12-14-2015

Forgotten Science of Bird Eggs: The Life Cycle of Oology at the Smithsonian Institution

Katherine Nicole Crosby
University of South Carolina - Columbia

FORGOTTEN SCIENCE OF BIRD EGGS: THE LIFE CYCLE OF OOLOGY AT THE SMITHSONIAN INSTITUTION

by

Katherine Nicole Crosby

Bachelor of Arts
University of Michigan, 2011

Submitted in Partial Fulfillment of the Requirements

For the Degree of Master of Arts in

Public History

College of Arts and Sciences

University of South Carolina

2015

Accepted by:

Allison Marsh, Director of Thesis

Ann Johnson, Reader

Lacy Ford, Senior Vice Provost and Dean of Graduate Studies

DEDICATION

This thesis is dedicated to my family. Thank you to my parents, Kristy, Mike, Gary, and Cheryl, for providing encouragement and humor when I needed it most. To my siblings, Cody, Alexi, Zoe, and Tobin, thank you for always making me laugh and keeping me honest. To my grandparents, Max, Phyllis, Gary, Jane, Sue, Mike, Roger, Nancy, and Charlotte, thank you for the many adventures and for helping me grow. I love you all, and I couldn't have done it without you.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the assistance of the following people, to whom the author is deeply indebted. At the University of South Carolina, my advisor, Dr. Allison Marsh, who provided insightful guidance and feedback at every step of the writing process. At the University of Cornell, Dr. Ann Johnson, my second reader, whose independent study course proved foundational to my approach for this thesis. At the National Museum of Natural History, Division of Birds, Christina Gebhard and Brian Schmidt, who assisted me immeasurably with locating materials and gave me their thoughts on the contemporary state of the egg collection at the NMNH. At the Field Museum, Dr. John Bates and Armand Esai, who assisted me with my research and provided insights on the legacy of their egg collection as well.

ABSTRACT

This thesis analyzes the influence the Smithsonian Institution had over the development of oology as a science from the mid-19th to the early 20th century. The Smithsonian promoted oology, or the study of bird eggs, through publications and collections of eggs in the mid-19th century, and the science enjoyed a brief period of proliferation and approval. In the end, however, the popularity of egg collecting as a hobby, in-fighting between oologists and ornithologists over the validity of oology as a science, and bird conservation groups opposed to collecting eggs, all conspired to halt oology's professionalization, and ultimately led to the downfall of the science, which is no longer practiced today. Museums still house these collections, and their history matters, particularly when the specimens are used to help make scientific discoveries that drive policy, as was the case with the 1972 ban of DDT. The thesis speaks to broader conversations in the history of science and public history about why scientific collections and their histories matter today.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Why do some practices become sciences, while others, like oology, experience moments of popularity but are ultimately abandoned? In the nineteenth century, natural history began to split into the various professional scientific disciplines with which we are familiar today, such as zoology, geology, and physics, among others. The professionalization of science produced divisions within scientific disciplines; in the case of zoology, the process of professionalization created branches based on the study of specific classes of animals, such that the study of birds (ornithology) was separated from the study of fish (ichthyology). While in retrospect these divisions seem logical, if not inevitable, they were not the only specializations naturalists attempted to professionalize within natural history. Some sciences were created and supported in this period that failed to maintain their scientific status to the present, and oology was one such science.

Oology[1], or the collection and study of bird eggs, was once pursued as a scientific practice in the United States. Starting in Great Britain in the 1830s, oology as a scientific practice grew throughout the 19th century, and the first text on North American oology was published in 1857.[2] Originally, the principle object of oology was to collect bird eggs

[1] The word is spelled as both oology and oölogy, and the spelling in this document will mirror how it was spelled in the relevant texts.

[2] William C. Hewitson, *British Oology: Being Illustrations of the Eggs of British Birds, with Figures of Each Species, as Far as Practicable, Drawn and Coloured from Nature: Accompanied by Descriptions of the Materials and Situation of Their Nests, Number of Eggs, &c.* 1 (Newcastle Upon Tyne, United Kingdom: Charles Empson, 1831).

for scientific study. Some oologists would also collect the nests of birds, but the study of nests, or nidology, was considered a separate science. The popularity of egg collecting as a hobby led to two groups of people who engaged in egg collecting: hobbyists and oologists. Some behaviors were common to both the hobbyist and the oologist: both identified the species of egg by observing the parents at the nest; collected the whole clutch of eggs laid by a bird, rather than just taking one egg; drilled a hole into the egg, blew out the contents, and rinsed the egg to preserve the shell; and placed markings upon the eggs for the purpose of identifying them within their collections.

With oologists, however, these activities were augmented with documentation throughout the collecting process for the purpose of preparing the eggs as scientific specimens. Oologists would not always identify the eggs simply by observing the birds at the nest, but would often shoot the bird to collect with the eggs, so that the specific species and subspecies could be determined with a greater degree of certainty. They filled out collection slips with detailed information about the location of the eggs, position of the nest with respect to trees, bushes, bodies of water and other landmarks, the date, the degree of certainty they felt about their identification of the species, and the level of incubation the eggs had undergone by the time they were collected. They standardized tools for drilling into and cleaning out the eggs, up to and including the proper size and location of holes on the eggs. Oologists also made some efforts at standardized marking practices for the eggs they collected; in addition to a set mark used to identify the eggs within their collection, they were also instructed to identify the species on the egg (in later years this would be done through the use of the American Ornithologists' Union (A.O.U.) numbers identifying each species), the date the egg was collected, and the

number of eggs in the set.[3] All of these activities were intended to ensure that the eggs had value as scientific specimens, that is, that they could be properly identified based on species, date, and location for the purposes of comparison with other eggs within the same species and for comparisons between species.

The main material products of scientific oology were collections of bird eggs; these collections ranged in size from a few clutches to several thousand eggs carefully stored in custom-made cabinets. Many of these collections found their way into museums. But what role did museums play in the development of oology as a science? Museums were not simply passive recipients of egg collections, but frequently weighed in on the quantities and species that scientists should be collecting, the appropriate purposes for which eggs should be collected, and who these collectors should be.

Beginning in the mid-19th century with the Smithsonian Institution's circulars until shortly after the founding of the National Audubon Society, museums exerted their influence over scientific oologists through circulars, journal articles, annual reports, and correspondence between museum officials, including curators who were also collectors, and collectors outside of the museum. The beginning of oology's decline was caused by the foundation of societies like the National Audubon Society, as these groups were horrified by the wanton destruction of birds in this period, and in their backlash, began to question the validity of oology as a science. Scientific oology had several challenges that ultimately contributed to its failure to remain a scientific specialization separate from

[3] For example, an egg marked with "15/3" would indicate that it was the 15th set of this species collected by the oologist and that there were three eggs in the set. Some oologists even attempted to standardize where these markings were in relation to the hole on the egg, so that a single glance could tell a scientist almost everything they needed to know about a specimen.

ornithology: the activity's popularity as a hobby in the same period, pushback from ornithologists, and conservation efforts made by groups like the Audubon Society.

The stakes concerning oology for museums were immense. By influencing scientific collectors in terms of who should be collecting and what they should be collecting (which species, from which regions, with how many specimens, etc.), museums were attempting to control the types of donations that they would receive from collectors. In the early years of popular oology, museums wanted to have collections that were as complete as possible, including eggs that were rare or difficult to obtain, and as such they would encourage patterns of collection and donation that would produce diverse and voluminous collections of eggs. Later, as the backlash against egg collecting picked up steam, museums attempted to temper hobbyist collecting in favor of scientific collecting; these efforts included language emphasizing the differences in purpose of scientific and hobbyist collecting, elevating the scientific over the hobbyist approaches.

In addition to contributing to the museums' prestige at the height of oology, museum bird egg collections have had a continuing importance for scientific discoveries, including the research that contributed to the ban on the use of DDT.[4] Studying the influence that museums had on oology demonstrates the strengths and weaknesses that museums like the Smithsonian Institution had in determining the course of a scientific practice. Ultimately, studying how that influence resulted in changes in museum bird egg collections is critical to understanding how museums obtained the collections they have today, and what the consequences of those collections could be for science in the future. If museums do not understand how they acquired their collections and the forces that

[4] U.S. Environmental Protection Agency, *DDT: A Review of Scientific and Economic Aspects of the Decision to Ban its Use as a Pesticide*, EPA/540/1-75-022 (Washington D.C.: Environmental Protection Agency, 1975), 62-68.

influenced them, the accuracy of the science to which their collections contribute could come into question.

This thesis examines the role of one museum, the Smithsonian Institution's National Museum, in shaping the history of oology in the United States. The selection of this museum in particular was based on the fact that this institution had the most notable documentation on the process of shaping oology as a scientific practice in a single institution, as well as its later importance as an influential player in the museum world with respect to collection policy and philosophy. Chapter one of this thesis introduces the topic of oology at the Institution and provides a roadmap for the remainder of the thesis. The second chapter gives important historiographical background on the thesis to situate it within several conversations in the field. The third chapter starts with a brief section detailing the early history of oology prior to the January 1st, 1860 Smithsonian Institution circular by Joseph Henry, including oology's move across the Atlantic from Great Britain to the United States and the influence of early oologists and museums on the development of oology. Chapter four covers the period from 1860 to 1884, when the Institution made its first tentative steps toward promoting oology as a science. Chapter five covers the period from 1884 to 1897, the height of oology as a scientific practice and a hobby. The Smithsonian Institution enjoyed considerable influence in this period and the involvement of oologists in the Institution increased substantially. The sixth chapter examines the backlash against hobbyists and oologists and the decline of oology as a specialization, from 1897 to 1922, when the Division of Birds permanently absorbed the Section of Birds' Eggs. Chapter seven, the conclusion, discusses the important

implications of the history of oology at the Smithsonian for the present day state of museum collections and ornithology.

Oology at the Smithsonian Institution was driven by individuals in positions as Honorary Curators and Custodians, whose enthusiasm for the science of oology provided important catalysts for its growth and development, and when they died off, so did the practice. With the deaths of these individuals, the science faltered and eventually collapsed without their sponsorship, as it was unable to withstand criticisms voiced outside the Institution without a persuasive advocate. Oology reached its zenith in the 1880s-1900s, with declining popularity and prestige afterward, particularly in light of the Audubon Society's activities in the late 19th and early 20th centuries. Although the Audubon Society was founded primarily in reaction to the slaughter of birds for fashion purposes, it encouraged criticism of all activities that resulted in the death of birds, including hunting and scientific practices.[5] While ornithology was able to adapt its practices to remain palatable to the Audubon Society, the unscientific popularity of egg collecting as a hobby combined with already extant derision of oology on the part of ornithologists, and the Migratory Bird Treaty Act to ring the death knell for oology as a science. While some individuals held out until the 1920s and beyond, the practice ultimately died off with the practitioners that had pursued it in its heyday.

[5] Mark V. Barrow, Jr., *A Passion for Birds: American Ornithology after Audubon* (Princeton: Princeton University Press, 1998), 112-113.

CHAPTER 2

HISTORIOGRAPHY

This thesis is in conversation with other works describing the role of museums in natural history. The first of these works is Paula Findlen's *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy*, published in 1996. This work examined the early development of museums in Italy and the role that they played in natural history in the period, and argued that the explosion of collecting related to natural history created the necessity for museums, but museums then in turn influenced the theoretical underpinnings of natural history.[6] Temporally and geographically, Findlen's work and this thesis are obviously distinct, yet in many ways their arguments complement each other, for this thesis also argues that museums, and in this case the Smithsonian Institution in particular, played a role in the development and change of natural history. In the case of this thesis, however, the focus is specifically on oology rather than all of natural history, and the change in question is from bird egg collecting as an encyclopedic process suitable as both a hobby and scientific practice to an illegitimate and outdated science harming bird conservation efforts. Findlen's work nonetheless provides an excellent framework for analyzing how museums and natural history influenced each other through her examination of changes in natural history philosophy, and this thesis uses a similar methodology to prove its argument.

[6] Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley, CA: University of California Press, 1996), 3-4.

The next work with which this thesis converses is Mark V. Barrow Jr.'s *A Passion for Birds: American Ornithology After Audubon*, published in 2000. Barrow's work analyzes the history of American ornithology from the end of the Civil War to World War II, and argues that ornithology struggled to differentiate itself from birdwatchers and was not completely successful in doing so due to the ornithologists' reliance on amateur bird watchers for sighting data.[7] Barrow's work contains rich detail on the development of ornithology as a professional science, including an emphasis on the role of amateurs in the production of knowledge for ornithology. In this work, Barrow describes how ornithology and oology had a contentious relationship, with some ornithologists discrediting oology as a mere hobby, rather than a science, while others argued that oology was an important part of ornithology and was therefore deserving of serious study.[8]

This thesis studies the other side of this coin, examining how the Smithsonian Institution contributed to the growth of oology as well as its ultimate downfall, and demonstrates how museums can make or break the chances for the professionalization of sciences. Furthermore, Barrow emphasizes the influence the conservation movement, in the form of the American Ornithologists' Union's Committee on Bird Protection and the Audubon Society, had on ornithology and how these organizations curtailed the collecting practices of ornithologists, first with the 1886 model law and later with other pieces of legislation.[9] This process of censure and debate is mirrored in the debates surrounding the legitimacy of oology as a science, with nuances specific to oology into which this thesis will delve further.

[7] Barrow, *A Passion for Birds,* 6.
[8] Barrow, *A Passion for Birds*, 139-142.
[9] Barrow, *A Passion for Birds*. 135.

Also in 2000, Mark V. Barrow Jr. published an article in *The Journal of the History of Biology* titled, "The Specimen Dealer: Entrepreneurial Natural History in America's Gilded Age." In this article, Barrow argues that professional specimen collectors and dealers played a major part in the development of natural history in the United States.[10] This article therefore examines an intermediate collecting position between those that this thesis studies, the hobbyists and the scientists, and demonstrates the importance that specimen dealers had to both types of collecting. This thesis complements the work done in this article by digging deeper into the history of a specific type of collecting, oology, and how a powerful institution, the Smithsonian, influenced that hobby to demonstrate that the popularity of activities like natural history collecting was influenced by multiple sources.

Finally, Robert Kohler's *All Creatures: Naturalists, Collectors, and Biodiversity, 1850-1950*, published in 2006, converses with this thesis through their mutual analysis of museum influence on natural history. Covering the same geography and the same period, *All Creatures* and this thesis nonetheless have different arguments to make about how museums influenced natural history. Kohler's work argues that museums sponsored expeditions to collect as many specimens as possible and in the process helped to discover biodiversity, therefore emphasizing the importance of museums as influential institutions in the production of science.[11] This thesis, while also interested in understanding how museums influenced science production, attempts to answer that question using oology as a case study to examine the Smithsonian Institution's influence

[10] Mark V. Barrow, Jr., "The Specimen Dealer: Entrepreneurial Natural History in America's Gilded Age," *Journal of the History of Biology* 33, no. 3 (2000): #.
[11] Robert E. Kohler, *All Creatures: Naturalists, Collectors, and Biodiversity, 1850-1950* (Princeton: Princeton University Press, 2006): xi.

over the philosophy of natural history collecting and the behavioral changes of hobbyists and scientific oologists that occurred as a result. It is important to note that oology was one of many specializations at the National Museum to benefit from the Institution's penchant for expeditions, but for most of the expeditions that the Institution supported or benefitted from, oology was an afterthought, rather than a primary focus.

CHAPTER 3

BACKGROUND

In 1846, the Smithsonian Institution was founded for the purpose of the increase and diffusion of knowledge, and Joseph Henry, the first Secretary of the Institution, had definite ideas about how that increase and diffusion should be enacted. Specifically, Henry argued that "no particular kind of knowledge is designated, hence a liberal interpretation of the bequest will exclude no part of the great domain of science and literature from the degree of attention its importance may demand."[12] Henry envisioned the Institution investigating a multitude of sciences, from meteorology to zoology, and from mineralogy to astronomy. With substantial monetary support (in the form of a large annual income), this new Institution was poised to promote a variety of sciences, including the exciting and nascent science of oology.

Oology as a science dates to the 1830s in Great Britain, and its leap across the pond was due in no small part to the actions of the Smithsonian Institution shortly after it was founded. In 1831, William C. Hewitson published the first volume of *British oölogy; being illustrations of the eggs of British birds*, the first monograph on oology.[13] Hewitson published subsequent volumes of the first edition until 1838, with a second edition

[12] Smithsonian Institution, *Fifth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1850*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1851), 6.
[13] Hewitson, 1.

printed from 1842-1846 and a third edition from 1853-1858, demonstrating the popularity and demand for Hewitson's work in Great Britain.[14] Hewitson's work provided an important foundation for the science of oology globally, and the existence of such a popular and well-respected series in Great Britain encouraged American ornithologists to pursue similar investigations in the United States.

In the *1855 Annual Report of the Board of Regents of the Smithsonian Institution*, Joseph Henry discussed Brewer's monograph, as it had been submitted, and the reasons why the Smithsonian was interested in promoting the science of oology. First, Henry noted that this paper, should the Smithsonian decide to publish it, would fill a gap in the existing literature, as no American ornithologist had published a work on oology or provided extensive descriptions on bird eggs in their works.[15] This echoes the intent of the Smithsonian's bequest to advance and diffuse knowledge, as it expands research in an otherwise uncharted territory. Henry further expounded upon the value of encouraging individuals like Brewer to write on obscure topics like oology. While he argued that it would be "a perversion of intellect" to encourage a large number of people to investigate a small field like oology, the Smithsonian's mission could support one individual's dedication to research in an obscure field.[16] By encouraging individuals to delve deeply into less popular sciences, Henry hoped that the Smithsonian would be able to increase

[14] Elliot Coues, "Fourth Installment of Ornithological Bibliography: Being a List of Faunal Publications Relating to British Birds," *Proceedings of the United States National Museum* 1 (1878): 474.
[15] Smithsonian Institution, *Tenth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1855*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1856), 19.
[16] *Tenth Annual Report*, 19-20.

the knowledge of the greatest number of sciences possible, and therefore honor the terms of Smithson's will.

From this, we can draw two conclusions, and of these, the first is that the Smithsonian did not see oology as a major science during this time period. Unlike its more popular sister science, ornithology, publishing a work on oology required a justification about the merits of the act in terms of a more broad ideology of the advancement of science, rather than standing on the value of the science alone. The second conclusion to be drawn from this description of the proposal to publish Brewer's work is an emphasis on pursuing smaller branches of science, like oology, in a highly systematized manner in order to create as complete a stock of knowledge as possible. In this pursuit, creating an encyclopedic collection for reference would have been advantageous, if not necessary, and here we can see the beginnings of tensions over how the Smithsonian Institution viewed the purpose of its museum at the outset and how that purpose changed over the course of the 19th and 20th centuries.

In the United States, Thomas M. Brewer's work was probably one of the first to be written on the subject of oology. Published as a separate memoir in 1857, the first volume of *North American Oölogy* analyzed the eggs of Raptores and Fissirostres, which he intended to follow with volumes on the other classifications of birds.[17] In an article written for *Bulletin of the Nuttall Ornithological Club*, editors J. A. Allen (the first president of the American Ornithologists' Union and first curator of birds and mammals at the American Museum of Natural History), Spencer Fullerton Baird (curator and

[17] Thomas M. Brewer, *North American Oölogy: Being an Account of the Habits and Geographical Distribution of the Birds of North America during their Breeding Season; with Figures and Descriptions of their Eggs, Part I – Raptores and Fissirostres*, Smithsonian Contributions to Knowledge (Washington, D.C.: Smithsonian Institution, 1857).

Assistant Secretary of the Institution from 1850 to 1878, and the second Secretary of the Smithsonian Institution from 1878 to 1887), and Dr. Elliott Coues (a noted American ornithologist) claimed that Brewer was one of the first to write on oology and that he was considered "a leading authority" on the subject.[18] Interestingly, Brewer credited his fascination with bird eggs to John James Audubon, the naturalist and artist renowned for his paintings of birds. In the introduction of his work on oology in North America, Brewer wrote that he owed his interest in oology to Audubon, stating that, "he must give credit for having been the first to warm into a permanent and enduring aim the earlier germs of interest in this subject."[19] It is unclear whether or not Audubon himself engaged in oology, but Brewer's admiration for the man makes it clear that Audubon was responsible for Brewer's interest in ornithology, at the very least.

In an effort to encourage memoirs like Brewer's work on oology, the Smithsonian had to solicit donations of specimens for investigators to study. In the appendix to the 1855 Annual Report, Baird specifically mentioned in a list of desiderata that bird eggs were "always desirable, especially such as may serve to complete the work of Dr. Brewer on American eggs, now underway."[20] Prior to 1855, there were few donations of birds' eggs to the Smithsonian Institution, so increasing the size of the collection was of critical importance to be able to assist Brewer in his work. The first donation of bird eggs to the Institution occurred in 1850, when Baird donated eggs representing approximately 150 species of North American birds and nests and eggs representing approximately 75 species of European birds; although a sizeable donation (some species had over 100

[18] J. A. Allen, Spencer F. Baird, and Elliot Coues, "Thomas Mayo Brewer," *Bulletin of the Nuttall Ornithological Club* 5, no. 2 (1880): 103.
[19] Brewer, iv.
[20] *Tenth Annual Report*, 55.

duplicates) it was the only donation of eggs for that year.[21] In 1851 there were two donations of bird eggs, but one was of European species (not useful for Brewer's work on American species) and the other was a donation of eggs from one species of bird, the guillemot.[22] There was only one donation of bird eggs in 1852, hailing from Florida, but no donations of eggs in 1853 or 1854.[23] In 1855, the number of bird egg donations climbed to five, and only one of these was not from North America.[24] Given the small number of donations the Institution had received, the sense of urgency present in the 1855 Annual Report reflects the Institution's knowledge that donations would have to increase in order for its collection to be of use to Brewer in his work.

After 1855, the number of bird egg donations remained steady. In 1856, there were only three donations of bird eggs.[25] There were no bird egg donations in 1857, but

---

[21] *Fifth Annual Report*, 43.
[22] Smithsonian Institution, *Sixth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1851*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1852), 46 and 61-62.
[23] Smithsonian Institution, *Seventh Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1852*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1853), 68. Smithsonian Institution, *Eighth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1853*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1854). Smithsonian Institution, *Ninth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1854*, by Joseph Henry and Spencer Fullerton Baird, (Washington D.C.: United States Government Printing Office, 1855).
[24] *Tenth Annual Report*, 59-61.
[25] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1856*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1857), 65-68.

the previous year's discussion of Brewer's work on oology had prompted several individuals to enter into correspondence with the Institution in an effort to express their interest and contribute to the work.[26] The year 1858 saw an increase in activity surrounding the eggs at the Institution, as the Institution made a point of arranging the nest and egg collection to create a "highly attractive feature," and the number of donations jumped to five; the most notable donation for this year was that of John Xantus, who donated hundreds of bird nests and eggs in addition to other natural history specimens.[27] In this early period, the Institution was attempting to promote the increase and diffusion not just of oology, but also of a substantial number of other sciences including other branches of zoology, meteorology, geology, and astronomy, among others. In this case, while Baird and the rest of the Institution may have hoped that a brief mention of eggs as desiderata in the Annual Report would garner them an increase in donations, they were ultimately proven wrong on this score, as the Institution was too small and too young to be influential through suggestions yet, and it was forced to be much more explicit in its requests in order to acquire the materials Brewer needed for his work.

In total, there were fifty-eight donations of bird eggs to the Institution in 1859, a massive jump from previous years where donations had been in the single digits.[28]

---

[26] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1857*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1858), 18, 50-54.

[27] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1858*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1859), 51-62.

[28] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for*

Because of this dramatic increase, the entire collection of skins and eggs had to be rearranged to include the new accessions.[29] While this increase was due to an overall increase in the number of accessions from 1858 (127 accessions) to 1859 (301 accessions), the Smithsonian was still unsatisfied with the quantity of oological specimens they had received, as was made evident by its decision to produce a circular in spite of the large increase in collections.

The year 1859 saw several important changes in how the Smithsonian Institution approached the practice of oology. In 1859, the Institution took a new step in soliciting collections from the public for the purpose of supporting publications: the circular. Sent to individuals to encourage the study of natural history, the first batch of circulars focused on American grasshoppers (due to their destructive tendencies with respect to American crops) and the nests and eggs of birds.[30] Of all the topics the Institution could have focused the first circulars on, entomology and oology were the first. The prioritization of these two topics in the first circulars is telling, as the Institution hoped to promote entomology along with oology in its early years, and it clearly emphasized this by publishing and circulating requests for further data on these subjects to assist its collaborators with publications on the subjects.

Also in 1859, the first expedition to have a naturalist travelling with an expressed emphasis on collecting bird eggs took place.[31] By the laws establishing the Smithsonian Institution in 1846, the Institution was (and still is) the legal repository for "all objects of

---

the Year 1859, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1860), 72-78.

[29] *Annual Report for the Year 1859*, 70.

[30] *Annual Report for the Year 1859*, 33-34. The Circular in Reference to the Collecting of Nests and Eggs of North American Birds would not be finished in time for publication in 1859, but was instead distributed in 1860. (1859 Annual Report, page 55).

[31] *Annual Report for the Year 1859*, 66.

natural history, plants, and geological and mineralogical specimens belonging to the United States,"[32] meaning that the natural history products of all explorations were sent to the Institution, a fact that worked in its favor, as it could send naturalists with these explorations or communicate with those on the explorations regarding its desiderata.[33] The National Museum was frequently the beneficiary of expeditions planned by other government agencies including at various times the War Department, the Interior Department, and the Fish and Wildlife Service, among others.[34] In some instances these were deliberately planned explorations, while in others, the Institution benefitted from amateur naturalists stationed at forts throughout the United States, who made explorations under the Institution's auspices. Regardless of their form, these explorations and national surveys were "the most important and constant sources of material" for the Institution during the period of this thesis.[35] Clearly, as a source for materials the expeditions were without equal, but that did not mean that they were perfectly suited to the needs of the Institution: because the Institution was not in control of these

[32] 20 U.S.C. § 50
[33] Kohler, 118.
[34] *Annual Report for the Year 1859*, 63. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1860*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1861), 67. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1886. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1886*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1887), 163.
[35] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1903. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1903*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1904), 17.

explorations, curators at the Museum had to persuade naturalists affiliated with the explorations to collect their desiderata, but ultimately could not compel them to do so. In the case of the 1859 exploration with an emphasis on bird eggs, this benefitted the development of oology as a scientific specialization. In the case of other explorations, from which oology occasionally benefitted, the collections were made at the whim of the particular naturalist attached to the exploration, and therefore could not be counted on as a reliable source for any one branch of science, including oology.

Most importantly for the science of oology, 1859 was the year that the Smithsonian republished Brewer's first volume of *North American Oology* in the *Smithsonian Contributions*.[36] The decision to reprint the memoir as a part of the *Smithsonian Contributions* demonstrated the investment that Smithsonian had in Brewer's work, as they increased the circulation of the memoir at their own expense and highlights the importance of the work's contribution to scientific knowledge. It was in the interest of assisting Brewer in producing the next volume of this work that the Institution increased its efforts to promote the science of oology, ushering in a new era for the science at the Institution.

[36] Brewer.

CHAPTER 4

EARLY SMITHSONIAN INTERVENTIONS IN OOLOGY

Joseph Henry, the first Secretary of the Smithsonian Institution, set the tone for the Institution's attitude towards the practice of oology in the mid 19th century. Henry served as the Secretary from 1846 to 1878, and during that period he promoted active collecting by hobbyists and scientific oologists through circulars and private correspondence.

One of the earliest Smithsonian publications attempting to influence oologists was a circular published by the Smithsonian Institution on January 1st, 1860. Written by Joseph Henry, this circular was titled "Instructions in Reference to Collecting Nests and Eggs of North American Birds." The circular starts with eight pages of advice written by Joseph Henry, followed by a thirteen-page article written by Alfred Newton, an English oologist, which described egg collecting and preservation as practiced in England.[37] In the section written by Henry, the circular discusses the Smithsonian's request for bird egg donations and gives preliminary advice for potential collectors. In Newton's section, the circular goes into greater detail regarding the technical aspects of collecting, including gathering the correct information and how to process and preserve eggs after they had been collected.

[37] Alfred Newton, "Suggestions for Forming Collections of Birds' Eggs," *Smithsonian Miscellaneous Collections* 2 (1862): 674.

The Smithsonian was not encouraging collecting without a purpose; instead, the Institution had distinct goals in mind for why oologists should collect the specimens that the Institution desired. In this circular, the Smithsonian stated that it "[was] desirous of collecting as full a series as possible of the nests and eggs of birds of North America… to serve as materials for a work on North American Oölogy, to be prepared by Dr. Brewer, of Boston, and published in successive parts by the Institution."[38] The goal of attaining an encyclopedic collection was one the Institution pursued not just with respect to bird eggs, but for all specimens the Smithsonian could hope to collect. By including Alfred Newton's description of how to collect eggs using the most current scientific practices possible, the Smithsonian Institution further cemented the idea that collecting should be scientific in nature. Newton's essay describes several levels of scientific practice necessary for obtaining information about the eggs and ensuring that they can be used for research; in particular, Newton emphasized the importance of identification and authentication for the science of oology and described in great detail how these processes should be done.[39] In the interest of creating a work on North American oology that would be comparable to William C. Hewitson's *British Oölogy*, published in 1833, the Smithsonian Institution recognized the need to solicit donations from members of the public throughout the country, as their own collections were still too small to be of use, and recognized the importance of ensuring that these specimens were scientific in nature.

The Institution was soliciting eggs from all but the most common species of North American birds, and encouraged collectors to gather as many specimens as possible for their collection. But who were the collectors to which Henry addressed his circular?

[38] Joseph Henry, "Instructions in Reference to Collecting Nests and Eggs of North American Birds," *Smithsonian Miscellaneous Collections* 2 (1862), 665.
[39] Newton, 675.

While Henry concedes that nests should not be disturbed by those that are not "competent," he urged that "the services of boys and other persons on farms, plantations, &c., may be called upon to great advantage into requisition in collecting eggs."[40] He concluded his circular by stating that the Institution had a pamphlet "containing the necessary instructions for preserving birds" that it was willing to send to anyone who asked for it.[41] We can conclude much from Henry's circular about the state of egg collecting in the United States during this period, and who the collectors were. The most important of these conclusions that we can reach is that egg collecting during this period was an activity that was conceived of as something that the average man could do, and this average man could even solicit the assistance of children. Indeed, with the inclusion of Newton's instructions for collecting eggs, the Smithsonian was attempting to turn interested civilians into oologists, hoping that by instructing them on scientific methods that they would engage in egg collecting as a science, rather than a hobby.

Two related areas of collecting that the circular addressed were the species and quantity of specimens that the Institution hoped collectors would collect on their behalf. The circular stated that the Smithsonian Institution "respectfully [invited] donations from all parts of the country of as many kinds of nests and eggs as can be obtained."[42] The Institution even encouraged submitting duplicate eggs, stating that because "duplicate eggs of all kinds, and in any number, can be readily used in the exchanges of the Institution, and in supplying other cabinets, no fear need be entertained of sending more than enough for the purposes in view."[43] This does not mean, however, that the

[40] Henry, 667.
[41] Henry, 671.
[42] Henry, 665.
[43] Henry, 665-666.

Institution was interested in having oologists collect completely indiscriminately. Although the Institution encouraged collecting for all species, it did prioritize species that it desired over others, including "eagles, hawks, owls, woodpeckers, small waders, [and] ducks," among others, and listed specific species in the text of the circular as well as in an appendix at the end of the circular.[44] Some of these species were prioritized for reasons of scarcity regarding known egg specimens, while others appear to be prioritized based on the appeal of the birds themselves.[45] Other species, however, were less desirable because of how common the species were, including "the eastern bluebird *(Sialia sialis)*, the robin *(Turdus migratorius)*, the cat-bird *(Mimus carolinensis)*, the red-winged blackbird *(Agelaius phoeniceus)*, and the crow blackbird *(Quiscalus versicolor)*."[46] The emphasis here was on limiting the collection of common, well-represented species, while at the same time directing oologists to send the Museum more desirable specimens instead. Even as early as 1860, the Smithsonian had already started to attempt to restrict the collecting behaviors of oologists to comply with their vision of oology, one where indiscriminate collecting was discouraged and instead to approach the specialization with an eye toward increasing knowledge through encyclopedic collections. This push to standardize the science of oology would not stop with this circular, and reflects the desire on the part of the Smithsonian to legitimize oology as a science in the way that other sciences of the period were becoming professionalized.

Viewed as a whole, this document serves to demonstrate the Smithsonian's approach to oology in several important ways. First, the purpose of egg collecting in this

[44] Henry, 666.
[45] Henry, 666.
[46] Henry, 666. The Smithsonian did not completely discourage collecting of these species, however, but rather urged collectors to be circumspect by limiting their collecting to one set of eggs for these species

early period was for scientific research, according to the Smithsonian. Second, the style of scientific collecting, focused on large quantities of eggs, closely mirrored the practice of egg collecting as a hobby that occurred in the same period. While the Institution may have had scientific goals in mind when they urged collectors to secure large numbers of eggs, this may have inadvertently encouraged non-scientific collectors as well. In this period, the Smithsonian pursued a specific collection policy with respect to natural history specimens.

In the 1865 Annual Report, Joseph Henry reiterated that this collecting policy preferred to collect for the advance and diffusion of knowledge, rather than for exhibiting objects to the general public.[47] Because the cost of the museum was consuming an increasing proportion of the Smithsonian's annual income, Henry argued that the museum's collections should be limited to type specimens, and that the museum should not collect indiscriminately.[48] The results of the 1860 circular contradicted Henry's hopes about the collection policy of the Institution. In the wake of the 1860 circular, the number of donations of eggs to the Smithsonian Institution grew substantially. Donations of eggs to the Institution went from 58 accessions in 1859 to 85 accessions in 1860.[49] Furthermore, oology was one of only three divisions of natural history to have additions to the collection from every part of the country, a fact that the Institution directly attributed to the publication of the circular earlier in 1860.[50] In this year, six explorations included bird eggs in their natural history specimens to a degree notable to the Institution,

[47] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1865*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1866), 59.
[48] *Annual Report for the Year 1860*, 49.
[49] *Annual Report for the Year 1860*, 77-85.
[50] *Annual Report for the Year 1860*, 66.

and the Institution also received bird egg donations from Chile and Europe.[51] The increase in specimens from not only expeditions but individuals at home and abroad demonstrated the growing reach and influence the Smithsonian was beginning to wield over scientific research, particularly within a field as relatively new as oology. Unfortunately for the Institution, the Civil War presented an obstacle to continued work, not only for oology, but for all types of research.

During the Civil War, the collecting practices of the Institution changed to reflect the necessities of the period. While the Institution continued to function, it deliberately cut back on expenditures not related to active operations in an effort to ensure the health of the Institution's funds.[52] The war also curtailed government expeditions, as only one of them was able to provide specimens during 1861, severely limiting the main source from which the Institution received its collections.[53] One exploration that remained relatively unaffected by the war was Robert Kennicott's exploration of the Hudson Bay Territory, which he continued from 1861 to 1862 with the purpose of collecting eggs of birds, among other specimens.[54] While the activities of the Smithsonian Institution were decreased during the period, they did not stop completely, particularly as it related to research and publication activities.

---

[51] *Annual Report for the Year 1860*, 67-72.
[52] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1861*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1862), 15-16.
[53] *Annual Report for the Year 1861*, 58. The only expedition to provide collections in 1861, the Northwest Boundary Commission, did not actually collect any objects in 1861, but the specimens that they collected in 1860 did not arrive at the Smithsonian until 1861.
[54] *Annual Report for the Year 1861*, 59-60. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1863*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1864), 52-53.

In 1862, the Smithsonian published the second volume of its Miscellaneous Collections, which contained a copy of Joseph Henry's 1860 circular, "Instructions in Reference to Collecting Nests and Eggs of North American Birds."[55] While the war made domestic collecting more difficult, the Smithsonian continued to receive international donations of bird eggs and nests from expeditions and collectors abroad, including those based in Canada, Jamaica, Mexico, England, and Palestine.[56] Explorations in the eastern portion of the United States in 1865 focused largely on collecting more eggs for Brewer's work on *North American Oölogy*, demonstrating a continued interest in promoting publications like Brewer's work to expand scientific knowledge.[57] Accessions of bird eggs fluctuated wildly during the war, from 85 in 1860, 32 in 1861, 14 in 1862, 41 in 1863, 12 in 1864, to 16 in 1865.[58] While the Smithsonian attributes the spike in 1860 to the publication of a circular with instructions for collecting bird eggs, the variation during the war must be attributed to the war itself. With the expeditions headed by the army put on hold for obvious reasons, the Smithsonian was much more dependent on the donations of individuals for their accessions, which explains the great variation in accessions for this period.

The years from 1866 to 1877 were largely uneventful ones for oology at the Smithsonian Institution. Brewer continued to work on Part II of *North American Oölogy*, and the Smithsonian encouraged this work through lending him specimens in 1866, 1867,

---

[55] Henry, 665.
[56] *Annual Report for the Year 1863*, 52-55. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1864*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1865), 82-83. *Annual Report for the Year 1865*, 62.
[57] *Annual Report for the Year 1865*, 60.
[58] See Table 4.1.

and1868; during this period, Brewer also worked with Baird on a monograph describing North American ornithology, which helped to explain why the second volume was never published.[59] In expeditions for each year, eggs were among the objects collected by naturalists. In 1876, the second part of an account of the natural history of Kerguelen Island was published as the third article Bulletin of the National Museum. While the first part of this work was devoted solely to the ornithology of the Island, the second part contained smaller sections on a variety of subjects, including oology, botany, geology, mammalogy, and so on.[60] Although oology was not completely forgotten during this period, it was not strongly emphasized either, in spite of the growing popularity of egg collecting as a hobby in the United States; this would change dramatically with the addition of an Honorary Curator for the egg collection in 1884, and may have been one of the contributing factors to the decision to create such a position in the first place. After all, the first volume of Brewer's *North American Oölogy* was published in 1857 and reprinted in 1859, yet by Brewer's death in 1880 there had been few other publications on

---

[59] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1866*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1867), 46. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1867*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1868), 52. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1868*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1869), 37. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1870*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1871), 41.

[60] J.H. Kidder, "Contributions to the Natural History of Kerguelen Island, made in connection with the United States Transit of Venus Expedition, 1874-'75, Part II," *Bulletin of the United States National Museum* 1 (1877): 162-195.

the subject of oology at all. Given the Institution's emphasis on the primacy of publication as a method of ensuring the "increase and diffusion of knowledge," it is not surprising that they found this period of publication unsatisfactory for the science of oology.

The museum continued to accession eggs during this period, but at a rate lower than it sustained during the Civil War. The average number of accessions from 1850 to 1865 was 16.9 per year, with the most accessions in a single year occurring in 1860 (85 accessions containing bird eggs), while the average from 1866 to 1877 was 14.2 accessions per year, with a peak of 24 accessions containing bird eggs in 1867.[61] Even this much growth was cause for concern for Joseph Henry. In 1876, Henry argued in the Annual Report that the care and expense of the Museum, rather than being a benefit, was actually harming the intended activities of the Institution, namely that of the advance and diffusion of knowledge, and called for the museum to be separated from the Institution and provided for separately.[62] Thus, the Institution and its Museum continued their uneasy truce in the pursuit of knowledge through collecting.

The deaths of Joseph Henry in 1878 and Thomas Brewer in 1880 had dramatic effects on oology as a science at the Smithsonian. Henry's death, in 1878, prompted a change in the leadership of the Institution and the attitude towards collecting and the Museum. Spencer Fullerton Baird, previously the Assistant Secretary, became the

[61] See Table 4.1.

[62] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1876*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1877), 12-13.

Secretary of the Institution.[63] While Baird initially argued in 1878 that the plans for collecting and scientific knowledge established by Henry should remain the same, he changed the policies surrounding the museum significantly by 1881. In the 1881 Annual Report, Assistant Director G. Brown Goode described the periods in the history of the Museum, which he periodized as follows: 1846 to 1857 – the Museum solely functioning as a scientific institution; 1857 to 1876 – the Museum as the "National Cabinet of Curiosities"; and 1876 to 1881 – the Museum as a space of public education in the wake of the 1876 Philadelphia Exhibition.[64] As a result of this change in policy, greater emphasis was placed on exhibiting natural history collections and demonstrating their natural history value. Henry was not pleased with the Museum's existence as a "Cabinet of Curiosities," and he mentioned specifically and frequently in the annual reports that the funds of the Institution should be spent on increase knowledge globally, rather than creating a museum that could only have a local impact on knowledge.[65] It was only under Baird's leadership that this transition to an educational museum, with an emphasis on increasing collections for education and display, was possible, as he embraced the transition to an educational museum in a way that Henry never would have.

The death of Thomas Brewer in 1880 did not have as profound an effect on the Institution writ large as that of Joseph Henry, but for the science of oology, it was significant. Despite many years of work, Brewer had only completed part I of *North*

[63] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1878*, by Spencer Fullerton Baird and G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1879), 9-10.
[64] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1881*, by Spencer Fullerton Baird and G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1882), 81-82.
[65] *Annual Report for the Year 1876*, 12-13.

American Oölogy at the time of his death, but had continued to compile materials for later parts until his death.[66] With Brewer's death, it looked as though there was no heir apparent to continue his work. Robert Ridgway was the curator of birds at the Museum, but his focus was primarily on ornithology, rather than oology. Furthermore, Ridgway was already consumed with work on North American ornithology, on which he had worked with Brewer in the past; with one massive project underway, it was unlikely that Ridgway would accept the responsibility of taking on another. In order for oology to survive at the Smithsonian, a new naturalist was needed, one to take oology to previously unimagined heights of scientific inquiry and public popularity.

The Smithsonian Institution initially promoted oology as a distinct science and attempted to differentiate it from both ornithology and hobbyist egg collecting through specific practices the Institution promoted. Specifically, the Smithsonian Institution defined scientific oology through descriptions of who legitimate scientific oologists were and toward what purpose they collected eggs. Legitimate, scientific oologists collected quantities and species of eggs that the Smithsonian suggested, while collecting behaviors deviating from the suggestions of the Smithsonian were the hallmarks of the hobbyist egg collector.

In the next phase of oology's development as a science in the Institution, it encountered favorable circumstances in the broader world, for oology as a science was booming outside the Museum as well. Oology's popularity was most evident through the multiplicity of journals published specifically for oologists, including: *The Oologist*

[66] "J. A. Allen, Spencer F. Baird, and Elliot Coues, "Thomas Mayo Brewer," *Bulletin of the Nuttall Ornithological Club* 5, no. 2 (1880): 104.

(1875)[67], *The Young Oologist* (1884), *The Oologist: for the student of birds, their nests and eggs* (1884), *The Sunny South Oologist* (1886), *The Bay State Oologist* (1888), *The Oologists' Exchange* (1888), *The Ornithologists' and Oologists' semi-annual* (1889), *The Oologists' Journal* (1891), and *The Bulletin of the Oologists' Association* (1897). Additionally, journals devoted to ornithology more generally such as *The Auk* and *The Condor* frequently featured articles on oology and prominent oologists. Furthermore, oologists banded together to form their own association, the Oologists' Association, which they formed with the purpose of "elevating the study above the mere collecting of birds' eggs, and to bring itself to that position so that it will be to oologists what the A.O.U. is to ornithologists."[68] Oology was developing seriously during this period and making strides towards professionalization through the use of professional journals and organizations. While the proliferation of journals on the subject of oology benefitted the science as a whole by putting oologists around the country in conversation with each other, it also had the effect of toppling the Smithsonian from its position as the primary source of scientific articles on the subject. Where earlier it had been the loudest voice in the conversation, it was now one voice among many, and as such, the influence it wielded over oology was far less than it had before.

But oology did not evolve uncontested, and the forces that ultimately led to the downfall of oology as a science had their start in oology's zenith. The fashion industry's penchant for feathers in hats incentivized killing birds in large numbers, and these actions provoked a backlash among members of the general public who mobilized to protect

[67] The number in parentheses following each journal title is the first year in which it was published.
[68] Isador S. Trostler, "Dear Brother Oologist," *Bulletin of the Oologists' Association* 1 (1897): 1.

them.[69] As early as 1886, criticisms of oology leveled by John Burroughs, a literary naturalist, had to be countered by those engaging in egg collecting for scientific reasons. J.A. Allen, the first president of the American Ornithologists' Union, countered Burroughs's claims that ornithologists were harmful to birds and failed to mention the damage wrought by killing birds for millinery purposes by arguing that responsible collecting was important and that "genuine ornithologists… deplore and frown upon much of the egg-collecting done in the *name*, but not in the spirit and interest, of science."[70] Within the community of ornithologists and oologists, this spurred activities to self-regulate collecting and provided the push to establish the A.O.U. Committee on Bird Protection, which in 1886 promoted a model law featuring permits for collecting that was adapted and adopted by the New York state legislature.[71] These criticisms encouraged the growth of organizations devoted to saving the birds, most notably the Audubon Society.

In 1886, George Bird Grinnell founded the first Audubon Society, and although this particular society was later discontinued, it provided an important example and name for later groups. Ten years later, Harriet Hemenway and Mina Hall organized the Massachusetts Audubon Society in response to the outrage over bird slaughter for the millinery trade. By 1897, state-level Audubon Societies existed in 8 states and the District of Columbia, and by 1903, thirty-four states and the District of Columbia had their own Audubon Societies.[72] The shifts in the state of oology and in the public opinion around bird collecting influenced the development of oology in the Smithsonian through

[69] Barrow, *A Passion for Birds*, 32.
[70] J. A. Allen, "Notes and News," *The Auk*. 3, no. 1. (1886): 142-143.
[71] Barrow, *A Passion for Birds*. 121.
[72] Barrow, *A Passion for Birds*, 130.

the institutional and outside support available in the form of specimens, publications, and exhibitions.

Note on the data in the graph and table: The data for the table and the graph came from the Annual Reports of the Smithsonian for every year listed. In some years, the number of accessions was stated in the report, and in other years the author had to count individual accessions containing eggs. The number of accessions does not indicate the number of eggs accessioned by the Institution, as some accessions contained only one egg, while others contained thousands. Unfortunately, accurate information on the number of specimens for each year was impossible to obtain, and in the interest of accuracy, the author resolved to use the number of accessions instead.

Table 4.1: Number of Smithsonian Institution Accessions Containing Bird Eggs, 1850-1922.

Year	Accessions	Year	Accessions	Year	Accessions	Year	Accessions
1850	1	1870	16	1890	41	1910	17
1851	2	1871	13	1891	49	1911	8
1852	1	1872	12	1892	47	1912	22
1853	0	1873	15	1893	51	1913	12
1854	0	1874	14	1894	71	1914	19
1855	5	1875	15	1895	44	1915	5
1856	3	1876	10	1896	43	1916	6
1857	0	1877	13	1897	26	1917	5
1858	1	1878	16	1898	20	1918	10
1859	58	1879	17	1899	11	1919	5
1860	85	1880	13	1900	11	1920	10
1861	32	1881	14	1901	33	1921	14
1862	14	1882	36	1902	26	1922	9
1863	41	1883	10	1903	26		
1864	12	1884	9	1904	15		
1865	16	1885	16	1905	37		
1866	10	1886	32	1906	11		
1867	24	1887	51	1907	12		
1868	13	1888	51	1908	6		
1869	15	1889	21	1909	12		

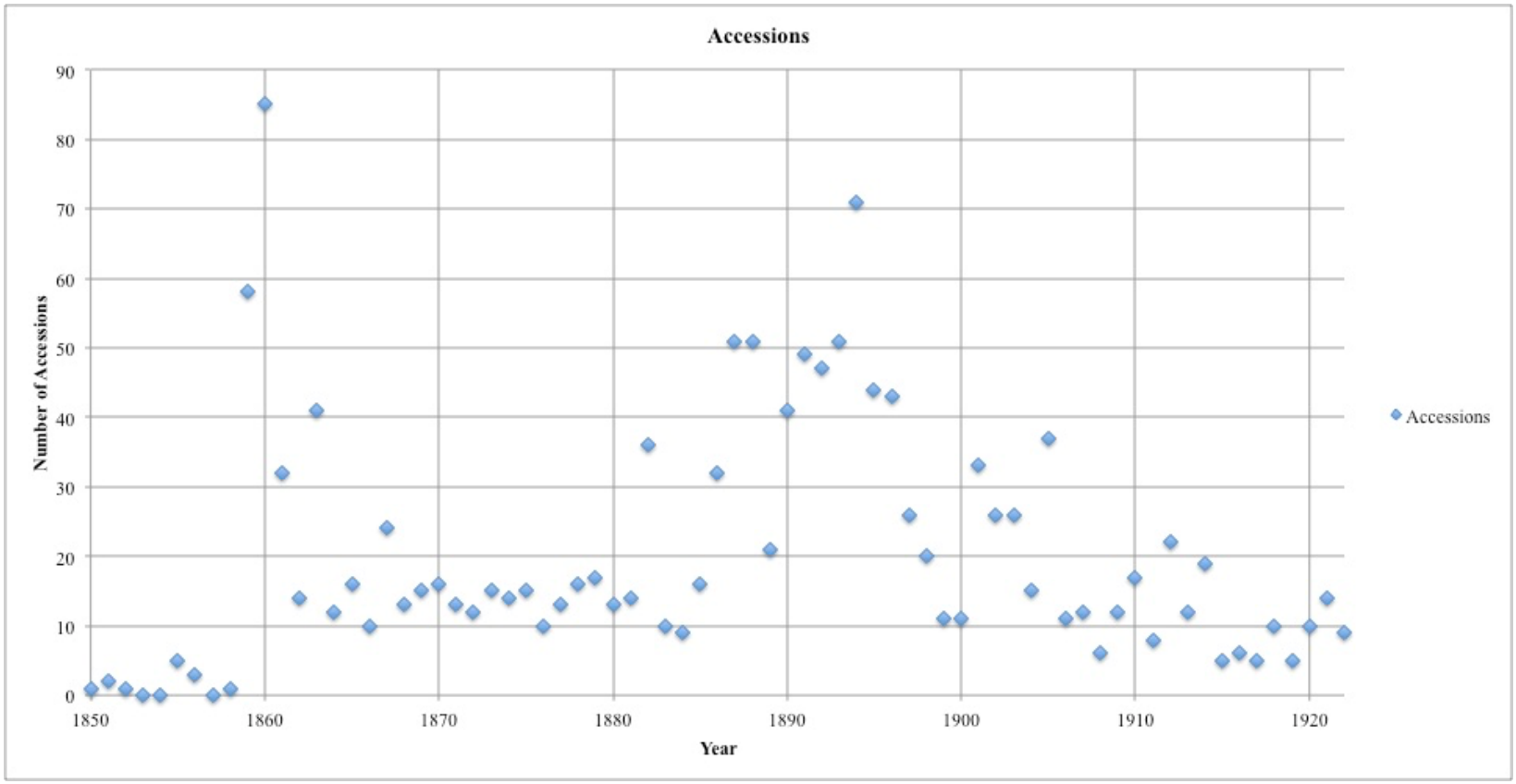

Figure 4.1: Number of Smithsonian Institution Accessions Containing Bird Eggs, 1850-1922.

CHAPTER 5

THE ZENITH OF OOLOGY AT THE SMITHSONIAN

While Joseph Henry and Spencer Fullerton Baird started the promotion of oology as a science, they were not the last to do so. The next key player in the development of oology as a science at the Smithsonian was Major. Charles Emil Bendire. Bendire (1836-1897) was an Army surgeon and active ornithologist who retired his commission in 1886 after serving for thirty-two years in the Army.[73] Bendire began his relationship with the Smithsonian in 1872, donating collections in conjunction with his work in the Army in Arizona and Washington.[74] In 1884, Baird asked Bendire to accept a position as the Honorary Curator of the Section of Birds' Eggs, a section created that same year, perhaps due to Ridgway's relative indifference to the subject and Bendire's overwhelming enthusiasm for it.[75] Indeed, one of the reasons Baird implored Bendire to become the Honorary Curator was to write about North American oology.[76]

---

[73] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1897. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1897*, by Charles D. Walcott, (Washington, D.C.: United States Government Printing Office, 1898), 35.

[74] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1872*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1873), 56.

[75] *Report of the U.S. National Museum for 1897*, 35-36.

[76] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the*

In accepting the position of Honorary Curator, Bendire dramatically changed the practice of oology at the Museum in several ways. Of the utmost importance is that Bendire was the first staff member devoted solely to working with the egg collection. While Brewer had worked on his publication by using the collection, he did not have the same control over the contents and organization of the eggs that Bendire wielded in this period. It is also critical to note here that the position of Honorary Curator of the Section of Birds' Eggs was a volunteer position, for which Bendire received no monetary compensation and to which he devoted some of his own income and a substantial amount of his time. From this, we can conclude that Bendire's work in the section was a labor of love that stemmed from a genuine belief in the value of oology as a science, which spurred him to levels of activity unparalleled in the history of the collection. Bendire, Honorary Curator of the Department of Birds' Eggs from 1884 to 1897, demonstrated the attitude of the Smithsonian toward oology in the late 19th century through his publications and collection practices. Bendire's tenure at the Smithsonian was marked by an explosion of activity in the practice of oology and massive efforts at legitimizing oology through efforts to standardize the practice that would be unparalleled by future Honorary Curators and Custodians of the section.

As the Honorary Curator of Birds' Eggs, Bendire was responsible for developing the collection policy for the section, and he wasted no time before letting naturalists know what the National Museum wanted to receive. In 1884, he penned a circular titled "A List of Birds the Eggs of Which are Wanted to Complete the Series in the National Museum with Instructions for Collecting Eggs," which was museum circular number 30

Year Ending June 30, 1892. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1892, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1893), 52.

of the Proceedings of the United States National Museum. In this circular, Bendire lists the species of birds for which eggs are extremely desirable, acceptable, or less desirable as additions to the collection, and describes the manner in which eggs should be blown, cleaned, marked, and packed for delivery to the National Museum.[77] The prioritization of some species of birds over others fits neatly with the Smithsonian's policy attempting to create encyclopedic collections for study and education. While there is a hierarchy of preference for some species of eggs over others, what is absent in this circular is any mention of species that should not be collected or reasons why one might not want to collect birds' eggs; Bendire's enthusiasm for oology in 1884 was as yet unrestrained.

His efforts to proscribe the behavior of oologists included managing how they collected eggs (including complete scientific information), how they preserved them (drilling a hole into the side using a particular type of tool), marked (with a soft pencil, and with markings located at specific points to mean specific things), and packed (in cotton, with wood boxes preferred over tin, etc.).[78] Bendire's efforts at standardization reveal his intent on making oology a scientific practice on par with the other departments of the Institution. This fact is driven home further by the fact that Bendire felt the need to create and circulate a new circular, in spite of the fact that the Institution had previously published a circular about egg collecting in 1860. This demonstrates the fact that Bendire felt that the first circular had not had a lasting impact on the manner in which oologists collected and recorded eggs. Otherwise, he would not have felt it necessary to minutely describe the steps necessary to correctly collect them, and he would have referenced the

[77] Charles E. Bendire, "Circular No. 30, Appendix: A list of birds the eggs of which are wanted to complete the series in the National Museum, with instructions for collecting eggs," *Proceedings of the United States National Museum* 7 (1884): 613-616.
[78] Bendire, "Circular No. 30," 613-616.

earlier circular, which he failed to do. Thus, Bendire may have felt the need to use his position at the Smithsonian to influence oology in favor of standardizing the science and preferring it over the hobby.

Bendire did not maintain a consistent position on collecting, however, and the changes from the 1886 circular to the 1891 Bulletin (No. 39) demonstrate the pressures that Bendire had started to feel as an ornithologist in response to the activities of the Audubon Society. This Bulletin, titled "Instructions for Collecting, Preparing, and Preserving Birds' Eggs and Nests," contained within it the first prescriptive statement issued by the Smithsonian regarding appropriate and inappropriate reasons for collecting eggs. In it, Bendire stated that:

> Unless the would-be collector intends to make an especial study of oölogy and has a higher aim than the mere desire to take and accumulate as large a number of specimens as possible regardless of their proper identification, he had better not begin at all, but leave the nests and eggs of our birds alone and undisturbed. They already have too many enemies to contend with, without adding the average egg collector to the number. The mere accumulation of specimens is the least important object of the true oologist. His principal aim should be to make careful observations on the habits, call notes, song, the character of the food, mode and length of incubation, and the actions of the species generally from the beginning of the mating season to the time the young are able to leave the nest. This period comprises the most interesting and instructive part of the life history of our birds.[79]

In this Bulletin, Bendire clarifies several important points about who should be collecting, what/how they collect, and for what purpose they collect in an effort to differentiate between hobbyists and scientific oologists. Most importantly, Bendire emphasized that the desire to collect was not sufficient justification for collecting, but

[79] Charles E. Bendire, "Instructions for Collecting, Preparing, and Preserving Birds' Eggs and Nests (Part D)," *Bulletin of the United States National Museum* 39 (1891): 3.

that a higher, scientific purpose had to be pursued instead, and that oology was not just concerned with the eggs themselves but the associated breeding behaviors of the birds. This is a dramatic revision from the first circular in 1860 and from Bendire's more recent circular in 1886, as it broadens the scope of oology considerably and effectively encroaches on some territory traditionally considered the province of ornithology. Bendire probably felt the need to protect oology as a science while discrediting the hobbyists, in an effort to help the outraged public, and Audubon Society members in particular, differentiate between the two.

Bendire engaged in active collecting and collections management in order to shape the oological collections of the National Museum to his satisfaction. When Bendire assumed control of the Section of Birds' Eggs, he made substantial donations to the section from his private collection. In addition to the donations he had sent since 1872, Bendire donated over 8,000 specimens to the collection in 1884.[80] He also made donations of eggs in 1886, 1891, 1892, 1893, 1896, and 1897. These donations demonstrate Bendire's commitment to improving the quantity and quality of the collections, as he not only solicited material from other collectors but also ensured that he too collected with the Institution in mind. Indeed, Bendire considered it his primary duty as the Honorary Curator of the collection to "fill as far as possible the existing gaps in the oological collection, and to increase the series of eggs, especially amongst the rarer

[80] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year 1884. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution, for the year 1884*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1885), 149.

species."[81] In addition to his own donations, Bendire encouraged others to donate eggs to the Museum, resulting in a large number of accessions during his tenure as the Honorary Curator of the section. While accessions of bird eggs in 1884 and 1885 were more modest and in line with the pre-Bendire era of oology at the Museum, accessions from 1886 to 1897 were substantially higher, resulting in an overall average of 39.4 accessions per year, compared with the average of 16.1 accessions per year from 1850 to 1883.[82] This period would mark the peak number of accessions per year for the Institution, and demonstrated both the popularity of oology outside the museum and the influence Bendire wielded as a persuasive curator in the field of oology.

Cultivating repeat donors was another way Bendire ensured that he would receive quality donations on a regular basis. In a letter dated September 5, 1893, from Colonel Wirt Robinson (a hobbyist based in the Washington Barracks in D.C.) Robinson describes the state of collecting and the difficulties he encountered in his attempts to fulfill a request for Bendire. While speaking with Bendire on familiar terms about the hazards of rough handling, mice, and small boys, Robinson also describes his success in collecting three sets of whip-poor-will eggs for Bendire after he had requested them.[83] This demonstrates that with at least some of the collectors for the Institution, Bendire had built enough of a relationship to be able to make requests and to direct collecting

---

[81] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1887. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1887*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1888), 101.

[82] See table in Appendix A.

[83] Wirt Robinson, *Wirt Robinson to Charles Bendire, September 5, 1893*, Letter, From Smithsonian Institution Archives, Record Unit 7394, Bendire, Charles, 1836-1897, Charles Bendire Papers.

activities to benefit the Museum, an important factor in the attempt to manage the specimens in the collection, as it meant he could tell collectors to avoid certain types of specimens while directing their attention to gaps in the collection that needed filling. Another important donor was Dr. William L. (W.L.) Ralph, who donated one important collection in 1892 and an even more important one in 1893, which Bendire called "one of the most important and beautifully prepared in existence."[84] Indeed, Bendire's cultivation of close working relationships with donors even provided a boon for the section after his death, as Ralph became the Custodian of the section after Bendire passed away.

Bendire supplemented his activities of to adding to the collection by spending considerable time and energy reorganizing and labeling the oological collections so they would be easier to use for visiting oologists. He first began that work in 1884, and additionally encouraged two aides to complete a census of the collection.[85] In subsequent years, he continued this process in addition to integrating specimens accessioned during the year into the established collection, always with an effort to match the latest taxonomical information put forth in checklists by the American Ornithologists' Union (AOU).[86] By 1892, Bendire was finally satisfied with the physical status of the egg collection, stating that the collection was in "excellent shape, easy of access, and reasonably safe from insects and vermin," in no small part thanks to the new cases

[84] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1893. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1893*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1894), 148-149.
[85] *Report of the U.S. National Museum for 1884*, 143, 153.
[86] *Report of the U.S. National Museum for 1887*, 18.

provided by the Museum to house the collection.[87] Bendire made a point of taking care of the collections while he was in charge of the museum, particularly with respect to the manner in which they were stored and the organization of specimens taxonomically according to a reputable source, the A.O.U., with the intention of making the collection as useful as possible not only for himself but for visiting scholars determined to use the collection to write publications.

Bendire's position as the Honorary Curator required him to write annual reports on the Section of Eggs, and in addition to these reports, which were published each year in Part II of the Annual Report of the Smithsonian Institution, Bendire frequently published papers of two distinct kinds: papers instructing individuals on collecting and scientific articles about oology. Of the former, in addition to the two circulars listed above, Bendire also published circulars in 1885 and 1889 about collecting. These were "Circular for the Guidance of Persons desiring to make Exchanges of Birds or Birds' Eggs with the National Museum" (1885); Circular No. 30, "A list of birds' eggs of which are wanted to complete the series in the National Museum, with instructions for collecting eggs," (1889); Circular No. 34, "Circular for the guidance of persons desiring to make exchanges of birds or birds' eggs with the National Museum" (1889).[88] In total, Bendire wrote five papers about collecting, all of which dealt with either how to collect

[87] *Report of the U.S. National Museum for 1892*, 153.
[88] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, to July, 1885*, by Spencer Fullerton Baird and G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1886), 16. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1889. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1889*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1890), 60. *Report of the U.S. National Museum for 1892*, 497.

bird eggs or which bird eggs the National Museum desired for their own collection. Bendire hoped to be an influential voice in the field of oology and had no qualms about expressing his opinion both in terms of what the right way to collect was and the value of some species or specimens over others. The ultimate goal of this influence was to be a force for standardizing the science of oology such that the science could professionalize and differentiate its practitioners from hobbyists bent on collecting for its own sake, and to thereby protect oology from mounting criticisms about the practice from outside forces including the nascent Audubon movement.

With regards to publishing scientific articles about oology, while Bendire was a major contributor at the Smithsonian, he was not the only person to write about oology using the specimens kept at the National Museum. 1888 was the first year that the publications based on materials in the collection had a separate column for birds' eggs, and 4 papers were published that year, all by Bendire.[89] In 1889 Bendire wrote 7, 6 about eggs, 1 about a bird species.[90] In 1890, two papers using the oological collections of the Museum were published in *The Auk*, and Bendire wrote 7 papers total.[91] Two works on

[89] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1888. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1888*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1889), 48, 708.
[90] *Report of the U.S. National Museum for 1889*, 747.
[91] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1890. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1890*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1891), 200, 689.

oology were published during the year of 1894.[92] In 1897, a non-museum investigator published one paper about bird eggs.[93] This relative flurry of publishing activity represented an increase over the publications about oology in the Pre-Bendire period, and demonstrated that the collections were serving their primary purpose of spurring scientific study. The priority on publications demonstrated the commitment the Institution felt toward the science of oology by facilitating staff research and encouraging visiting scholars to use the collections as well. For Bendire, the process of writing scientific articles acted as a method of gaining broader scientific approval for oology as a science and also improved the prominence of the collection because of the types of specimens written about in the papers.

In addition to the smaller, article-length papers Bendire wrote during his Honorary Curatorship, he pursued an ambitious, multivolume study of North American oology that would be his crowning achievement. This work, specifically commissioned by Baird, was titled "Life Histories of North American Birds," and Bendire hoped that this would function as the complementary oological work to Robert Ridgway's *The Birds of North and Middle America*. Bendire started work on the project in 1890, focusing in particular on the breeding and eggs of birds. The first volume of "Life Histories of North American Birds" was ultimately printed as Special Bulletin No. 1 in 1892.[94] The

[92] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1894. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1894*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1895), 34.
[93] *Report of the U.S. National Museum for 1897*, 26.
[94] *Report of the U.S. National Museum for 1890*, 199. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1891. Part II: Report of the United States National Museum, under the Direction of the Smithsonian*

Smithsonian Institution intended for the Special Bulletin series to provide a space for monograph-length works based on the collections of the National Museum, and Bendire's work had pride of place as the inaugural volume, with the hope, expressed by G. Brown Goode, Assistant Secretary of the Institution, that further volumes would follow shortly afterward.[95] In 1893, the Annual report listed many positive reviews of Bendire's first volume of the "Life Histories of North American Birds," one of which explicitly mentioned how the Smithsonian Institution should be highly regarded for publishing such a work.[96] Such high praise of the first volume of "Life Histories" almost certainly motivated Bendire to work on the second from 1893 to 1895, such that the volume went to the press in 1896, and was published in 1897.[97] The importance of Baird, the Secretary of the Institution, requesting this work and granting it the position as the first of the Special Bulletins, cannot be overstated. This was clear, unambiguous institutional support for oology and demonstrated the commitment that the Institution had to promoting the science through publications. At the same time, the praise the volumes received show the prestige the Institution received after publishing the volumes, particularly within the

---

Institution for the Year Ending June 30, 1891, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1892), 63. *Report of the U.S. National Museum for 1892*, 52.

[95] *Report of the U.S. National Museum for 1892*, 52.

[96] *Report of the U.S. National Museum for 1893*, 148.

[97] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1895. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1895*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1896), 57. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1896. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1896*, by G. Brown Goode, (Washington, D.C.: United States Government Printing Office, 1897), 38. *Report of the U.S. National Museum for 1897*, 43.

oological community. Unfortunately, Bendire's death in 1897 meant that he was unable to complete the series as he intended, but the popularity of the "Life Histories" would become one of the main motivating factors for later honorary Custodians, curators, and collaborators to work with the collection.

The final type of activity in which Bendire engaged as the Honorary Curator of the Section of Birds' Eggs was in working on the exhibitions at the Museum. In 1886 the first exhibition of eggs was curated by the museum, with 1,491 eggs and nests put on exhibition as part of a larger section on birds.[98] In 1887, G. Brown Goode, Assistant Secretary of the Smithsonian Institution, indicated in the Annual Report that "an exhibition of birds' eggs would be of popular interest."[99] Goode meant that in addition to the eggs already on display, a special section of eggs would be of interest to the general public because of the contemporary enthusiasm for oology. But exhibition space, always an issue in museums and a particularly critical one in the National Museum during this period, set the terms for what could and could not be exhibited for all divisions, including oology. Bendire first argued in 1892 that the exhibit of nests and eggs should be given more space in the main hall.[100] In 1894, G. Brown Goode again complained about the size of the bird egg exhibition series, but still called it effective and interesting.[101] While the interest in expanding the exhibition was there, the space could not be found.

Then, in 1895 a new development in exhibiting eggs occurred that highlighted the tensions between the Department of Birds and the Section of Birds' Eggs. In his reconfiguration of the Department of Birds exhibition space, Ridgway and his aides

[98] *Report of the U.S. National Museum for 1886*, 163
[99] *Report of the U.S. National Museum for 1887*, 18.
[100] *Report of the U.S. National Museum for 1892*, 153.
[101] *Report of the U.S. National Museum for 1894*, 50.

curated an exhibition intended to appeal to the casual visitor and those making an elementary study of ornithology that included eggs of varying sizes from humming birds to *AEpiornis*.[102] Notably absent from both Ridgway and Bendire's reports from that year, however, is any discussion of Bendire assisting with that part of the exhibition, even though Bendire described other routine tasks he accomplished in the year and his progress researching "Life Histories."[103] There are two possible reasons for Bendire's lack of involvement in the exhibition: either Ridgway did not encourage or invite him to participate, or he was too involved in working on the "Life Histories" to work on the exhibition as well, though the former seems more likely given Bendire's previous enthusiasm for exhibitions. G. Brown Goode again argued in the 1896 Annual Report that the exhibition of bird eggs and nests was a positive asset to the museum and that "it would be very desirable to increase it, were this course now practicable."[104]

The tensions plaguing the challenge of exhibiting oology highlight the fundamental obstacles the science faced in the Museum. While there was institutional support for oology above the Department of Birds, as is evident through G. Brown Goode's repeated praise for exhibiting oology, there were also problems with the relationship between the Department of Birds and the Section of Birds' Eggs that made exhibiting the collection difficult. Additionally, many of G. Brown Goode's comments reflect an emphasis on popularity that indicates he hoped they would appeal to visitors, most of who were probably not scientifically-oriented oologists but who may have been hobbyists. While this appeal to the public reflected the Museum's interest in being an educational center, it also conflicted indirectly with Bendire's attempts to professionalize

[102] *Report of the U.S. National Museum for 1895*, 54.
[103] *Report of the U.S. National Museum for 1895*, 54.
[104] *Report of the U.S. National Museum for 1896*, 33.

oology by encouraging hobbyists to visit the Museum. Furthermore, oology struggled, and ultimately failed, to receive exhibition space that was adequate for appropriately displaying the collection, a problem that would continue after Bendire's death in 1897.

All was not entirely well within the Section of Birds' Eggs, even at its zenith. First, we can see that the collection was always the *Section of Birds' Eggs*, and was never elevated to a full department during Bendire's tenure. Instead, the Section of Birds' Eggs, was always a subsection of the Department of Birds, and ultimately answerable to Robert Ridgway as the curator of that department. Similarly, the Bendire's position was always honorary, and therefore uncompensated, whereas the curators of almost all of the other departments were paid. Ridgway curated the 1895 exhibit, and as discussed previously we can sense tension in the way the reports were written over how and how many eggs should be exhibited. As early as 1886, space in the museum became a problem for the oological collections, as the collection was housed in a small, inconvenient area of the museum, far away from the ornithological collections with which they were associated.[105] With respect to publications, while papers on the subject of birds' eggs were briefly singled out in tables describing papers based on the collections of the Museum, this occurred inconsistently during and after Bendire's stay.[106] Finally, and most importantly, Bendire was influenced by events outside the museum and beyond his control, particularly by the increased activities of the various state-level Audubon Societies. While he attempted to continue promoting oology and differentiating it from hobbyist

[105] *Report of the U.S. National Museum for 1886*, 41.
[106] *Report of the U.S. National Museum for 1888*, 48. *Report of the U.S. National Museum for 1891*, 60. *Report of the U.S. National Museum for 1893*, 76. *Report of the U.S. National Museum for 1894*, 34.

colleting, the field as a whole was beginning to stumble over how to justify itself in the face of massive bird deaths.

Bendire was precisely the sort of advocate that niche sciences and collections dream of having in their corner, and his death on February 4th, 1897, in Jacksonville, Florida, was a powerful blow to oology at the Smithsonian.[107] The 1897 Annual Report of the United States National Museum eulogized Bendire thoughtfully, complimenting his zeal and methodological approach to the advancement of oology as a science.[108] While Bendire left the oological collections well tended, the Museum lamented the fact that he had been unable to finish his series, "Life Histories of North American Birds," calling their incomplete status "a sincere regret and a great loss to ornithology."[109] It was in the interest of completing this series that the work of oology as a scientific practice at the Institution was continued after Bendire's death.

[107] *Report of the U.S. National Museum for 1897*, 9.
[108] *Report of the U.S. National Museum for 1897*, 35-36.
[109] *Report of the U.S. National Museum for 1897*, 36.

CHAPTER 6

THE WANING YEARS OF OOLOGY AT THE INSTITUTION

With the death of Charles Bendire, oology at the Smithsonian Institution began to decline as a practice. While others stepped in and attempted to maintain the momentum built by Bendire, they could not sustain the same level of donations, research, and publications that made him a successful curator and advocate for oology. Immediately after Bendire's death, the oological activities of the Museum were carried out by Ridgway and the assistant curator of the Division of Birds, Charles W. Richmond, but the Division of Birds would not remain in control for long.[110] The first individual to step up was Dr. W.L. Ralph, a donor cultivated by Bendire and recruited by the Institution to finish Bendire's "Life Histories of North American Birds."

Dr. William LaGrange Ralph (1851-1907) was originally trained as a medical doctor, but health problems forced him to abandon a career in medicine; in the wake of his forced career change, he embraced his childhood love of nature and began to study ornithology and oology.[111] Ralph's connection to the National Museum predated his position as the honorary Custodian, as he donated his first accession, containing 1,630 eggs and 100 nests, in 1892. This was no ordinary first donation, as Bendire called it the

---

[110] *Report of the U.S. National Museum for 1897*, 41.

[111] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1908. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1908*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1909), 63.

most important donation for the year and the most valuable gift made to the collection in several years. The collection was so impressive, in fact, that Ralph and Bendire reached an understanding that the collection would not be "drawn upon for purposes of exchange or donation, and that it [would] form an integral part of the national collection of birds' eggs."[112] Ralph continued to donate to the institution after 1892 until Bendire's death in 1897, at which time he took a more active role in the Institution. The poor health that pushed him toward ornithology, however, affected the extent to which he could be active in the Museum, and ultimately made him less effective in the position than Bendire had been.

Ralph was appointed Custodian of the Section of Birds' Eggs in 1898, after Bendire's death.[113] The first sign of problems with the Section of Birds' Eggs arose that same year, as the National Museum remarked that it found the system of Honorary Curatorships difficult and disadvantageous to the Institution because "men are not entirely at the command of the administrative officers and are not obliged to serve at definite hours or under the ordinary restrictions of the paid curators," and the Institution hoped to reduce the number of Honorary Curators it used.[114] While Ralph was still an Honorary Custodian at this point and not yet an Honorary Curator, this indictment of Honorary Curators meant that the Institution intended to have a tighter rein on their activities than it had previously, meaning that Ralph did not enjoy the same freedoms as

[112] *Report of the U.S. National Museum for 1892*, 17-18.
[113] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1898. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1899*, by Charles D. Walcott, (Washington, D.C.: United States Government Printing Office, 1899), 39.
[114] *Report of the U.S. National Museum for 1898*, 10.

his predecessor, Bendire. In 1901, Ralph was promoted from the position of Honorary Custodian to Honorary Curator, reflecting his attention not just to the status of the collections but also to the other activities of the Section, including publications and exhibitions.[115] While Ralph made admirable efforts to keep the section alive, his poor health resulted in a decreased output from the Section and changes in the personnel of the section as well.

The Institution's support for oology and the Section of Birds' Eggs was still high, but Ralph's poor health meant that he could not hope to match the output of Bendire if he continued to work alone. The Museum stepped in to try to solve the problem, and for the first time in the history of oology at the Institution, the Section of Birds' Eggs had assistants. Joseph Harvey (J.H.) Riley had been with the Museum as an assistant in the Division of Birds since 1897, but he was transferred to the Section of Birds' Eggs to help Ralph with the work of the Section.[116] The allocation of an assistant to the Section of Birds' Eggs demonstrates the investment the Museum felt for oology, as there was a shortage of scientific assistants in the Museum that year, resulting in several collections not receiving adequate care.[117] On December 30, 1903, however, Riley was returned to the Division of Birds to assist Ridgway with his work on ornithology, and Edward

---

[115] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1901. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1901*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1902), 42.

[116] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1899. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1899*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1900), 35.

[117] *Report of the U.S. National Museum for 1898*, 10.

Horgan was temporarily installed in the Section of Birds' Eggs to replace him.[118] By 1907 Horgan had severed connection with the Museum, and no one stepped up to fill his role in the Section of Birds' Eggs.[119] It appears as though the Institution valued the work of the Section of Birds' Eggs enough to grand Ralph assistants to complete the routine work so that he could focus on publications and accessions, for the work of increasing and diffusing knowledge about oology was still in demand, and Ralph was the most qualified and enthusiastic individual at the Museum to do so.

In his first year at the Institution, one of Ralph's primary objectives was to process accessions left after Bendire's death and to start to care for nests, which had not been cared for with the same enthusiasm as the eggs.[120] Ralph maintained the important task of assessing the status of the collections and to making necessary repairs and replacements, which he continued throughout his tenure at the Museum, remarking in 1899 that the study collection of eggs was in good shape, but the eggs on exhibition needed repair and replacement.[121] By 1903, the egg collection was in good condition and progress was made in rearranging eggs and nests, but the Section needed new cases in

---

[118] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1904. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1904*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1905), 95.

[119] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1907. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1907*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1908), 52.

[120] *Report of the U.S. National Museum for 1898*, 40.

[121] *Report of the U.S. National Museum for 1899*, 30.

order to complete the work.[122] His role in collections management was primarily one of maintaining the work that had already been done by Bendire and making small improvements where necessary, but he did not take on the larger scale projects that Bendire tackled involving reorganizing the collection as a whole. In part, this was because of the thoroughness Bendire had exhibited in his own work on the collections; apart from the accessions that had accumulated after Bendire's death, Ralph inherited a collection that was in remarkably good condition. But more importantly, Ralph completed this part of his duties as the Honorary Curator of the Section of Birds' Eggs with the assistance of his assistants, but did not distinguish himself here because he devoted the majority of his efforts to other activities related to curatorship, most notably publications and accessions.

There were significant differences in the pattern of accessions between Bendire's tenure as the Honorary Curator and Ralph's. First, the number of accessions dropped precipitously. During Bendire's curatorship (1884-1897), the average number of accessions per year containing bird eggs was 39.4 accessions, while the average number of accessions during Ralph's curatorship (1898-1907) was only 18.2 accessions.[123] Dropping from 39.4 to 18.2 accessions per year meant that Ralph had half as many accessions per year to manage as Bendire. While on the one hand this generally meant that there was less work to do with respect to adding collections (although not always, as some accessions from single donors could be exceptionally large), it also meant that the Section of Birds' Eggs was not receiving new materials at the same rate as it had previously, which made the prospects for writing new scientific articles about oology

[122] *Report of the U.S. National Museum for 1903*, 72.
[123] See Graph in Appendix A.

more difficult. This drop in accessions also made Ralph's contributions to the collection all the more important, as he donated eggs to the Section almost every year that he worked in the Section. Indeed, in 1901 the most important donation of bird eggs to the collection was from Ralph.[124] Ralph's focus was more securely fixed on the "Life Histories" than on collections management, and as a result he was not able to exert as much influence over the quantity of accessions made during his tenure.

With a declining emphasis on collections management, continuing donations from long-term donors became more vital to increases in the collection, but there too the Section of Birds' Eggs ran into problems. This period saw the death of several oologists who frequently donated to the museum, among them Dr. James Cushing Merrill, U.S.A., a major donor who contributed 28 accessions of eggs and other materials to the Museum between 1875 and 1896 (during Bendire's tenure).[125] Older oologists were dying off and leaving their collections behind, a great temporary boon for the National Museum and other museums around the country, but these oologists were not being replaced with younger counterparts because the popularity of oology had started to wane. The effects of oology's waning popularity could be seen as early as 1904, when the accessions of the year for bird eggs were "fewer in number and less noteworthy" in spite of increases in accessions for most other classes in the Museum.[126] Ultimately, Ralph was the major contributor for most of the years he was with the Museum, including donating his collection upon his death in 1907.[127] The decrease in accessions that started in Ralph's

[124] *Report of the U.S. National Museum for 1901*, 19.
[125] *Report of the U.S. National Museum for 1903*, 47.
[126] *Report of the U.S. National Museum for 1904*, 77.
[127] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1908. Part II: Report of the United States National Museum, under*

years at the Museum only continued to worsen after his death, as the Museum lost one of its most devoted donors.

Ralph was devoted to continuing the publication of the "Life Histories" started by Bendire in addition to the collections work, but was less focused on other publications during the period. In 1901, Ralph started to work on completing Bendire's "Life Histories of North American Birds," to which end a circular was published to request oological information from the scientific community, Circular No. 50. The ornithologists and oologists who received the circular answered with "a gratifying number of responses."[128] Throughout the remainder of his time at the Museum, Ralph worked on continuing the Life Histories, but "owing to the precarious state of his health the third volume of this work was incomplete at the time of his death."[129] Meanwhile, other publications based on the collection started to suffer from neglect. In the early years of Ralph's curatorship, a few articles about oology based on the collection were published every year, but by 1905 that was no longer the case, and no new works were published on oology during the remainder of Ralph's curatorship.[130] In 1905, the Museum reprinted several parts of

---

the Direction of the Smithsonian Institution for the Year Ending June 30, 1908, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1909), 95.

[128] *Report of the U.S. National Museum for 1901*, 38, 75.

[129] *Report of the U.S. National Museum for 1908*, 64.

[130] *Report of the U.S. National Museum for 1898*, 69. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1900. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1900*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1901), 131-132. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1902. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1902*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1903), 141, 159.

Bulletin 39 ("Instructions on collecting…"), including Part D, eggs, which were widely distributed to assist ornithologists and oologists in their collecting pursuits.[131] This was the only instructional publication about oology released by the Museum during Ralph's tenure at the Museum. Overall, there was a marked decrease in publications after Bendire passed away, as Ralph's poor health perhaps made prioritization a necessary evil in his work on the collection, with efforts to professionalize the science of oology as the unfortunate casualty.

After Bendire's death, the Section of Birds' Eggs entered a downward spiral that Ralph did his best to reverse, but he lacked the energy and momentum that characterized Bendire's curatorship, and the circumstances outside the Museum were much more bleak for oology during Ralph's tenure than they had been for Bendire. The Audubon Society ramped up its anti bird-killing legislative activities in the early 20th century, changing public opinion and making collecting increasingly difficult for oologists. In 1901 the state-level Audubon groups form loose coalition, and by 1905 the National Audubon Society was incorporated, which further increased their efficacy with respect to discouraging indiscriminate bird killing and, by extension, egg collecting.[132] The ornithology journals were hardly kinder, as the 1906 article by Thomas Montgomery Jr. in *Bird-Lore* (the journal for the Audubon Society before the *Audubon Magazine* was established), titled "The Amount of Science in Oology" mounted an attack the hobbyists

[131] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1905. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1905*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1906), 56.

[132] Barrow, *A Passion For Birds*, 134.

and the damage that they did to the science of oology as a branch of ornithology.[133] Montgomery, a professor at the University of Texas, held that oologists only engaged in scientific activity when they attempted to create scientific laws, and that collection and description alone were not sufficient activities to warrant calling oology a science. Furthermore, Montgomery then cast aspersions on the value of the science produced by oologists, and he ultimately concluded "they deceive themselves when they consider [oology] scientific work."[134] This article's publication in *Bird-Lore*, the Audubon Society's journal, demonstrates that this was at least reasonably representative of the members of the Society that made up the editorial board.

A retort to Montgomery's article came from an unusual source, however: Joseph Grinnell (founder of the Audubon Society), wrote "Is Egg-Collecting Justifiable?" in *The Condor*, in which he argued that while certainly most "oologists" were not scientists, that some certainly were, and that the educational value of responsibly pursued oology was quite important for the making of young ornithologists.[135] The Audubon Society had yet to decide how it felt about the value of oology, and this indecisiveness stirred up in the scientific community could not have made Ralph's attempts at managing the Section of Birds' Eggs any easier. Ralph made valiant strides in maintaining the Section of Birds' Eggs, but his inconsistent health took its toll, and he died on July 8, 1907.[136] His passing accelerated the decline of the Section of Birds' Eggs, and it would never again have a curator who ensured through his own donations that the Section continued to survive.

---

[133] Thomas Montgomery Jr., "The Amount of Science in Oology," *Bird-Lore* 8, May-June (1906): 95.
[134] Montgomery, 98.
[135] Joseph Grinnell, "Is Egg-Collecting Justifiable?" *The Condor* 8, no. 6 (1906): 155-156.
[136] *Report of the U.S. National Museum for 1908*, 63.

Beginning with Bendire's assignment in 1882, the section of bird eggs had a curator or custodian for 25 years continuously. With the death of Ralph, that streak was broken, and the years from 1908 to 1919 marked the first period of benign neglect for the collection. Without a curator or custodian specifically assigned to manage the collection, it was subsumed under the Division of Birds, and there it was a lower priority than existing work already underway, particularly with the chronic shortages of labor about which the Museum frequently complained. The process of neglect was gradual, and at first, the collection was largely maintained correctly. But, when the neglect started, ensuring the taxonomical order of newly accessioned specimens was the first task to go, as in 1912 the summary of activities for the Division of Birds remarked that "the accessions of eggs and nests received during the year were labeled, numbered, and stored as such, the division not being provided with sufficient assistance to permit the systematic distribution of the specimens in the reserve series."[137] In 1913, this neglect of the collections was further compounded, as the Division of Birds staff catalogued the eggs but did not systematically arrange them.[138] Neglect continued in 1914, as some of the eggs accessioned over the course of the year were put in cases, but "most of the accessions of eggs were left for attention at a future time."[139] In 1915, the Division of Birds attempted to address the neglect of the egg collection, as they labeled and distributed the more important accessions of bird eggs received in the previous years. But, from 1916 to 1918 there was no mention of the Section of Eggs at all in the Annual Reports, and no updates on its condition. It appears as though the Division did not consider the Section of Birds' Eggs to be a high priority to spend their limited resources

[137] *Report of the U.S. National Museum for 1912*, 39.
[138] *Report of the U.S. National Museum for 1913*, 57.
[139] *Report of the U.S. National Museum for 1914*, 99.

on, although that may not be the only explanation, and without a dedicated staff member, the collection eventually came to be almost completely neglected by the staff.

Beginning in this period, the Annual Reports of the U.S. National Museum started to list the scientific visitors to their collections, and the Section of Birds' Eggs was not completely neglected by visiting scholars. The shifting attitude toward oology within the Division of Birds can be seen with respect to the visitors to the collections in that there were some years where the Division distinguished between visitors to the bird skins/skeletons collection and visitors to the egg collection, and other years where they did not, so complete data on how many visitors came every year specifically for the eggs is impossible to ascertain. For the years that the Division did distinguish between visitors for skins/skeletons and visitors for eggs, the number of visitors never climbed above 8 total in a year, whereas the number of visitors to the skins and eggs was always at least 15 in a year.[140] While we are unfortunately unable to compare this number with the number of visitors to the collection during Bendire's or Ralph's time as Honorary Curator, the fact that any scientific visitors at all were interested in the collection spoke to

[140] In 1913, the number of total visitors to the eggs was 5. In 1914, the total was 6. In 1916, there were 8 total visitors to the egg collections. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1913. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1913*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1914), 58. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1914. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1914*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1915), 99-100. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1916. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1916*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1917), 34-35.

the lingering interest in oology outside the museum. Furthermore, the act of recording and differentiating between the visitors interested in bird skins/skeletons or eggs demonstrated that the Museum still recognized the distinction between oology and ornithology as scientific practices.

Accessions during this period declined even more than they had in previous periods. While the average number of accessions per year pre-Bendire was 16.1 accessions, under Bendire it was 39.2, and it was 18.2 under Ralph, the average number of accessions during the curator-less period for the Section of Birds' Eggs was only 11.6, the lowest average for the collection since the Smithsonian Institution was founded.[141] Large donations in this period were often associated with the death of an oologist/ornithologist, such as the collections of Clarence H. Morrell in 1910.[142] A few other donations over this period were sufficiently large to be remarked upon in the annual reports, including a large gift of eggs from Dr. Edgar A. Mearns in 1914 and a large donation from Dr. T.W. Richards, U.S. Navy, of about 12,000 specimens of American and foreign eggs in 1915.[143] Without an active curator pursuing collections on his own and coordinating with the collections of others, the accessions for the Section of Birds'

---

[141] See Figure 4.1.

[142] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1910. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1910*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1911), 29-30.

[143] *Report of the U.S. National Museum for 1914*, 98. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1918. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1918*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1919), 36.

Eggs suffered from a lack of direction and were at the mercy of the oologists and collectors who chose to donate to it, and there were fewer of them every year.

Curiously, during this period there was renewed activity in an area that had been relatively neglected under Ralph's tenure: exhibitions. Starting in 1913, the Museum planned a set of special exhibitions for topics including "the eggs and nests of birds, animal architecture, phases of evolution, mimicry, albinism, melanism, the cotton boll weevil, and the distribution of the Rocky Mountain grasshopper," each to take up bays approximately 17 ½ feet wide and 18 ½ feet across (323.75 square feet).[144] The Museum moved relatively quickly on the project, and by 1914 the special exhibition opened, with the bird eggs displayed in three tabletop cases.[145] From this seemingly small example, there are two things to emphasize, the first of which is that the eggs were exhibited in a very small space, and that small a space may not have been necessary. The exhibition for the Division of Birds was housed in a space covering 9,652 square feet, while the bird eggs were in a space of only 323.75 square feet.[146] One possible reason for this is that exhibiting the bird eggs was not as high a priority as the birds, as the Museum might have found a different way to allocate the space so that the eggs could have had more room, and therefore displayed more specimens. The second, and more important question this exhibition raises is why the bird eggs were not included with the rest of the birds, but instead with other niche/bizarre/trendy topics that occur across species. Was this because oology was seen as novelty, or because it was popular with non-scientists and the Museum knew it would draw visitor attention? In either case, the Museum did not place

[144] *Report of the U.S. National Museum for 1913*, 30-31.
[145] *Report of the U.S. National Museum for 1914*, 113.
[146] *Report of the U.S. National Museum for 1913*, 26.

the exhibition on eggs with the birds, which hints at its attitude toward the relationship between ornithology and oology.

Publications during this period were particularly lackluster, with the exception of the "Life Histories," which will be discussed in greater detail below. In the years from 1909 to 1918, the range of publications per year was from zero in 1909 and 1916 to a high of three papers in 1915.[147] This decrease in publications based on the collections is almost certainly attributable to the lack of a Custodian or curator on staff to promote research in oology, although at least a few researchers still visited the collections to continue oological research. While this decrease in publications reflected poorly on the usefulness of the collections during this period, it was not an entirely negative publishing outlook for the Institution. In 1918, the Museum reprinted three parts of Bulletin No. 39, including Part D (which gave instructions on collecting bird eggs) in small editions to

[147] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1911. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1911*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1912), 124. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1912. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1912*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1913), 76. *Report of the U.S. National Museum for 1913*, 180. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1915. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1915*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1916), 193-194. Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1917. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1917*, by Richard Rathbun, (Washington, D.C.: United States Government Printing Office, 1918),157-158.

"meet the constant demand for them."[148] The demand for this Bulletin hints at the continuing popularity of oology outside of the Museum, but lingering questions remain about who asked for the Bulletin, hobbyists or oologists, and to what purpose they asked for it.[149] The publications of this period show the tensions between the inner workings of the Museum and the outer world in which it operated.

In an effort to finish the "Life Histories" series started by Charles Bendire, the National Museum made the decision to reach an agreement with an unaffiliated ornithologist and oologist, Arthur Cleveland (A. C.) Bent.[150] In light of changes to the A.O.U. Checklist of North American Birds since Bendire's publication of the original Life Histories, Bent elected to start from scratch to ensure uniformity throughout the series.[151] Both Bendire's version of "Life Histories" and Bent's version had holistic approaches to the term "life histories" that encompassed not just the eggs but everything else about the birds, including their nests, breeding behavior, and other topics that, while not strictly oology, tended to be neglected by ornithology. Originally, Bent contracted with the Institution to produce six large volumes of the "Life Histories," but as he began to dig further into the project, he amended his statement, saying, "It will be my life work."[152] He submitted the manuscript of the first volume of the new "Life Histories" in 1917.[153] Bent was a frequent visitor to the collections throughout his period of association with the Museum, making use of the eggs and birds in his work. Although Bent had been

[148] *Report of the U.S. National Museum for 1918*, 88. The other two parts of Bulletin No. 39 to be reprinted in 1918 were on collecting birds and insects.
[149] I have been unable to locate a list of those who asked for or received a copy of the Bulletin at this time.
[150] *Report of the U.S. National Museum for 1910*, 30-31.
[151] Wendell Taber, "In Memoriam: Arthur Cleveland Bent," *The Auk* 72, no. 4 (1955): 338.
[152] Taber, 338.
[153] *Report of the U.S. National Museum for 1917*, 37.

working with the Museum's collections since 1910, it was not until 1928 that he was made a collaborator in the Division of Birds, on December 1, of that year.[154] Bent remained affiliated with the Institution until his death in 1954, and over the course of his life he wrote a total of twenty-one volumes of "Life Histories", of which nineteen were completed before his death, one was nearly complete at his death and published posthumously, and the final work published more than a decade after his with the assistance of collaborators seeking to complete his work. With Bent's death, the main publications of the Smithsonian relating to oology came to an end as well.

From 1908 to 1919, the Museum did not have an Honorary Curator for the Section of Birds' Eggs, but on August 20, 1919, Bradshaw H. Swales was designated the Honorary Custodian of Section of Birds' Eggs.[155] Swales was different from the previous Honorary Curators/Custodians of the Section, as he was not exclusively interested in eggs and started working with Dr. Charles Richmond on birds of Santo Domingo and Haiti within a year of working in the Section.[156] In 1919 the department of biology bemoaned the inadequate number of staff members to bring the work up to date in several divisions. Because of a lower rate of accessions across all divisions, the Museum was given the

---

[154] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1928. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1928*, by Alexander Wetmore, (Washington, D.C.: United States Government Printing Office, 1929), 39.

[155] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1919. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1919*, by William deC. Ravenel, (Washington, D.C.: United States Government Printing Office, 1920), 36.

[156] *Report of the U.S. National Museum for 1919*, 78.

chance that year to catch up on their backlog by employing temporary assistance.[157] While this shortage may have been a contributing factor to Swales's work in the Division of Birds, it did not mean that he did not complete tasks in the Section of Birds' Eggs. In 1920, Swales accomplished an admirable amount of work, as he safely stored, labeled, and taxonomically organized 2,300-2,500 eggs that had been accessioned in previous years.[158] Swales and his fellow staff members in the Division of Birds also attempted to respond to a massive donation in 1922 but were unable to finish the job completely, as the collection in question contained over 8,000 eggs.[159] The Section of Birds' Eggs was fortunate, in light of the shortage of staff members, to have Swales working on the collection, but his presence there did not last long.

Accessions during Swales's tenure were fewer than any previous period in the Museum's history. The average number of accessions during Swales's curatorship was only 9.5 per year, less than even the period when there was no curator or Custodian in charge of the Section.[160] What makes this lack of accessions in the Section of Birds' Eggs all the more startling is that in 1919, Swales established the Swales Fund at the Museum

---

[157] *Report of the U.S. National Museum for 1919*, 71.
[158] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1920. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1920*, by William deC. Ravenel, (Washington, D.C.: United States Government Printing Office, 1921), 82.
[159] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1922. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1922*, by William deC. Ravenel, (Washington, D.C.: United States Government Printing Office, 1923), 62.
[160] See Table 4.1.

to be used for collecting or purchasing the skins of birds, but not eggs.[161] Swales clearly had the disposable income to invest in purchasing specimens or funding explorations for the purpose of collecting eggs, but instead funded skins in spite of the fact that he was in charge of the Section of Birds' Eggs. Further evidence of the muddying of the distinction between the Division of Birds and the Section of Birds' Eggs occurred in 1921, when the Museum received a large collection from Dr. T.W. Richards of 8,344 eggs and 10 nests. The accessioning was accomplished by the division as a whole, not just Swales, and took a substantial amount of time; the Annual Report for that year noted that "as yet it has been found impossible to number the individual eggs, a work absolutely necessary and for which special provision has been asked, as it can not be handled with the present force."[162] In 1922, Swales made a donation of skins, skeletons, nests, and eggs, spread over several accessions.[163] Through this examination of accessions during Swales's honorary position in the Section of Birds' Eggs, it is evident that he did not share the same commitment to oology that Bendire and Ralph had before him. While he did not appear to be negligent in his duties to the Section, he did not go above and beyond the call of duty in the way that his predecessors had, and this lack of enthusiasm for oology certainly harmed the development of the science at the Museum, as decreasing accessions signaled decreasing engagement between the Section and the outside world on which it

[161] *Report of the U.S. National Museum for 1919*, 15.
[162] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1921. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1921*, by William deC. Ravenel, (Washington, D.C.: United States Government Printing Office, 1922), 62.
[163] *Report of the U.S. National Museum for 1922*, 51.

depended for donations, though the challenges oology faced outside the Museum absolutely contributed as well.

Swales's appointment to the Section of Birds' Eggs was not permanent, however, and by 1922, he became the honorary assistant curator in the Division of Birds. There was no separate Section of Birds' Eggs in the annual report for that year, making 1921 the last year in which the Section of Birds' Eggs would be considered a distinct entity from the Division of Birds by the Museum.[164] He continued working in the division until his death in 1928.[165] Swales was the last Honorary Curator/Custodian of Birds' Eggs ever appointed at the Smithsonian. In 1923, after his appointment to the Division of Birds, the Museum had the following to say about the collection of birds' eggs:

> The collection of eggs and nests is unchanged; little or nothing has been done to improve the collection by adding the accumulations of the past year or two to the arranged series. However, this does not mean deterioration or decay in the collection, but simply that the specimens have not been "distributed" in the series, this being a more involved matter than in bird skins.[166]

Without a curator (even an honorary one) to advocate for the collection (and by extension, the science of oology), this period of benign neglect extended to the present day. It was thus that the science of oology went out with a whimper, rather than a bang, at the U.S. National Museum.

---

[164] *Report of the U.S. National Museum for 1922*, 7.
[165] *Report of the U.S. National Museum for 1928*, 40-41.
[166] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1923. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1923*, by William deC. Ravenel, (Washington, D.C.: United States Government Printing Office, 1924), 59.

Oology during and after Swales's curatorship was a science under attack in the field of ornithology, and although it put up a good fight, the forces against oology ultimately prevailed. Though the process of muddying the definition of oology began with Bendire's 1891 bulletin, which was the first instance of the science of oology coopting activities traditionally considered the province of ornithology, the years during and after Swales's curatorship finished the job. In 1908, Robert Rockwell, a naturalist from Colorado, submitted an article titled, "Suggestions on the Preparation of an Oological Collection" to *The Condor*, in which he wrote as though the fad of egg collecting had already passed as a result of public outcry, and he made a point of differentiating between hobby collecting and scientific practice. Oology still had defenders in 1915, as W. Leon Dawson addressed an open letter in *The Condor* to Dr. Harold C. Bryant, a Game Expert for the California State Fish and Game Commission. Dawson argued in his letter, titled, "Fair Play for the Collector: An Open Letter," that he agreed with the Californian system of requiring permits for hunting and scientific collecting, but that he hoped they would be applied fairly, such that the scientist had an equal claim to the species and quantities of birds as the hunter.[167] Milton S. Ray, a Californian ornithologist, defended oology in a 1919 article in *The Condor*, where he argued that he "considers oology an inseparable part of ornithology, but as it has been separated by some and completely divorced by others, [he was] forced to use the term."[168] He argued that studying bird eggs had value, and defended the practice when carried out scientifically, but saw oology as an inextricable part of ornithology, not as a

[167] W. Leon Dawson, "Fair Play for the Collector: An Open Letter," *The Condor* 17, no. 5 (1915): 208-212.
[168] Milton S. Ray, "A Defense of Oology," *The Condor* 12, no. 1 (1910): 19-22.

separate science. Here, even though the practices within oology were being defended, the legitimacy of oology as a separate science was not.

Perhaps one of the most interesting and persuasive defenses mounted for oology as a science was made by T. W. Richards of the U.S. Navy, who argued in 1914 that oology was scientific and valuable under specific conditions, and less scientific or valuable under others. He first criticized the hobbyists who collected as a pastime or out of a sense of acquisitiveness, as well as those who collected for aesthetic reasons and the "faunal" collectors who attempted to collect representative eggs from every species within a particular region.[169] Instead, Richards argued that collections would be most useful for scientific discovery if the oologist collected based on the taxonomical relationships between birds (in his example, the hawks) to make discoveries about the eggs of birds in specific genera, families, and orders.[170] By organizing collecting and organizing eggs in this way, Richards argued that oologists could provide valuable scientific information to ornithologists. But in spite of the increasingly frantic and inventive defenses by oologists, the writing was on the wall for oology as a scientific specialization. By 1937, even A. C. Bent, the man tasked with continuing Bendire's oology-focused "Life Histories of North American Birds," saw collecting bird eggs as a boyhood hobby that had to be outgrown in order to become a serious ornithologist.[171] While oologists fought hard to preserve their science, their gradual concessions to permits, to being a part of ornithology, and to being a boyhood hobby for ornithologists

[169] T. W. Richards, "A Plea for Comparative Oology," *The Condor* 16, no. 4 (1914): 162.
[170] T. W. Richards, "A Plea for Comparative Oology," *The Condor* 16, no. 4 (1914): 163.
[171] Arthur Cleveland Bent, "In Memoriam: Frederic Hedge Kennard 1865-1937," *The Auk* 54, no. 3 (1937): 342.

did more harm than good for the science, as their rhetoric destabilized and delegitimized oology from the inside.

In a last, desperate push for oology, W. Leon Dawson, the author of the open letter discussed above, founded the Museum of Comparative Oology in 1916 in Santa Barbara, California. By 1919 the Museum had its own journal, the *Journal of the Museum of Comparative Oology*, which attempted to display the variety of collections acquired by the Museum and to promote the Museum to other oologists.[172] The Museum of Comparative Oology acquired its building and opened in 1922, but by fall of that year Dawson, the founder and director of the museum, took what was meant to be a brief leave of absence to finish his manuscript on oology, and he was never reinstated as the director. The board of trustees for the museum, seeing an opportunity upon Dawson's departure, decided to broaden the scope of the museum beyond oology and in 1924 the Museum of Comparative Oology became the Santa Barbara Museum of Natural History and Comparative Oology, and began to add collections in other fields.[173] Incensed, Dawson founded the International Museum of Oology in 1924, and created a new journal for this museum, *The Comparative Oologist*, but both were short-lived; Dawson died in 1928, and at the time of his death the new museum was not even mentioned in his memorial in *The Auk*.[174] Despite Dawson's best efforts, oology was not an important enough science in to support an entire museum when he made the attempts to create them.

---

[172] W. Leon Dawson, "The Museum of Comparative Oology: Who and What," *The Journal of the Museum of Comparative Oology* 1, no. 1 (1919): 4.
[173] "Then and Now: The Museum's Oological Collections," *Santa Barbara Museum of Natural History*, last modified 2014, http://www.sbnature.org/crc/729.html
[174] Witmer Stone, "The Ornithological Journals," *The Auk* 41, no. 3 (1924): 501. Witmer Stone, "Notes and News," *The Auk* 45, no. 3 (1928): 417.

Oology was also under attack on the legal front. While several state level hunting and collecting laws had been passed prior to 1913, the first law on the federal level to protect birds was the Weeks-McLean law in 1913, but this was later strengthened and replaced in by the Migratory Bird Treaty Act (MBTA) in 1918.[175] What is interesting to note is that the Migratory Bird Treaty Act was not mentioned once in the Annual Reports of the Smithsonian Institution from 1913 to 1923, in spite of the fact that it had an effect on the collecting practices of the ornithologists attached to the Museum. From this, we can deduce that the exceptions in the law that allowed for scientific collecting with permits were sufficient for the Museum to continue collecting uninterrupted. For ornithologists and oologists unattached to a museum, however, the law proved to be more harmful. While this meant that the practice of oology did not stop over night, it made hobbyist collecting illegal and therefore prevented the next generation of budding ornithologists from beginning their journey by collecting bird eggs. Instead, as Barrow effectively argues in *A Passion for Birds*, the growing popularity of bird-watching, combined with an increasing availability of binoculars and cameras, made bird-watching a much more appealing, and legal, means of engaging with ornithology in childhood; changes in attitudes also promoted replacing collecting birds and eggs, both inherently destructive activities, with bird-watching, which one could engage in without killing the birds.[176] Bird watching, in essence, supplanted the role that oology played in the early development of many ornithologists, producing fewer individuals that had the potential to become oologists in adulthood. Effectively, the Migratory Bird Treaty Act and the

[175] "Other Relevant Laws," *U.S. Fish and Wildlife Service*, last modified September 16, 2015, http://www.fws.gov/birds/policies-and-regulations/laws-legislations/other-relevant-laws.php#weeks
[176] Barrow, *A Passion for Birds*, 158-161.

subsequent rise of bird-watching disrupted the continued practice of oology as a science by discouraging new oologists, requiring permits for acting oologists, and replacing oology as a childhood introduction to ornithology.

CHAPTER 7

CONCLUSION

The science of oology went out with a whimper, rather than a bang. While the Smithsonian Institution was able to influence some individuals at key points in the development of oology as a science, particularly in the early years, it was unable to control the popularity and practice of oology as a whole. The Institution's circulars acted as suggestions for those willing to listen, but it was only one voice among many attempting to influence the science, including those such as the Audubon Society and the A.O.U.'s Committee on Bird Protection, who questioned the validity of the science as a whole. Oology in the United States may have been promoted and popularized by the Smithsonian Institution, but it couldn't be saved by it.

Oology in the world outside the museum suffered as a result of its own popularity. The popularity of the hobby killed off the scientific value of the activity, and as the hobby became less popular, fewer people were introduced to the science and became interested in pursuing it. Environmental concerns and the growing realization of the damage caused by killing birds for millinery purposes combined to create an environment where justifications were needed for killing birds and destroying their eggs. Oology was not the bird conservation movement's primary target at first, but the fact that oologists often killed birds to verify parentage, combined with taking eggs that had the potential to become breeding birds that could help populations rebound, did not endear the science to

groups like the Audubon Society. Oology's problems compounded, as it struggled to justify itself, particularly because ornithology as a whole was divided over its usefulness, while ornithologists were not divided over the usefulness of their own specialization. Infighting in the broader field of ornithology left the science of oology in a weakened, defensive position, and they were unable to defend their science from a war on two fronts. The rise of bird-watching, and the legal hurdles placed in the path of oology by the MBTA were the final nails in the coffin for oology, and it declined steadily from that point to the present.

The Audubon Society continued to advocate on behalf of birds and spoke out against many environmental issues they felt negatively affected birds. In 1945, the Audubon Society became concerned about the hazards of dichlorodiphenyltrichloroethane (DDT), an insecticide used extensively during and after World War II, and participated in a study with the U.S. Fish and Wildlife Service to investigate the effects of DDT on birds.[177] Scientists interested in examining the effects of DDT on birds were able to use historical collections of eggs laid before the use of DDT to demonstrate that DDT was linked with eggshell thinning.[178] Birds crushed these thinner eggshells during incubation, causing a catastrophic decrease in populations, and the results of scientific studies on this phenomenon contributed to the ban on DDT use in 1972.[179] The ultimate irony here is that the collections of eggs to which the Audubon Society objected were used to prove the harm caused by DDT and promote the ban of the

[177] Neil Hotchkiss and Richard H. Pough, "Effect on Forest Birds of DDT Used for Gypsy Moth Control in Pennsylvania," *The Journal of Wildlife Management* 10, no. 3 (1946).
[178] Joseph J. Hickey and Daniel W. Anderson, "Chlorinated Hydrocarbons and Eggshell Changes in Raptorial and Fish-Eating Birds," *Science* New Series 162, no. 3850 (1968).
[179] *DDT: A Review*, 62-81.

substance to save the birds; if the Audubon Society had had its way, these necessary collections might not have existed at all.

The example above highlights the problems with the neglect of collections that can happen when institutional support is withdrawn or resources are prioritized elsewhere. While the oologists who collected those eggs in the late 19th and early 20th century did not have DDT testing in mind when they collected their specimens, they were useful nonetheless. In addition to their use in DDT studies, eggs have been used to answer questions about bird morphology, taxonomy, historical distributions of species, archaeology, x-ray diffraction, pigmentation studies, and examinations of the environment, to name but a few.[180] It is impossible to anticipate the ways collections will be used in the future, but it is necessary to ensure that they continue to exist and to grow in order to ensure that future scholars have the opportunities to use them. Allison Marsh, a historian of technology at the University of South Carolina, and Lizzie Wade, a correspondent for *Science*, wrote an article about the forgotten engineering collection at the Smithsonian Institution, in which they argued that "without a curator, a collection cannot grow and evolve," and with the passage of enough time, orphaned collections become difficult to use and interpret.[181] In the case of oological collections, some scientists have expressed concerns about the availability of egg collections and their futures, among them ornithologist Lloyd Kiff. In a brief article for *The Auk*, Kiff outlined the current status and future of some of the collections in museums, and concludes with a list of five recommendations for preserving collections and expanding knowledge about

[180] Lloyd F. Kiff, "History, Present Status, and Future Prospects of Avian Eggshell Collections in North America," *The Auk* 122, no. 3 (2005): 995.
[181] Allison Marsh and Lizzie Wade, "Collective Forgetting: Inside the Smithsonian's Curatorial Crisis," *Issues in Science and Technology* 30, no. 4 (2014): 51.

the collections. These suggestions were to preserve traditional oological knowledge, provide funding for egg collection conservation and growth, consolidate egg collections, collect eggs and eggshell fragments for environmental monitoring purposes, and compile a global database of data about the eggs.[182] The history of oology at the Smithsonian suggests that even if a science like oology is no longer practiced as such, the materials produced by that science can still answer questions today.

[182] Kiff, 994-999.

BIBLIOGRAPHY

Allen, J. A. "Notes and News." *The Auk* 3, No. 1 (Jan., 1886): 142-144.

Allen, J. A., Spencer F. Baird, and Elliot Coues. "Thomas Mayo Brewer." *Bulletin of the Nuttall Ornithological Club* 5, no. 2 (1880): 102-104.

Barrow, Mark V. Jr. *A Passion for Birds: American Ornithology after Audubon*. Princeton: Princeton University Press, 1998.

Barrow, Mark V. Jr. "The Specimen Dealer: Entrepreneurial Natural History in America's Gilded Age." *Journal of the History of Biology* 33, no. 3 (2000): 493-534.

Bendire, Charles E. "Circular No. 30, Appendix: A list of birds the eggs of which are wanted to complete the series in the National Museum, with instructions for collecting eggs." *Proceedings of the United States National Museum* 7 (1884): 613-616.

Bendire, Charles E. "Instructions for Collecting, Preparing, and Preserving Birds' Eggs and Nests (Part D)." *Bulletin of the United States National Museum* 39 (1891): 3-10.

Bent, Arthur Cleveland. "In Memoriam: Frederic Hedge Kennard 1865-1937." *The Auk* 54, no. 3 (1937): 341-348.

Brewer, Thomas M. *North American Oölogy: Being an Account of the Habits and Geographical Distribution of the Birds of North America during their Breeding Season; with Figures and Descriptions of their Eggs, Part I – Raptores and Fissirostres*. Smithsonian Contributions to Knowledge (Washington, D.C.: Smithsonian Institution, 1857).

Coues, Elliot. "Fourth Installment of Ornithological Bibliography: Being a List of Faunal Publications Relating to British Birds." *Proceedings of the United States National Museum* 1 (1878): 359-477.

Dawson, W. Leon. "Fair Play for the Collector: An Open Letter." *The Condor* 17, no. 5 (1915): 208-212.

Dawson, W. Leon. "The Museum of Comparative Oology: Who and What." *The Journal of the Museum of Comparative Oology* 1, no. 1 (1919): 4-8.

U.S. Environmental Protection Agency. *DDT: A Review of Scientific and Economic Aspects of the Decision to Ban its Use as a Pesticide*. EPA/540/1-75-022. Washington D.C.: Environmental Protection Agency, 1975.

Findlen, Paula. *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy*. Berkeley, CA: University of California Press, 1996.

Grinnell, Joseph. "Is Egg-Collecting Justifiable?" *The Condor* 8, no. 6 (1906): 155-156.

Henry, Joseph. "Instructions in Reference to Collecting Nests and Eggs of North American Birds." *Smithsonian Miscellaneous Collections* 2 (1862): 665-673.

Hewitson, William C.. *British Oology: Being Illustrations of the Eggs of British Birds, with Figures of Each Species, as Far as Practicable, Drawn and Coloured from Nature: Accompanied by Descriptions of the Materials and Situation of Their Nests, Number of Eggs, &c.* 1. Newcastle Upon Tyne, United Kingdom: Charles Empson, 1831.

Hickey, Joseph J. and Daniel W. Anderson. "Chlorinated Hydrocarbons and Eggshell Changes in Raptorial and Fish-Eating Birds." *Science* New Series 162, no. 3850 (1968): 271-273.

Hotchkiss, Neil and Richard H. Pough. "Effect on Forest Birds of DDT Used for Gypsy Moth Control in Pennsylvania." *The Journal of Wildlife Management* 10, no. 3 (1946): 202-207.

Kidder, J. H. "Contributions to the Natural History of Kerguelen Island, made in connection with the United States Transit of Venus Expedition, 1874-'75, Part II." *Bulletin of the United States National Museum* 1 (1877): 155-277.

Kiff, Lloyd F. "History, Present Status, and Future Prospects of Avian Eggshell Collections in North America." *The Auk* 122, no. 3 (2005): 994-999.

Kohler, Robert E. *All Creatures: Naturalists, Collectors, and Biodiversity, 1850-1950*. Princeton: Princeton University Press, 2006.

Marsh, Allison and Lizzie Wade. "Collective Forgetting: Inside the Smithsonian's Curatorial Crisis." *Issues in Science and Technology* 30, no. 4 (2014): 47-55.

Montgomery, Thomas Jr. "The Amount of Science in Oology." *Bird-Lore* 8, May-June (1906): 95-98.

Newton, Alfred. "Suggestions for Forming Collections of Birds' Eggs." *Smithsonian Miscellaneous Collections* 2 (1862): 674-686.

Ray, Milton S. "A Defense of Oology." *The Condor* 12, no. 1 (1910): 19-22.

Richards, T.W. "A Plea for Comparative Oology." *The Condor* 16, no. 4 (1914): 161-167.

Robinson, Wirt. *Wirt Robinson to Charles Bendire, September 5, 1893*. Letter. From Smithsonian Institution Archives, Record Unit 7394, Bendire, Charles, 1836-1897, Charles Bendire Papers.

"Then and Now: The Museum's Oological Collections." *Santa Barbara Museum of Natural History*. Last modified 2014. http://www.sbnature.org/crc/729.html

Smithsonian Institution. *Fifth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1850*. By Joseph Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1851.

Smithsonian Institution. *Sixth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1851*. By Joseph Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1852.

Smithsonian Institution. *Seventh Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1852*. By Joseph Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1853.

Smithsonian Institution. *Eighth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1853*. By Joseph Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1854.

Smithsonian Institution. *Ninth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1854*. By Joseph Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1855.

Smithsonian Institution. *Tenth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives, showing the Operations, Expenditures, and Condition of the Institution during the year 1855*. By Joseph

Henry and Spencer Fullerton Baird. Washington D.C.: United States Government Printing Office, 1856.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1856*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1857.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1857*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1858.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1858*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1859.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1859*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1860.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1860*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1861.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1861*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1862.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1862*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1863.

Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1863*, by Joseph Henry and Spencer Fullerton Baird, (Washington, D.C.: United States Government Printing Office, 1864.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the*

Institution, for the Year 1864. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1865.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1865*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1866.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1866*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1867.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1867*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1868.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1868*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1869.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1869*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1870.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1870*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1871.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1871*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1872.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1872*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1873.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the*

Institution, for the Year 1873. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1874.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1874*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1875.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1875*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1876.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1876*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1877.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1877*. By Joseph Henry and Spencer Fullerton Baird. Washington, D.C.: United States Government Printing Office, 1878.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1878*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1879.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1879*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1880.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1880*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1881.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1881*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1882.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the*

Institution, for the Year 1882. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1883.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, for the Year 1883*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1884.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year 1884. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution, for the year 1884*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1885.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, to July, 1885*. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1886.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution to July 1885. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution, to July 1885*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1886.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30*, 1886. By Spencer Fullerton Baird and G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1887.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1886. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1886*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1887.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1887. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1887*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1888.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1888. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1888*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1889.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1889. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1889*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1890.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1890. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1890*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1891.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1891. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1891*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1892.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1892. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1892*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1893.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1893. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1893*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1894.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1894. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year*

Ending June 30, 1894. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1895.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1895. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1895*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1896.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1896. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1896*. By G. Brown Goode. Washington, D.C.: United States Government Printing Office, 1897.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1897. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1897*. By Charles D. Walcott. Washington, D.C.: United States Government Printing Office, 1898.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1898. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1899*. By Charles D. Walcott. Washington, D.C.: United States Government Printing Office, 1899.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1899. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1899*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1900.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1900. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1900*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1901.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1901. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1901*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1902.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1902. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1902*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1903.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1903. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1903*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1904.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1904. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1904*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1905.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1905. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1905*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1906.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1906. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1906*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1907.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1907. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year*

Ending June 30, 1907. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1908.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1908. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1908*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1909.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1909. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1909*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1910.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1910. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1910*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1911.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1911. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1911*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1912.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1912. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1912*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1913.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1913. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1913*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1914.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1914. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1914*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1915.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1915. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1915*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1916.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1916. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1916*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1917.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1917. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1917*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1918.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1918. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1918*. By Richard Rathbun. Washington, D.C.: United States Government Printing Office, 1919.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1919. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1919*. By William deC. Ravenel. Washington, D.C.: United States Government Printing Office, 1920.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1920. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year*

Ending June 30, 1920. By William deC. Ravenel. Washington, D.C.: United States Government Printing Office, 1921.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1921. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1921*. By William deC. Ravenel. Washington, D.C.: United States Government Printing Office, 1922.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1922. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1922*. By William deC. Ravenel. Washington, D.C.: United States Government Printing Office, 1923.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1923. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1923*. By William deC. Ravenel. Washington, D.C.: United States Government Printing Office, 1924.

Smithsonian Institution. *Annual Report of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1928. Part II: Report of the United States National Museum, under the Direction of the Smithsonian Institution for the Year Ending June 30, 1928*. By Alexander Wetmore. Washington, D.C.: United States Government Printing Office, 1929.

Stone, Witmer. "Notes and News." *The Auk* 45, no. 3 (1928): 417-422.

Stone, Witmer. "The Ornithological Journals." *The Auk* 41, no. 3 (1924): 500-505.

Taber, Wendell. "In Memoriam: Arthur Cleveland Bent." *The Auk* 72, no. 4 (1955): 332-339.

Trostler, Isador S. "Dear Brother Oologist." *Bulletin of the Oologists' Association* 1 (1897): 1-8.

"Other Relevant Laws." *U.S. Fish and Wildlife Service*. Last modified September 16, 2015, http://www.fws.gov/birds/policies-and-regulations/laws-legislations/other-relevant-laws.php#week