; W. S. Strobe; C. S. Thompson; A. O. Treganza; J. G. Tyler; University of California; A. Walker; E. R. Warren; A. T. Wayne; B. G. Willard; W. C. Wood; A. D. Dubois; I. E. Hess; A. R. Hoare; A. W. Honywill, jr.; L. B. Potter; H. J. Rust; S. S. S. Stansell; and J. Williams.

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The following have contributed photographs: American Museum of Natural History, R. M. Anderson, Bird-Lore, W. S. Brooks, E. S. Cameron, The Condor, W. L. Dawson, D. R. Dickey, W. E. Ekblaw, W. L. Finley, Francis Harper, H. K. Job, Lynds Jones,

F. E. Kleinschmidt, D. B. MacMillan, C. F. Stone, J. E. Thayer, C. H. Townsend, and Alex. Walker. All such photographs which have been used have been marked with the name of the photographer.

In the study of molts and plumages free access has been given to the collections of the American Museum of Natural History, the Biological Survey, the California Academy of Sciences, the Museum of Comparative Zoology, the United States National Museum, the University of California, and the private collections of Louis B. Bishop, William Brewster, Jonathan Dwight, and John E. Thayer. Specimens for study have also been loaned by Louis B. Bishop, William L. Finley, the Geological Survey of Canada, F. Seymour Hersey, Lawrence M. Huey, and P. A. Taverner. The conclusions arrived at regarding molts and plumages are based on a careful study of all this material, but even that great mass of material proved lamentably insufficient in many cases to arrive at entirely satisfactory conclusions.

We are also indebted to the officials of the following institutions for a mass of data, taken from specimens in their collections, which has been useful in working out distributions and migrations: Biological Survey, California Academy of Sciences, Carnegie Museum, Colorado Museum of Natural History, Geological Survey of Canada, United States National Museum, and University of California.

With the consent of the American Museum of Natural History and Mr. Donald B. MacMillan, Mr. W. Elmer Ekblaw has sent us a full report of the ornithological results of the Crocker Land expedition. This generous contribution has enabled us to publish much new and interesting information regarding arctic bird life in advance of their own plans for future publication. For this exceptional courtesy my readers and I are very grateful. Furthermore, the American Museum of Natural History has kindly placed at our disposal the entire collection of bird photographs made by members of this expedition, from which we have selected what we wanted to use. I am therefore indebted to them for the use of all photographs taken by Mr. MacMillan and Mr. Ekblaw.

Much of the merit in the work is due to the untiring efforts of the author's valued assistant, Mr. F. Seymour Hersey, who has spent many months in the field, often in remote localities, gathering specimens, photographs, and notes for use in this work. The distributional part of the work was practically all done by him, with what assistance Doctor Bishop and the author could give him. No one who has not done work of this kind can appreciate the mass of detail to be handled and the expert knowledge necessary to handle it properly.

Finally, thanks are due to the author's devoted wife, Madeleine V. Bent, for many weary hours of painstaking work in typewriting,