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LISTENING AT THE LAB: BIRD WATCHERS AND THE CORNELL LABORATORY OF ORNITHOLOGY

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LISTENING AT THE LAB: BIRD WATCHERS AND THE CORNELL LABORATORY OF ORNITHOLOGY

A THESIS APPROVED FOR THE
DEPARTMENT OF HISTORY OF SCIENCE

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Abstract

Professionalization within the sciences has often been presented as a process of separation between scientists and the public. Implicit within this conception of professionalization is a hierarchical conception of knowledge which is diffused from the laboratory to the public. However, the history of ornithology reveals very different dynamics which requires historians to challenge this notion of professionalization. From its origins as a science oriented toward the collection of specimens for the purposes of taxonomy, ornithologists have formed a community of practice with amateurs. Amateur bird watching fostered a new set of skills for bird identification at a time when professional ornithologists became reliant upon such skills in order to study birds in the field. A study of the Cornell Laboratory of Ornithology reveals the extent to which professional ornithologists were embedded within the community of bird watchers and depended upon them for the very survival of the institution. The interaction between professional ornithologists and a wider culture of bird watchers as seen through the recording activity of the CLO is inadequately explained by models the isolate "science" and the "public" and assume a one-way flow of scientific knowledge. The example of sound recording shows how amateurs were important figures in scientific networks which were maintained by personal relationships. The rise of citizen science at the CLO in the late 1980s demonstrates its reliance upon the participation of large numbers of amateur bird watchers to produce data published in scientific literature. Rather than a diffusionist model of professionalization, the Cornell Laboratory of Ornithology points to a model of professionalization through popularization built upon a common culture of bird watching.

Introduction

"So let's take the little book with its colored plates and go for a bird walk" the voice of Arthur A. Allen beckons over the snaps and crackles of the record "we will use our ears as well as our eyes." Allen is now in the garden, pausing to identify a bluebird before proceeding on through "the elms and maples by the roadside" to the edge of a marsh where a Red-winged Blackbird issues its unmistakable conkareee![1] Here at the end of his life, Allen, who was one of the most prominent ornithologists of the early twentieth century was inviting his listeners on a bird walk. But this is a walk of the imagination. For one thing, it was impossible to both listen to Allen and take the book outside at the same time. For another, these sounds are a composition, edited from the thousands of samples that were housed in the Cornell Laboratory of Ornithology's Library of Natural Sounds.

This spring time bird walk with Allen, for the purposes of recreation and for training the listener to recognize and identify bird songs in the field encapsulates the essence of what this thesis is about. It demonstrates; through the medium (records), the songs (contributed by a network of sound recorders), and the rhetoric (going for a bird walk at the side of Allen) the various ways in which the Cornell Laboratory of Ornithology has engaged with the community of bird watchers that formed its base of support. Allen's technique of placing the listener with him in a shared space, which appears in other records as well, underscores the central argument of this thesis: that the Cornell Laboratory of Ornithology is a non-exclusive space where professional scientists and amateurs have interacted as part of single bird watching community.

[1] Arthur A. Allen, *Bird Songs in Your Garden*, (Boston: Houghton Mifflin Company, 1961)

Allen's professional accomplishments as the first university professor of ornithology in the United States include the establishment of what became known as the "grad lab" at Cornell University. Until his retirement in 1953 Allen trained over one hundred ornithologists at Cornell who would go on to achieve successful careers in museums, academia, and government positions. As the only institution offering degrees in ornithology until the 1940's Allen was incredibly influential in the creation of the professional landscape of ornithology in the twentieth century.

Yet, Allen was also a bird watcher who also played a tremendous role in educating thousands of bird watchers through his summer school classes, undergraduate classes, and bird walks. For Allen, there was no divorcing the popular from the professional: his work in photography, sound recording, and motion pictures were shown at meetings of the American Ornithologists' Union and to bird watching friends alike. Allen was a part of this community and not separate from it. As a result, the history of the Cornell Laboratory of Ornithology is also deeply embedded within that community. The Cornell Laboratory of Ornithology, when it was physically constructed in 1957 was built in the Sapsucker Woods, a little over a half a mile from the Cornell University Campus, where Allen had spent time as a young man bird watching with his good friend the bird artist Louis Agassiz Fuertes. That it was here that the Cornell Laboratory of Ornithology was built, rather than at Cornell University itself speaks to the importance that bird watching had in its construction and subsequent development.

Bird watching provided a common community of practice for both amateurs and professional ornithologists in the twentieth century. A majority of the ornithologists working within academic and museum settings in the twenty first century became bird

watchers early in life. As a practice bird watching provided the fundamental skills which ornithologists would rely upon in their professional work. The common culture of bird watching makes it difficult to apply models of professionalization that seek to separate scientists from the public in the case of ornithology. A study of the Cornell Laboratory of Ornithology demonstrates that ornithologists are deeply embedded within the bird watching community and are dependent upon that community for much of their professional work. The longstanding engagement with amateur bird watchers has continued to play a key role in how Cornell Laboratory of Ornithology functions, by embracing a data-driven approach to science fueled by the participation of bird watchers in citizen science projects which allowed it to produce important research.

Brief History of the Cornell Laboratory of Ornithology

I have chosen to divide the history of the Cornell Laboratory of Ornithology into four phases. The first phase spans a period slightly over Arthur Allen's entire working career from his appointment as assistant professor in the department of Entomology in 1915 to construction of the lab building in Sapsucker Woods in 1957. I have designated this phase of the CLO the "aspirational" phase because it lacked an administrative reality within the structure of Cornell University. Nonetheless, the CLO existed in some form as Allen and his two closest graduate students-turned-colleagues were able to effectively promote the idea of the lab in the minds of the bird watching community of which they were apart. At every opportunity Allen promoted the brand of the CLO, using its name in a semi-official capacity on their office doors and on their vehicles.

The brand of the CLO was also recognizable for the activities that took place there: photography, motion pictures, and sound recording were all distinctly "Cornellian" approaches to ornithology. Photography and sound recording were also products that were consumed by bird watchers that helped to solidify the identity of the CLO. However, it was sound recording, more than any other activity, that transformed the lab from an idea to a reality as it was the donations of bird songs from the network of bird watchers that supported the CLO that gave it physical presence at the university and enabled Allen and Kellogg to make the argument for the creation of a physical space to house it.

The second phase of the CLO ran from 1957-1981. It begins with the newly constructed lab building. The building itself was 120 feet long and 50 feet wide with a north-south orientation with rooms for graduate students in the north and offices, including Allen's, to the South. There was a also large observatory overlooking the pond on the west side. The main hallway was also an art gallery which featured the work of prominent bird artists who were associated with the CLO. The north end of the hallway was given over to the work of Louis Agassiz Fuertes, who had been Allen's close friend and a lecturer in ornithology for the CLO before his death in 1927. The south end featured the work of such artists as George Miksch Sutton. The new building provided a permanent home for the activities that had been pursued in the first phase with spaces provided for "indoor photography containing a built-in tank with heavy plate-glass front for studying and filming underwater activities of birds; and air-conditioned room for processing, editing, and storing film; a sound room built on specifications from the Bell Laboratories for giving the best acoustical performance

with no echoes or standing waves." This room was also to be the permanent home of the Library of Natural Sounds.[2]

Some of the earliest mass data collection programs, that would become a model for the citizen science efforts of the late 1980s and early 1990s had their origins during this phase. Some of the programs from this period include the North American Nest Record Card Program (1965), the Colonial Bird Register (1975), and Cooperative Research Program which was conducted in partnership with the National Audubon Society all of which enrolled amateur bird watchers to produce relevant data.[3] However, one of the chief features of this period of the CLO's history is financial difficulty and declining membership.[4] As I will argue in chapter three, this decline is related to the nature of the CLO's communication with bird watchers in this period. From 1962-1981 the CLO published a technical journal called *The Living Bird*. Cluttered with technical nomenclature and tables and graphs, and with comparatively few color photographs *The Living Bird* placed many of the bird watching members of the CLO in a position of having to support a publication that did not meet their own needs.

The third phase of the CLO begins with the introduction of *The Living Bird Quarterly* in 1982 as a successor to the technical journal to the development of the

[2] Arthur Allen, "Cornell's Laboratory of Ornithology", *The Living Bird,* 1962, 11
[3] Marianne Gosztonyi Ainley, "The Contribution of the Amateur to North American Ornithology: A Historical Perspective", *The Living Bird* 1979-1980, 170. I cannot comment with confidence on the specifics of much of what happened with these programs. This period of the CLO is murky, and the oral history component, had I been able to do it, would have clarified much of this.
[4] A distinction should be made as to how the CLO has organized its support network and the labels given to them. "Membership in the Laboratory is available to anyone who wishes to participate in its educational, research, and cultural programs." *The Living Bird,* 1980-81, 162. "Research Associate" is most often used in the context of sound recorders in the first phase of the CLO. It is a form of recognition that was given to those individuals who donated a significant number of recordings to the Library of Natural Sounds. L. Irby Davis, Myles E. W. North, and Donald McChesney were all called research associates in *The Living Bird*.

National Science Experiments in 1992. As glossy popular magazine that featured stunning color photography of birds the new magazine both underscored the CLO's historical relationship to photography and popularization along the lines of Arthur A. Allen, but it also provided a number of other services for bird watchers such as reviews of binoculars and spotting scopes. *The Living Bird* magazine, unlike the journal, was developed specifically with the needs of bird watchers in mind and as a result, became one of the most important avenues of communication between the CLO and the wider bird watching community. This period is characterized by a steady improvement in membership of the CLO, going from a low of around 2,050 to over 14,000 by 1990. Along with this dramatic increase in membership of the CLO there was also an associated rise in the financial outlook of the institution.[5] Also during this time the CLO gained launched two new important assets: Project Feeder Watch and the Bioacoustics Research Program. Feeder Watch was initially developed in Canada, but the CLO was able to acquire it in 1987.

The last phase runs from 1992 to the present. The financial stability and outreach to bird watchers that had been achieved in the previous phase allowed the CLO to capitalize on its financial and human resources. After years of general neglect Cornell University and the CLO deepened their relationship and a series of endowed professorships were created: The Edwin H. Morgens professorship of ornithology, the

[5] Autumn issues (originally it was the winter issue) of *The Living Bird* contains an annual report for the previous year tracking income and expenses. It is not until the late 1980s that income is finally able to meet the expenses of the CLO. In 1980-82 the income from members is only $141,000 while in 2012 that income was nearly $8.9 million. "Annual Report 1994-1995, *The Living Bird*, Autumn 1995 and Annual Report 2012 accessed from: http://www.birds.cornell.edu/page.aspx?pid=2560

Louis Agassiz Fuertes Directorship, and the Arthur A. Allen Directorship of citizen science.

It is in this period that there was a dramatic increase in the number of data gathering citizen science projects that the CLO becomes involved in. These projects also represent a somewhat different relationship with bird watchers than the previous ones. As I will demonstrate in chapter three, Rick Bonney's involvement in developing the CLO's National Science Experiments in 1991 hooked the lab into the funding apparatus of the National Science Foundation with its expectations for the promotion of "science literacy". I will argue that this had the result of altering the relationship between the CLO and the bird watchers it relied upon for gathering data as citizen science projects became vehicles for improving science literacy generally; a goal which bird watchers have been ambivalent about and has been largely unsuccessful.

Thesis Overview

In chapter one I will examine the transformation of American ornithology as it moved from a focus on collecting specimens to bird watching. During this period, bird watchers attacked and eventually displaced amateur collectors and destroyed their networks through the passage of laws such as the Federal Migratory Treaty Act of 1918 that forbade the killing and transport of migratory birds which destroyed the economy of exchange which sustained the culture of amateur collecting. Bird watchers built their own knowledge network which froze out collectors from gathering information about birds. With the decline of collecting culture it was the bird watching community that

provided the early skill sets of a rising generation of new ornithologists who were more familiar with binoculars and field guides than shotguns and bird skins.

The Cornell Laboratory of Ornithology was a product in this transition. The CLO itself was a part of the bird watching community, both immediately within Ithaca itself, but across the United States as well. The shared community allowed Allen and Kellogg to recruit members of this network to donate songs to the Library of Natural Sounds, an activity which resulted in the physical construction of the lab building in 1957. Sound recording, and the relationships among figures involved in this activity, form the subject of chapter two in which I will be focused upon the first phase of the CLO's history. These relationships were built and maintained by personal ties. The individuals engaged in sound recording were a small subset of the larger community of bird watching and many of them knew each other personally and shared techniques and assistance. Kellogg, the director of the CLO's Library of Natural sounds was a part of this community and managed it through friendship and personal interactions with those who would ultimately donate songs to the library. This chapter shows that the relationship between the CLO and sound recorders was a horizontal one based on circulation of techniques, songs, and relationships rather than diffusion from a clearly defined center.

The concluding chapter examines the history of *The Living Bird*, the publication of the CLO, both as a mechanism for connecting ornithologists to the bird watching community and as an overview of the citizen science projects which get debuted in the pages of the magazine and attempt to enroll its audience. *The Living Bird* was first established as a technical journal as an attempt to professionalize the CLO. It failed.

And in its failure and rebirth as a popular magazine it revealed the extent to which the CLO was reliant upon the bird watching community for its very survival and the inadequacy of models of professionalization that separate scientists and the public. For the CLO its very existence hinged upon being able to develop ties to the bird watching community. The new magazine allowed the CLO to tap into this community and stabilized its membership and its finances. However, the way the CLO interacted with bird watchers through the pages of the magazine was different from that of sound recorders. Because of the large increase in membership the relationship became more formal and structured. Nonetheless, the new magazine was explicitly designed to meet the needs of bird watchers by providing them relevant news and information. At the same time, it was through the pages of the magazine that the CLO began to mold bird watchers for participation in citizen science projects developed by the CLO. I have also included an appendix that gives brief descriptions of important figures discussed in the thesis.

Historiography

Bird Watching and Ornithology

In discussing the history of the Cornell Laboratory of Ornithology and their interactions with birdwatchers who contributed to the science I will be drawing upon histories of natural history, ornithology, and bird watching. Ornithologists and birdwatchers have both contributed to the writing of their own histories. However, the two have not been well integrated, with the exception of the work of the historian Mark Barrow. The most comprehensive history of ornithology is *Ten Thousand Birds* by Tim Birkhead, Jo Wimpenny, and Bob Montgomerie each of whom is a practicing ornithologist. The authors of the book are quite explicit in pointing out that the book is not a history of birdwatching.[6] Instead it is very much a practitioners' history written by ornithologists prominent in the field. As the title suggests, the book is focused upon evolution as the most important intellectual principle within the discipline and how it provided a common discourse for practitioners in the various sub-disciplines within ornithology from paleontology, systematics, and behavior, to communicate with each other. Key figures of the discipline such as Niko Tinbergen, Ernst Mayr, and Konrad Lorenz receive a great deal of attention. Nonetheless, this is not a history of the great heroes of ornithology and the authors spend a great amount of time dealing with social and cultural aspects. A strength of the book, and perhaps some of its unrealized potential comes from the inclusion of over thirty interviews with currently practicing

[6] Tom Birkhead, Jo Wimpenny, & Bob Montgomerie, *Ten Thousand Birds: Ornithology Since Darwin*, (Princeton: Princeton University Press, 2014), xii

ornithologists. The intent of the authors was to create an ornithological oral history repository, although that seems to not to have happened.[7] Despite the fact that the authors intended to exclude the history of bird watching from their book, the autobiographical details of the interviews reveals just how important it was in the early life of a majority of ornithologists who are in the field today.[8]

Mark Barrow's *A Passion for Birds* remains the best general history of ornithology in the United States and speaks directly to the issues that I will be discussing in my thesis. Barrow's book investigates the relationships between ornithologists who were striving to professionalize the discipline and the much larger network of amateur collectors and birdwatchers that they interacted with[9]. One of the most interesting and subtle points that Barrow makes is that ornithology throughout its history has always relied on the existence and participation of amateur networks in bird study, but that this involvement was met with a great deal of ambivalence from ornithologists who were attempting to professionalize the discipline.

Despite its general usefulness for the insights he gives about the relationships between professional ornithologists and amateur collectors, Barrow's account is limited in a couple of ways. First, his narrative ends with the onset of World War II, which means that a great deal is missing from his account. Secondly, Cornell and Arthur A.

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[7] I checked out the website that accompanies the book and could not find the actual oral history interviews anywhere. This is despite the fact the authors conclude with a powerful message about the importance of oral history to ornithology.

[8] Twenty-five out of thirty-one of the ornithologists who are interviewed in the book mention bird watching as a key formative experience in their early lives. One discusses oology which is interesting. Four came to ornithology by a general interest in biology. For his part Ernst Mayr seems to be more interested in birds as a way to understand evolution than with birds themselves. Which makes sense, as Ludlow Griscom recounts how Mayr declined to go bird watching with him in New York City.

[9] Mark Barrow, *A Passion For Birds: American Ornithology After Audubon* (New Jersey: Princeton University Press, 1998), 6

Allen are mentioned but briefly. But in this Barrow is not unusual, in fact the lack of attention to both the Cornell Laboratory of Ornithology and Arthur Allen seems to be rather common place not only in histories of ornithology but also in histories of bird watching. This neglect is mystifying on both counts. Allen personally trained a large proportion of the ornithologists who would later receive important university posts as ornithology became increasingly a university based discipline. He was also heavily involved in the early promotion and popularization of recreational birdwatching through the publication of his bird books, his partnership with National Geographic and bird photography, as well as teaching undergraduates or by leading bird walks. While training over one hundred graduate students is of course significant, it should not be overlooked just how many people Allen taught who did not go on to assume professional posts in ornithology but remained connected to the study of birds in some way or another.

Despite his criticism of the "trait" model of professionalization Barrow also seemingly applies it when it comes to graduate education which by providing "systematic and rigorous training, a reliable form of certification, and reasonable job prospects, graduate education helped transform scientific ornithology into a full-blown profession."[10] However, as Barrow points out, Cornell was *the* place to receive a graduate education in ornithology into the 1940s and continued to play an influential role after that. At Cornell there is a circumstance in which the model for graduate

[10] Barrow, *A Passion For Birds,* 190 Under the trait model "a profession…is a full time occupation defined by some combination of the following characteristics: possession of an abstract and systematic body of knowledge that commands authority; formal educational requirements; routine (often state-sanctioned) procedures for certifying and licensing practitioners; associations to enforce standards, honor achievement and exert control within the field; and a general orientation toward public service." Barrow, *A Passion For Birds,* 4

education within ornithology occurs within an inclusive space where professional ornithologists and amateur bird watchers interacted as a matter of course. This indicates that Barrow's assumptions about graduate school and professionalization are somewhat mistaken.

While studying the Cornell Laboratory of Ornithology does lend credence to many of the points that Barrow makes about the ambivalent relationship between professional ornithologists and amateurs, it also underscores the extent to which ornithologists were dependent upon this amateur community. Though Barrow does recognize the contributions that amateurs made the theme of dependence does not play an important role in the story he tells. However, I argue that dependence is absolutely central to understanding the dynamics of the Cornell Laboratory of Ornithology. The survival of the Lab was tied to the abilities of its founders to connect with the larger community of birdwatchers and, as I will demonstrate in the last chapter, *The Living Bird* was transformed to deepen this connection and save the CLO from a financial crisis.

The fate of *The Living Bird* mirrors the discussion that Barrow has about the fight that occurred in the 1880s the use of "plain English" in the pages of the *Auk*, the publication of the American Ornithologist's Union. Barrow points out that the small cadre of professional ornithologists who controlled the AOU used their political power within the organization to push for a system of trinomial nomenclature to designate ever more slightly differentiated subspecies, which in turn depended upon access to ever larger collections to create essentially favoring museum based specialists. This was bitterly resented by the community of collectors one of whom complained in 1897 that

if the manager of the *Auk* "cannot take the time to insert the [common] names in case the authors neglect so to do then do *not* ask the layman to help support the publication of scientists, as the management has done ever since I have been acquainted with their method—1889.[11] For Barrow, this fight over nomenclature revealed conflicting visions of science. "One was a more inclusive model that sought to reconcile the needs of scientists with those of the larger community of amateur practitioners. The other model presented the construction of boundaries between the technically oriented specialist and the novice as a necessary step in the continued development of science."[12] The contrast with what happened in the case of *The Living Bird* is instructive. The journal was part of an attempt by the generation after Allen and Kellogg to create some boundaries between themselves and amateur bird watchers, but it was noncommittal in that aim and haphazardly executed. And it failed. The technical orientation of the journal drove away the community of bird watchers during a time that the CLO was in dire financial straits. To save itself the CLO had to reconnect with the community and *The Living Bird Magazine* became one of the most important ways that they did this.

Bird watchers too, have played an active role in the writing of their own history. Authors such as Scott Weidensaul, author of *Of a Feather: A Brief History of American Birding* have an awareness of the living history that is contained within the social world of birdwatching. Because of their own participation they are fully aware of who the important figures are and the relevant debates. Because bird watchers are actively participating in the authoring of their own history and because of the close relationships

[11] Quoted from Barrow, *A Passion For Birds*, 94
[12] Barrow, *A Passion for Birds*, 89

they have formed with others in this community this history has a remarkably oral aspect to it.

The most important event in the history of bird watching, or at least the commonly accepted one, is the publication of Roger Tory Peterson's *A Field Guide to the Birds* in 1934. As the single most celebrated figure in bird watching Roger Tory Peterson has not only written his own autobiography, but has been the subject several biographies, the most recent of which is *Birdwatcher: The life of Roger Tory Peterson* by Elizabeth Rosenthal. Again underscoring the oral nature of histories of bird watching, Rosenthal's biography is based on over one hundred interviews with people who knew Peterson. The embeddedness of these authors in the social world of birdwatching gives them a historical knowledge of how the networks in it have grown and developed and how techniques and field guides have grown over time. They have an historical expertise that it is difficult for an outsider to match and any history that seeks to examine the relationship between professional ornithologists and birdwatchers has to take them in to account. For instance, Rosenthal's oral interviews reveal the way in which field guides were becoming increasingly complex and specialized as they began to cater to a group of bird watchers who had gained considerable amounts of expertise in the identification of birds. This made the field guide market more competitive and Peterson less relevant moving into the 1980s. The ever-increasing growth in expertise in field identification techniques amongst bird watchers themselves along the growth of the CLO gave it a pool of field expertise that it was able to draw upon for its various projects.

Other authors have also investigated the link between birdwatchers and their field guides. *In Binocular Vision: The Politics of Representation in Birdwatching Field Guides* Spencer Schaffner contextualizes the history of field guides to argue that they create a kind of blindness to the effects of pollution upon the environment. According to Schaffner the underlying logic of the field guide is overwhelmingly visual in such a way that decontextualizes the bird from its environment, while at the same time the social emphasis on checklists and growth of birding as a sport has meant that "listing", the practice of marking bird species seen on various kinds of checklists, has taken precedence over conservation or awareness of ecology. While Schaffner does make some interesting points, he is himself suffering from "binocular vison" by his exclusive focus on field guides as the sole means to understand the social world of birdwatching. For one thing there are many different kinds of birdwatchers including ornithologists, sport birders or listers, artists, and feeder watchers all of whom rely on the tools of binoculars and field guides. Furthermore, these groups are not distinct categories and there is considerable overlap among them. To ascribe the traits of sport birders (even if true) to field guides is perhaps a stretch. It is true that field guides have a particular visual aesthetic to them which makes them reminiscent of abstracted natural history images of individuated specimens detached from their environment. However, the construction of a field guide means that an awareness of environment is a fundamental feature. Secondly, field guides are often highly individuated objects which are customized from person to person depending upon style and use.[13] Many of them are

[13] Peterson himself expected this kind of customization in his guides. "It is gratifying to see a copy marked on nearly every page, for, I know that it has been well used….I have seen copies torn apart, reorganized, and rebound to suit the owner's taste; others have been tabbed with index tabs, or fitted with

also collections of memories with notes being jotted down which indicate when, where, and what. Thus far from representing a soulless and abstracted view of nature imposed by a logic of capitalism they can be, and often are, inscribed with deeply personal interactions with nature. Another objection, is that field guides are just one object out of the many tools that a birdwatcher uses. In particular, Schaffner's thesis does not take into account that vision has its limitations, a fact that users of field guides fully recognize. Learning bird songs is also a very important skill that can aid in the identification of birds. Audio is thus an essential aspect of bird watching that I will explore more fully in the next chapter.

A much better history of field guides is found in the account of historian Thomas Dunlap. He divides the history of field guides into roughly three periods: pioneer, mature, and environmental. I do have some issues with this particular way of framing the history of field guides. It does not really take into account increasing specialization of guides as a part of increasing expertise and skill, nor does it really make sense to call one of the periods "environmental" when birdwatching itself was a part of the bird protection movement. However, as a rough periodization it works well enough. He begins with a focus upon Florence Meriam Bailey, who had been a very early promoter of recreational bird watching and had written one of the first field guides, *Birding Through an Opera Glass*, in 1889. Roger Tory Peterson's 1934 publication of *A Field Guide to the Birds* represented the culmination of these efforts with the development of the field mark system and the struggle to legitimize the verification of sight records through the efforts of Peterson's own mentor Ludlow

flaps or envelopes to hold daily check-lists." Roger Tory Peterson, *A Field Guide to the Birds* 2nd ed, (Boston, Houghton Mifflin Company, 1947), xviii

Griscom. What makes Dunlap's book valuable for my purposes is that he focuses on the craft aspects of birdwatching and the ways in which birdwatching interacted with ornithology. This mirrors the historiographic focus within the history of science of paying attention to the practices of science. Bird watching as a practice; a set of techniques, tools, and language which includes ornithologists and amateurs will be a central focus of my argument.

I have also drawn from a number of autobiographies and biographies of Margaret Morse Nice, Ludlow Griscom, Roger Tory Peterson, George Miksch Sutton Jr., and Olin Sewall Pettingill Jr. some were figures who were in some way important in the transition from collecting to bird watching, as was the case with Nice, Griscom, and Peterson, while others had trained under Arthur Allen as graduate students; Griscom, Sutton, and Pettingill who give some insight into the way the Allen trained his students. Just as there is no general history of the CLO, there is also currently no biography or autobiography of Arthur Allen or the students who worked closely with him in sound recording: Albert R. Brand and Peter Paul Kellogg. However, these biographies of contemporary ornithologists and bird watchers help both to fill the gaps in what was happening at Cornell, while also indicating that the wider cultural environment in which the Cornell ornithologists were working was not restricted to that institution.

Margaret Morse Nice, though she was not directly involved in the activities that were taking place at the CLO, and only interacted with Allen infrequently, including a voyage to France for the Ninth Ornithological Congress in 1938 where Allen screened a "sound film of disappearing North American Birds" at the Cinema Normandie, played a

pivotal role in the transformation of American ornithology.[14] Her work in observing song sparrows over a period of nearly a decade in the 1930s made her a prominent figure in ornithological circles and was championed by figures such as Konrad Lorenz, Erwin Stresseman, and Ernst Mayr. Nice's song sparrow studies were based upon the technique of bird banding "which gave sure knowledge of the individual bird through season after season."[15] Bird banding consists of placing metal rings on the feet of birds with identification numbers and contact information. Initially, banding was able to do little more than show the distance a bird had travelled before it died. But with the growth of banding networks, and a deeper understanding of migration, individual birds could be tracked through consecutive years. Banding was first implemented in Denmark by a Danish schoolteacher named Hans Christian Mortensen in 1899, by 1901 the first bird observatory and ringing station was established in Prussia by Johanes Thienemann and as early as 1909 bird banding was being practiced within the United States as well although it was not unit 1939 before a bird observatory was build.[16] The fact that both Nice's Song Sparrow studies and Allen's dissertation on the study of the Red-Winged Blackbird, were each widely praised in their own time is indicative of the extent to which ornithology was embracing new questions and techniques and was moving beyond collecting and taxonomy.

At the same time that ornithology was being transformed by the work of Nice, Allen, and others who focused on studies of the living bird, the culture that ornithology inhabited was also being radically altered by the rise of recreational bird watching.

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[14] Margaret More Nice, *Research is a Passion With Me*, (Toronto, Consolidated Amethyst Communications Inc., 1979),165
[15] Nice, *Research is a Passion*, 104
[16] Birkhead et al, *Ten Thousand Birds*, 127-128

Ludlow Griscom and his most famous protégé, Roger Tory Peterson, were two of the most important figures in promoting the rise of recreational bird watching and the techniques of identification that bird watchers employed. The field mark system, which Peterson introduced in 1934, was a method of field identification which was largely based on the techniques that Griscom had developed in the nineteen teens and twenties. William Davis' biography of Ludlow Griscom, *Dean of the Bird Watchers,* shows Griscom playing a key role in the promotion of bird watching culture while at the same time vigorously clashing with members of the ornithological old guard in a bid to legitimate sight records; the visual identification of birds without having to shoot them. One of the limitations of the book is that although Griscom was Allen's first graduate student, Davis has remarkably little to say about their relationship beyond the mere suggestion that perhaps Griscom was critical of Allen. Although Davis does not elaborate upon the details.

George Miksch Sutton and Olin Sewall Pettingill Jr. were classmates and close friends during their time at graduate school and both wrote autobiographies in which they reflect upon the period. In addition, Sutton has been the subject of a recent biography by Jerome Jackson, a bird watching friend of Sutton's. Taken together, these three books yield tantalizing clues about what the environment at Cornell was like, however, they also contain a frustrating lack of detail. For instance, from Pettingill I learned that upon his arrival to McGraw Hall, the then current location of the CLO within the university, for his first day Allen welcomed him "warmly" and introduced him to "his assistant, Peter Paul Kellogg"[17]. Nothing more is heard about Kellogg in the

[17] Pettingill, *My Way to Ornithology*, 130

entirety of the book. Allen himself is a rather mysterious, albeit genial, figure in Pettingill's account. Other graduate students, with the exception of Sutton with whom he lived, get the same kind of treatment.

Sutton's interaction with Cornell is more enlightening. In many ways Sutton was a special kind of graduate student. He was already making his way in ornithology when he met Allen and agreed to become a graduate student. He was also deeply committed to collecting. After he received his doctorate, Sutton became the curator of the ornithological specimen collection at Cornell. This set the stage for a conflict with Allen about the direction that the CLO was taking. In Sutton's view, Allen was not being sufficiently supportive of the collection. In a letter to Josselyn Van Tyne, the curator of birds at the University of Michigan's Museum of Zoology, Sutton claimed that "neither Allen nor Brand is really interested in the building up of the collection that I have in mind. The whole story here is motion pictures and sound recording and color photography, with some courses worked in here and there. I'm no photographer, so there's not much hope for me, I fear."[18] Sutton here is clearly indicating that Cornell was a space that was engaged in activities that were very different from the specimen collecting that he was used to. In his biography, Jackson suggests that one of the reasons that Sutton departed Cornell was that he felt that the photography, films, and sound recording that were taking place there were "popular science" while "real science" (meaning a place that appreciated the value of collections and taxonomy) was being done at Michigan.

[18] Jerome Jackson, *George Miksch Sutton: Artist, Scientist, and Teacher*,

John T. Battalio's *The Rhetoric of Science in the Evolution of American Ornithological Discourse* straddles the line between being a history of ornithology and a model of science communication. His analysis of the history of ornithological discourse is relevant to the discussion of *The Living Bird* in chapter two. Battalio's discourse model, based on an analysis of *The Auk,* argues that the professionalization of ornithology proceeded at a much slower pace due to the continuing influence of amateur contributions within ornithological literature. However, by the middle of the twentieth-century a rift emerged between natural history discourse and those based upon experimental science. While Battalio argues that most histories of professionalization "overemphasize the incompatibility between amateur and professional. Science is seen as an exclusionary body, consciously "throwing out" the amateur scientist." "Rather" Battalio writes "it is through technological sophistication, not conscious effort or desire, that the split between amateur and professional has been made."[19] Battalio's model assumes the separation of scientists and amateurs into two separate communities. However, a study of ornithology at the CLO points to a very different circumstance. Throughout its history the CLO has always been a part of a wider culture of bird watching with which they interacted with and depended upon to conduct their scientific work. I will demonstrate this in chapter one through an investigation of the sound recording activity of the CLO. Additionally, Battalio's model does not take into consideration the attempts made by professional ornithologists to broaden their channels of communication with bird watchers. This is evident with the CLO's *The Living Bird* magazine examined in chapter two. Thus, while the discourse

[19] John Battalio, *The Rhetoric of Science in the Evolution of American Ornithological Discourse*, (Stamford: Ablex Publishing Corporation,1998), 180

analyzed by Battalio in the scientific output of the *Auk* is technical and scientific that same output is enabled through an outreach to bird watchers achieved through *The Living Bird*. Essentially, there are *two* discourses that get developed simultaneously a fact which significantly alters his conclusions. Finally, Battalio does not consider the impact that the tense interaction between collectors and a new community of bird watchers may have had in precipitating the collapse of a natural history discourse.

Observational Science and Amateur Participation

Observational sciences, including natural history, astronomy, and meteorology each saw extensive amateur participation in the nineteenth century. Unlike experimental science, observational science had much lower barriers to participation and were practiced within much larger communities that linked participants through bonds of friendship and the exchange of materials and techniques.

Natural history, in particular, was productive of a culture of collecting that spanned the English-world, engaging its practitioners in collecting, preservation, categorization, and display. It offered few barriers to participation for large numbers of people, including women and children while at the same time offering room for developing considerable forms of amateur expertise in areas such as botany and zoology. At the same time, as natural history was based around the collection, exchange, study, and display of objects it participated in the structures of a market economy.

The history of natural history has received increased attention in recent decades with scholars paying particular attention to the practices, technologies, relationships, and objects which appear in *Cultures of Natural History*, an edited volume gathering together essays written by a number of scholars working on the history of natural history. The essay contributions of the third part of the book are especially concerned with issues of practices, tools, and amateur participation in natural history.

Anne Secord's essay "Artisan botany" examines the ways in which members of the working-class participated in the science of botany. The space in which this work was conducted was the pub and was engaged in with reference to "artisanal notions of skill."[20] The space of the pub was important for structuring and organizing the work of those engaging in it. It allowed for the exchange of botanical knowledge when the members of the group, as a part of the working class, had minimal education and limited time to devote to botany. In terms of what I am discussing in the rest of the essay, it was the space of the pub that allowed for the creation of an amateur community of botanists who exchanged specimens and information and were maintained by personal relationships. As a self-contained scientific practice without much overlap between the working class members who participated in it and scientific professionals, this episode, while fascinating as an example of science occuring outside of professional spaces, does not offer much guidance as to the relationships between amateurs and professionals as forming a common community.

The issue of amateur participation was also examined by Jean-Marc Drouin and Bernadette Bensaude-Vincent in their essay "Nature for the people". Here Drouin and

[20] Nicholas Jardine, James Secord, & Emma Spary, *Cultures of Natural History*, (Cambridge University Press, 1996), 379

Bensaude-Vincent present the relationship between professional and amateur naturalists as a hierarchical one in which "harmonious co-operation between occasional practitioners and professional naturalists was possible through a clear division of labour, with the volunteers wandering over hills and mountains in order to provide the 'professionals' with raw materials for taxonomic skills…"[21] For Benaude-Vincent natural history, while it allowed for the participation of amateur "volunteers", only did so through their ability to contribute to the work and concerns of professionals. And although natural history remained open to non-specialist forms of language and practice it was difficult to draw boundaries; "popular natural history both created an image of the public and, at the same time, stabilized the identity of the natural scientist."[22] A study of the CLO challenges this view of the relationship between professionals and amateurs. For one thing the relationship becomes somewhat inverted and the emphasis is less upon the contributions that amateurs could make and more upon the dependence that the professional ornithologists working at the CLO had upon amateur involvement for its survival. And rather than "popularization" creating a cleavage of identities between scientists and the public, individuals such as Allen engaged in it to maintain their connection to the bird watching community and used it to create a shared space.

Studies of practice must necessarily take into account a study of the tools and techniques used by the participants engaged in it. Anne Larsen's contribution to the volume examines the various tools used by naturalists. Particularly valuable is her reminder that specimens themselves were a kind of tool as "manageable pieces of the

[21] Nicholas Jardine, James Secord, & Emma Spary, *Cultures of Natural History*, (Cambridge University Press, 1996), 418
[22]Nicholas Jardine, James Secord, & Emma Spary, *Cultures of Natural History*, (Cambridge University Press, 1996), 424

natural world that could be bought, sold, exchanged, transported, catalogued, displayed and consulted by many people" and as "artificial things designed and constructed by naturalists to answer various scientific needs."[23] Just as specimens were artificial creations made for specific purposes, supported by a range of techniques from gun craft to taxidermy that went into their creation so too are the bird songs that appear on the records made by the CLO artificial things, made in specific ways for specific ends.

Robert Kohler's history of survey collecting has been particularly valuable for a number of reasons. Like Barrow, Kohler is deft in blending environmental and cultural history in his account and is attendant to the kinds of practices that undergirded collecting. Survey work itself, Kohler points out, was a particular species of collecting that shared a landscape with other forms of collecting that was born out of a desire to answer specific kinds of questions about taxonomy by using the specimen collection itself as a kind of tool.

Kohler has also informed my thinking about how the technological and natural environments interact. For instance, Kohler points out the ways in which survey workers were tied to the rail road system which allowed both access to a transportation and communication structure and, because of the way the railroad system grew, especially in the Western United States, gave survey workers access to a large area of the natural environment in which to collect. Sound recorders such as the Stillwells, operated under similar kinds of affordances and constraints in attempting to balance their access to nature on the one hand, and their reliance upon a technological infrastructure of roads and electricity on the other.

[23] Nicholas Jardine, James Secord, & Emma Spary, *Cultures of Natural History*, (Cambridge University Press, 1996), 358

Kohler also points out the ways in which professional collectors have been deeply embedded with the culture of collecting and formed important connections with them. For instance, Alexander Ruthven, the curator of the University of Michigan Museum, was as much a part of the communities of collecting, as Allen and Kellogg would be to that of the community of bird watchers later on. Being part of this community gave Ruthven connections with local naturalists and he managed this relationship through "a continual exchange of little gifts and favors: exchange of specimens for expert identifications; honorific expeditions and honorary curatorships; and cash gifts."[24] This was very similar to the ways in which Kellogg would manage the network of sound recorders that donated songs to the Library of Natural Sounds. Also, like the CLO, the museum depended upon these relationships for its very survival as an institution.

Similarly to the ways in which Allen or the Stillwells were deeply dependent upon local knowledge to locate birds to record, so too was the practice of collecting "always local…because plant and animal species are not evenly distributed throughout their ranges but are concentrated in favored local microhabitats….knowledge of books and maps was often a less useful guide to setting traps than local knowledge of the sort that comes from long residence in a particular place."[25] Survey collectors could access this knowledge by tapping into the network of amateur naturalists, while Allen and Kellogg did so by tapping the bird watching community.

[24] Robert Kohler, *All Creatures: Naturalists, Collectors, and Biodiversity, 1850-1890*, (New Jersey: Princeton University Press, 2006), 126
[25] Kohler, *All Creatures*, 156

Despite this horizontal community structure that could obtain between professionals and amateurs, the ever-increasing size of collections necessary to work in the science of taxonomy created an imbalance of power between those individuals who had access to large collections and those who did not. While private individuals could, and a few sometimes did, maintain large collections of their own, it was within museums that large collections came to be housed. This had the effect of amplifying the split between field naturalists who engaged most directly in the practices of collecting, and museum naturalists who benefitted from their activities and specimens. The rise of ecology shifted this focus away from the museum into the field as studies of ethology and life histories gained importance over studying specimens.

Because astronomy, like natural history, has been an area of active participation by amateurs, historians of astronomy have been dealing with the same sorts of issues of professionalization, the creation of boundaries, and the identity of amateur scientists. As an observational science that depended heavily upon telescopes the ability of amateur astronomers to participate in scientific astronomy has depended upon a balance between the quality and cost of optical equipment. The historian John Lankford has examined this point in relation to the controversy over telescope size that embroiled many in the astronomical community from 1885 to 1911. Lankford's analysis of this issue is useful because of the way it problematizes narrow conceptions of professionalization. Instead, Lankford argues that "the development of astronomy does not fit existing models of the way in which science becomes professionalized because the professional never achieved a complete monopoly; instead, the role of amateurs became institutionalized

within the discipline."[26] Lankford's article chronicles the ways in which amateur astronomers clashed with professionals working in observatories over the quality of observations that could be obtained using telescopes of modest size and cost. One of these was A. Stanley Williams who was a solicitor by day and astronomer by night who was recognized as an accomplished non-professional working on observations of Saturn. In the ensuing debate that occurred in the pages of astronomical journals William argued that "amongst the hundreds of small telescopes now in use there may be a few of such superlative excellence, as regards the dealing with planetary details, as to reduce the superiority of big telescopes to a vanishing point."[27]. However, Lankford's conclusion is somewhat ambivalent: amateurs continued to play a role "in the growth and development of the science" they did so in a hierarchical relationship with professionals representing "expert knowledge" while amateurs "stood for careful and persistent observing of a routine nature."[28]

Patrick M. McCray grappled with the term "amateur" in his history of the Smithsonian Institution's Moonwatch program. Initiated by Fred Whipple, the director of the Smithsonian Astrophysical Observatory, Moonwatch recruited amateur astronomers to serve as auxiliary observers during the International Geophysical Year (IGY). While initially conceived of as playing a secondary role to the system of large telescopes being built in anticipation of the IGY. With the surprise launch of Sputnik in 1957 the Moonwatch observers were the best system in place to track satellites. As McCray recognizes, trying to strictly demarcate the boundary between amateurs and

[26] John Lankford, "Amateurs versus Professionals: The Controversy over Telescope Size in Late Victorian Science" Isis, 1981, Vol 72, 11
[27] Quoted from Lankford, "Amateurs versus Professionals", 26
[28] Lankford, "Amateurs versus Professionals, 28

scientists is an impossibility. They overlap too much, and many amateurs have considerable expertise that make the creation of such a boundary untenable. Like other amateur sciences, those working in astronomy maintained links with professionals and created vibrant communities that shared information and techniques while developing ways to recognize expertise within that community.

However, I believe that the very complexity of the term "amateur" makes it more valuable than terms such as "lay person" or, what is becoming increasingly popular "citizen scientist".[29] The difficulties that inevitably arise when using it are a reminder of the complicated history behind these relationships that is often elided by the use of other terminology. "Citizen scientist" is especially problematic because it is often used uncritically as a celebratory phrase intending to indicate the involvement of members of the public in the scientific process without attention to the kinds of hierarchical relationships and labor structures that the term entails. This makes it very different from amateur science where the relationships tend to be more horizontal rather than hierarchical. For this reason, and because "amateur" is an actor's category used by participants in debates in ornithology, I have chosen to continue to use this term.

[29] McCray himself, in his book talking about Moonwatch in his book essentially repeats his adherence to using the terms "'professional scientist' and 'amateur scientist'" as actors categories "while today " 'citizen scientist' is gaining in popularity." The implication here is that amateur scientist and citizen scientist mean the same thing. They do not. Patrick M. McCray, *Keep Watching the Skies: The Story of Operation Moonwatch and the Dawn of the Space Age*, (New Jersey, Princeton University Press, 2008), 13

Natural History and New Media

Increasingly, scholars have also begun to explore natural history and popularization through other forms of media apart from print such as paintings, photography, and cinema. Natural history has had a deep relationship with illustration with images being deployed both as a means of argumentation, but also as a method of popularization. However, different media do this in different ways and, as Lorraine Daston and Katherine Park have shown in *Objectivity* these different styles of image production and the rhetorics they entail are based on varying conceptions of the scientific self. Bird art is an intriguing example: with the introduction of photography the camera was championed as both a new scientific breakthrough and was used, through the use of magazines such as the National Audubon Societies' *Bird-Lore*, as a way of promoting the cause of bird conservation. Despite this fact, unlike the atlases explored in *Objectivity*, photography never displaced traditional methods of bird illustration. Quite the opposite, the explosion of field guides in the middle of the twentieth century all eschewed photography in favor of paintings. Photography ultimately presented the viewer with far too much detail to be useful within the format of the field guide.

Cinema and natural history is the subject of Gregg Mitman's *Reel Nature: America's Romance with Wildlife on Film* in which he explored the ways in which nature films "have blended scientific research and vernacular knowledge, education and entertainment, authenticity and artifice."[30] In Mitman's analysis of natural history

[30] Gregg Mitman, *Reel Nature: America's Romance with Wildlife on Film*, (Seattle, University of Washington Press), 3

cinema authenticity and entertainment were often competing values as "increasingly, the influence of Hollywood played an instrumental role in determining the conventions and market through which nature films might reach a popular audience."[31] While there was a concern with "nature faking", a term that emerged from late nineteenth concerns over the anthropomorphizing of animals in literature, from the earliest days of natural history film-making the demand for narrative and drama in the presentation of animal life created tension with using cinema as a vehicle to disseminate natural history facts.[32] Mitman's third chapter is useful for providing some context, from the perspective of the history of cinema in natural history, on the decline of natural history collecting that I will be discussing in chapter one. Due to the diminishing returns of collecting and its rising cost naturalists who were increasingly interested in questions of ethology turned to cinema as novel technology that could be used to study animal behavior through motion.[33] Mitman's focus on cinema contains an implicit argument about the relationship between the producers of natural history knowledge and the public dividing them into realms of production and consumption. From the cinema house to the television, the natural history docudrama is consumed in spaces where scientists and the public have limited interaction.

[31] Mitman, *Reel Nature*, 27

[32] This was not an issue that originated with cinema. The family life of birds was a common feature of many early bird books and was especially prominent in the rise of bird photography. Allen's own *Stalking Birds With Color Camera*, written under the auspices of the National Geographic Society, is full of allusions the domestic affairs of birds in humanized terms, while being careful to note the authenticity of the behavior observed.

[33] It is noteworthy that the example Mitman uses to demonstrate this turn to cinematography was ethology with reference to the work of Niko Tinbergen and Konrad Lorenz, speaking to the ways in which ornithology especially had become exhausted by taxonomic science based on collecting and was seeking new technologies and techniques to answer new kinds of questions.

The interest in new media in the history of natural history studies has not yet included a comprehensive study of sound recording. As we will see in chapter two, sound recording at the CLO has very close ties to both photography and to cinema. However, it seems to suffer not only from neglect in terms of the media involved, but this neglect is compounded by the fact that the CLO, as one of the best examples of this activity, has also itself been largely ignored. The story of sound recording, I argue, presents a very different picture to that of natural history cinema as developed by Mitman. Instead of a conflict between science and "showmanship" and the tension between Hollywood production for popular markets and science communication in nature documentary edutainment, sound recording reveals a shared space between scientists and the public in which they form a single coherent community. Even those bird watchers who did not participate in sound recording themselves benefitted from the production of records by allowing them to become better at their craft.

I have managed to find a single article that deals with both sound recording in natural history as well as the Cornell Laboratory of Ornithology. In a recent article for the journal *Social Studies of Science*, Joeri Bruyninckx examines the relationship between Cornell's Library of Natural Sounds (CLNS) and the sound recorders that donated bird songs to the library. Drawing on work from Science and Technology studies on theories of exchange such as Peter Galison's "trading zones" or the "boundary objects" of Susan Star and James Griesemar, as well as ideas of "social capital" Bruyninckx argues that the CLO was able to marshal its resources to enroll sound recorders in an economy of exchange based upon reciprocity. Copyright and recognition from the CLO in the form of being named a "research associate" were the

ways that the CLO exerted pressure on amateur recorders to improve the quality of their recordings, both in terms of technical sound but also in providing important metadata about the time and location when the birds were recorded.

Chapter One: Collection, Conservation, and Community

Introduction

This chapter examines the period between 1870 and 1930 to establish the context for the Cornell Laboratory of Ornithology as a scientific institution born in the transition from specimen collection for taxonomic purposes to field observations of live birds as new questions arose about bird behavior, migration, and ecology. This shift in the questions that concerned ornithologists was mirrored by a wider cultural transformation in which a thriving culture of amateur collectors was undermined and eventually displaced by the rise of recreational bird watching that embraced a new set of practices and tools. During this period the relationships between ornithologists and bird watchers could be ambivalent. The cause of bird protection gave bird watchers a voice in the American Ornithologists' Union, which was founded in 1883 as the main professional organization for American ornithologists. However, the frequent polemics against the killing of birds often alienated collecting oriented ornithologists.

However, by the time graduate programs in ornithology were established ornithologists had become bird watchers. After 1930 ornithologists were drawn from the community of bird watchers in which they had participated in their youth where they had learned the skills of bird identification though the use of field guides, binoculars, listing, and bird song records. These skills were both the fundamental practices of a new ornithological science based on field work and observation and the means by which ornithologists and bird watchers formed a coherent community of

practice that allowed them to communicate easily with each other. The Cornell Laboratory of Ornithology was born as a place for bird watching, both scientific and recreational, rather than being an institution based upon collecting. While collections remained important for teaching the finer points of bird anatomy and classification, collecting itself was no longer part of an ornithological education, it was bird watching as a practice that linked the CLO with the public that sustained it.

Culture of Collecting

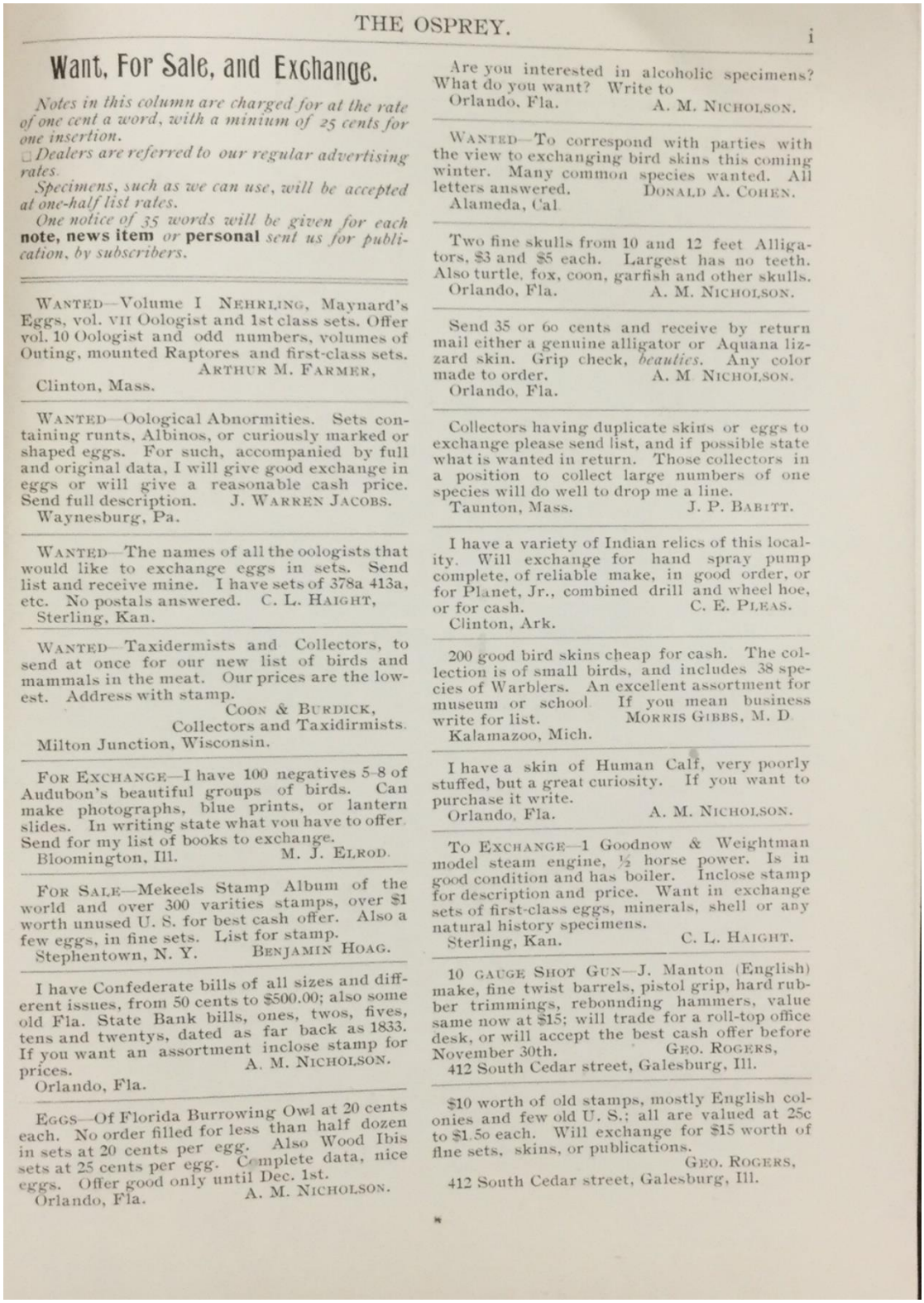
A study of the practices that defines the discipline of ornithology reveals a dramatic shift that occurred between 1890 and 1930. An ornithologist in 1890 inhabited the world of collection in which the practices, techniques, and tools of ornithology were centered on the collection and identification of specimens in the hand. The construction of taxonomies was the essential task of the professional museum centered ornithologist. Taxonomy relied upon the use of keys, such as that created by the prominent ornithologist Elliott Coues, which were predicated on the assumption of identification through collection.[34] Classification required the key, the key relied upon the specimen, and the specimen was created by the shotgun and the use of arsenic.[35] Collecting formed a common cultural bond between amateurs and the very few professional ornithologists that existed in the country.

[34] Mark Barrow, *A Passion For Birds: American Ornithology After Audubon* (New Jersey: Princeton University Press, 1998), 35

[35] A key takes the format of a series of increasingly detailed questions about the external characteristics of the bird to determine its species. For instance, what shape is the bill short and broad, or long and thick etc.

Collecting was also the basis for a vibrant amateur culture with a strong economy of exchange. These amateur collectors traded specimens, tools, and techniques among one another through the pages of collecting oriented periodicals such as *The Oologist*. In the pages of these periodicals amateurs could learn tips for locating and creating specimens, share news and information, and become aware of the pertinent debates occuring within ornithology. Such periodicals were essential to maintaining community ties among collectors. The following advertisements from the November 1896 issue of *The Osprey*, "an illustrated monthly magazine of ornithology" published from Washington D.C., give a glimpse as to how this amateur collecting economy functioned through the exchange of specimens and services that created links which

sustained the community of amateur collectors in the nineteenth century.



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WANTED—Volume I NEHRLING, Maynard's Eggs, vol. VII Oologist and 1st class sets. Offer vol. 10 Oologist and odd numbers, volumes of Outing, mounted Raptores and first-class sets.
ARTHUR M. FARMER,
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WANTED—The names of all the oologists that would like to exchange eggs in sets. Send list and receive mine. I have sets of 378a 413a, etc. No postals answered. C. L. HAIGHT,
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WANTED—Taxidermists and Collectors, to send at once for our new list of birds and mammals in the meat. Our prices are the lowest. Address with stamp.
COON & BURDICK,
Collectors and Taxidirmists.
Milton Junction, Wisconsin.

FOR EXCHANGE—I have 100 negatives 5-8 of Audubon's beautiful groups of birds. Can make photographs, blue prints, or lantern slides. In writing state what you have to offer. Send for my list of books to exchange.
Bloomington, Ill. M. J. ELROD.

FOR SALE—Mekeels Stamp Album of the world and over 300 varities stamps, over $1 worth unused U. S. for best cash offer. Also a few eggs, in fine sets. List for stamp.
Stephentown, N. Y. BENJAMIN HOAG.

I have Confederate bills of all sizes and different issues, from 50 cents to $500.00; also some old Fla. State Bank bills, ones, twos, fives, tens and twentys, dated as far back as 1833. If you want an assortment inclose stamp for prices. A. M. NICHOLSON.
Orlando, Fla.

EGGS—Of Florida Burrowing Owl at 20 cents each. No order filled for less than half dozen in sets at 20 cents per egg. Also Wood Ibis sets at 25 cents per egg. Complete data, nice eggs. Offer good only until Dec. 1st.
Orlando, Fla. A. M. NICHOLSON.

Are you interested in alcoholic specimens? What do you want? Write to
Orlando, Fla. A. M. NICHOLSON.

WANTED—To correspond with parties with the view to exchanging bird skins this coming winter. Many common species wanted. All letters answered. DONALD A. COHEN.
Alameda, Cal.

Two fine skulls from 10 and 12 feet Alligators, $3 and $5 each. Largest has no teeth. Also turtle, fox, coon, garfish and other skulls.
Orlando, Fla. A. M. NICHOLSON.

Send 35 or 60 cents and receive by return mail either a genuine alligator or Aquana lizzard skin. Grip check, *beauties*. Any color made to order. A. M. NICHOLSON.
Orlando, Fla.

Collectors having duplicate skins or eggs to exchange please send list, and if possible state what is wanted in return. Those collectors in a position to collect large numbers of one species will do well to drop me a line.
Taunton, Mass. J. P. BABITT.

I have a variety of Indian relics of this locality. Will exchange for hand spray pump complete, of reliable make, in good order, or for Planet, Jr., combined drill and wheel hoe, or for cash. C. E. PLEAS.
Clinton, Ark.

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200 good bird skins cheap for cash. The collection is of small birds, and includes 38 species of Warblers. An excellent assortment for museum or school. If you mean business write for list. MORRIS GIBBS, M. D.
Kalamazoo, Mich.

I have a skin of Human Calf, very poorly stuffed, but a great curiosity. If you want to purchase it write.
Orlando, Fla. A. M. NICHOLSON.

TO EXCHANGE—1 Goodnow & Weightman model steam engine, ½ horse power. Is in good condition and has boiler. Inclose stamp for description and price. Want in exchange sets of first-class eggs, minerals, shell or any natural history specimens.
Sterling, Kan. C. L. HAIGHT.

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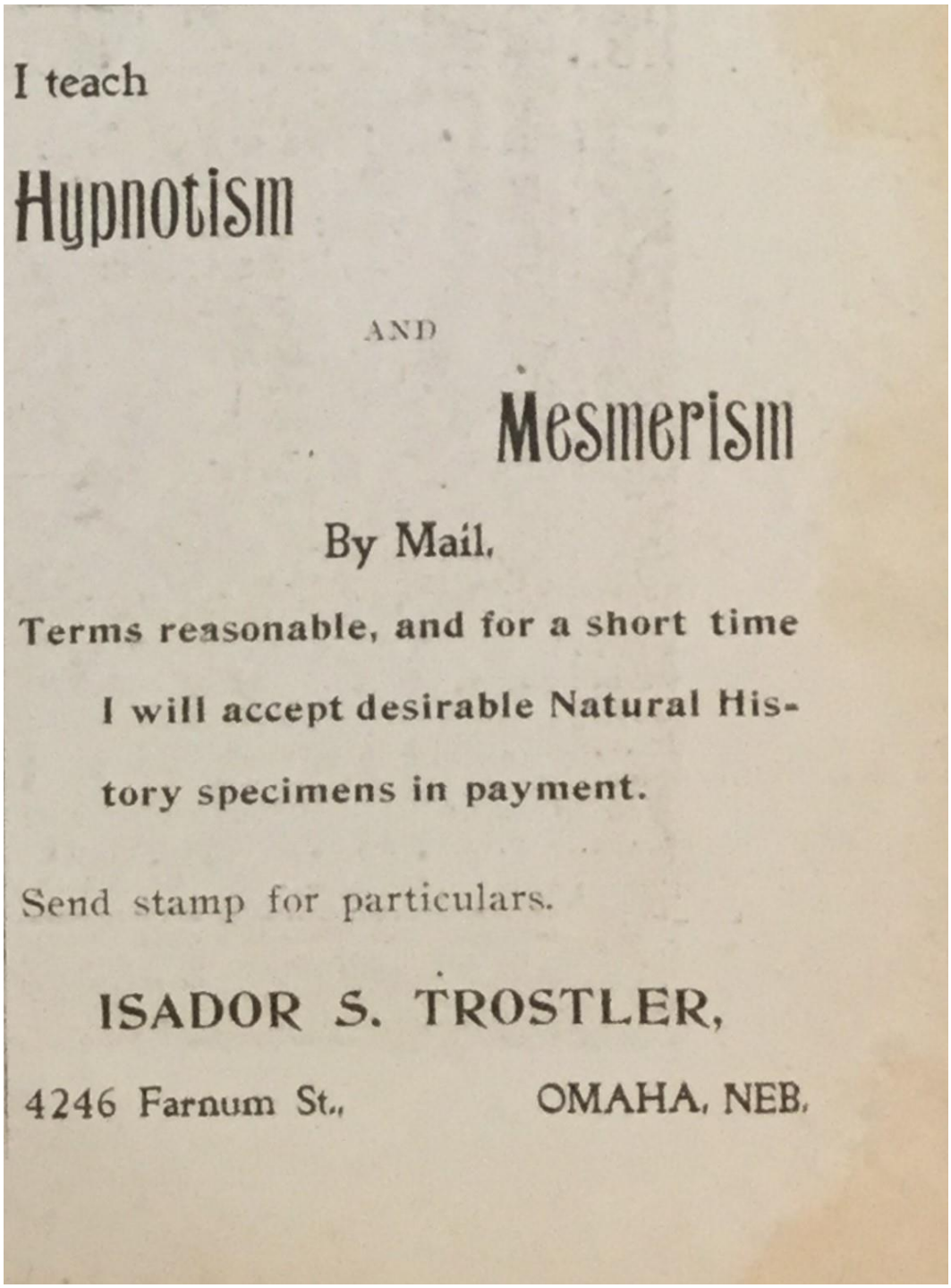
10 GAUGE SHOT GUN—J. Manton (English) make, fine twist barrels, pistol grip, hard rubber trimmings, rebounding hammers, value same now at $15; will trade for a roll-top office desk, or will accept the best cash offer before November 30th. GEO. ROGERS,
412 South Cedar street, Galesburg, Ill.

$10 worth of old stamps, mostly English colonies and few old U. S.; all are valued at 25c to $1.50 each. Will exchange for $15 worth of fine sets, skins, or publications.
GEO. ROGERS,
412 South Cedar street, Galesburg, Ill.



Professional ornithologists came from this culture and remained connected to it. They also relied upon the knowledge and expertise of amateur collectors and taxidermists to develop the huge museum collections that were necessary to advance the science of taxonomy. This culture also provided the early training in the skills that were

necessary to achieve a position on a survey or at a museum. The practical skills associated with taxidermy or blowing eggs, were absolutely essential to later professional development. These skills horizontally were distributed throughout the network of collectors and were not diffused down from establishment science.

An intriguing example of the connections between professional ornithologists and this wider amateur collecting culture can be seen in the *Illustrations of the Nests and Eggs of Birds of Ohio*, a work of oology and nidology containing sixty-eight plates hand colored plates.[36] As the name of the book indicates, the book takes a far deeper interest in eggs and nests than it does with birds. In fact, in the entire book there are only two birds that are depicted. The production of the book, arising out of amateur naturalism, and the subject matter of its illustrations, eggs and nests, point to a thriving culture of collecting. The subsequent fate of the book was tied to that culture, and its collapse caused it, and other artifacts like it, to fall into obscurity.

Genevieve Jones, a woman who grew up in Circleville Ohio, began the book in 1878 and her father, who was an ardent amateur naturalist, proposed to raise the funds to produce the lavish illustrations through a subscription drive. Eventual subscribers to the work included some of the most prominent ornithologists in the country including Elliott Coues and William Brewster, who went on to found the American Ornithologist's Union in 1883. When the illustrations went out for review they were compared favorably to those of Audubon's *Birds of America*. The book quickly became a family affair as her brother Howard assisted by gathering the nests and eggs that were needed while Genevive and her friend Eliza Shulze drew them and prepared the

[36] Oology refers to the practice of egg collecting and the study of eggs, while nidology refers to nests.

lithographs. After the first part of the book was competed in 1879 Genevieve suddenly died of typhoid fever. Her mother, Virginia, then took up the project and hired three female assistants to assist in hand coloring the illustrations of the copy.[37]

This book gives a rare glimpse of the participation of women in natural history beyond the subsidiary roles they took on in relation to their male peers. Natural history has been more open to the involvement of women than laboratory sciences, but their stories are often obscured due to their having been the assistants of male colleagues, usually members of their family. Women's substantive roles in ornithology, is to be expected given prominent place of women such as Florence Meriam Bailey and Mabel Osgood Wright in the rise of bird watching, but their place in oology is surprising, as it is frequently presented as a male pursuit. The circumstances that went into the production of this book demonstrates a need for an expanded view of scientific participation.[38]

The appearance of this beautifully illustrated work in Ohio, far from the center of ornithological study on the East Coast, and the mode of its production through the family suggests both the importance and the depth of amateur natural history during this period that was possible. The eagerness with which professional ornithologists such as Coues and Brewster subscribed to the work is indicative that amateurs were capable of producing work on par with that of professionals. Recognition of the existence of a much wider interest in nests and eggs among collectors, both amateur and professional,

[37] Joy M. Kiser, *America's Other Audubon*, (New York, Princeton Architectural Press, 2012), 13-18 The title of this book is ill-chosen, but for marketing purposes (and because nobody knows what oology is) it works.

[38] For a larger discussion of women's participation in natural history see Barrow, *A Passion For Birds*, 43-54 and Elizabeth Keeney, *The Botanists: Amateur Scientists in Nineteenth-Century America*, (Chapel Hill, The University of North Carolina Press, 1992), 69-83.

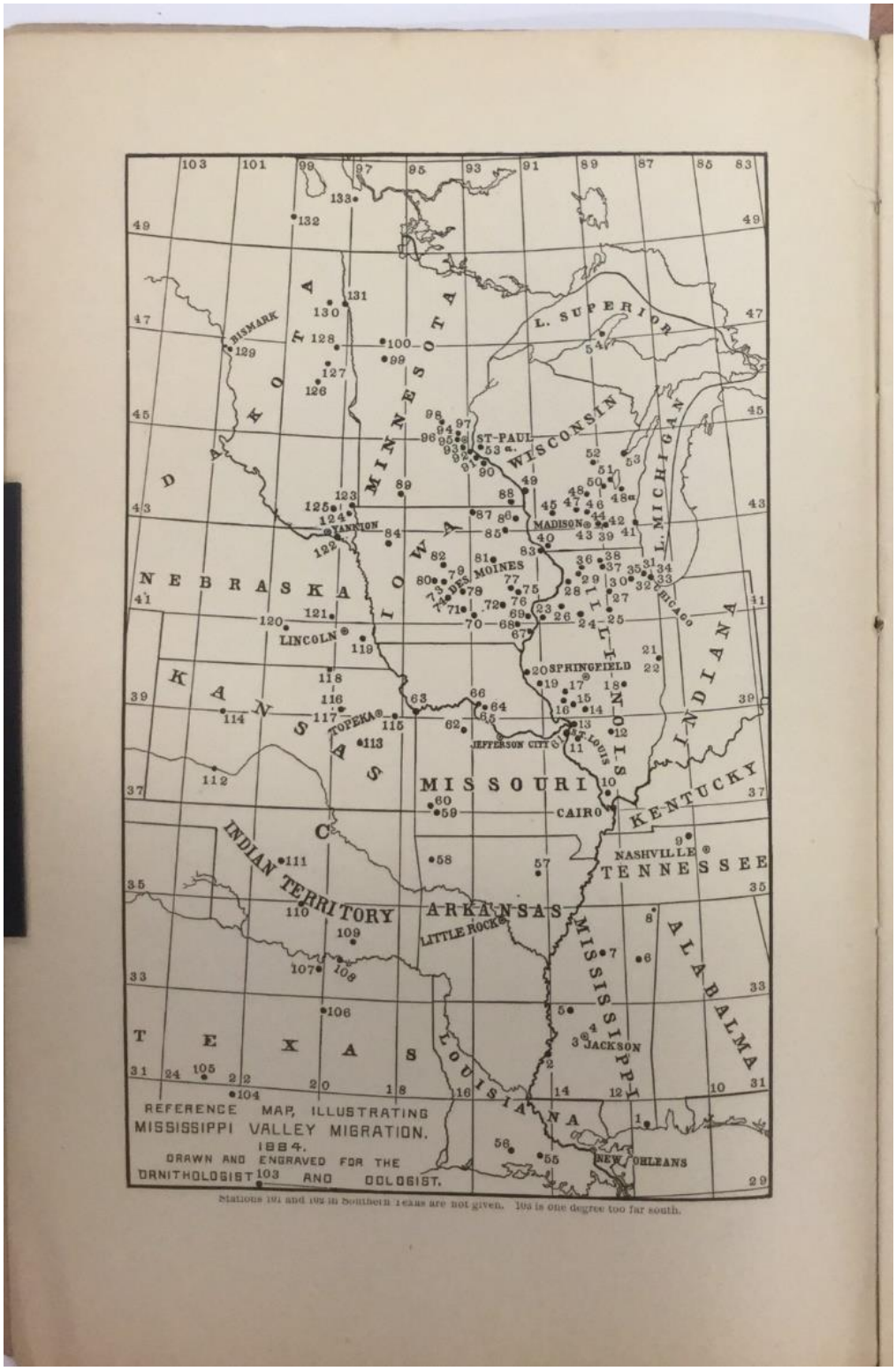
has been obscured by the subsequent displacement of this culture by the community of bird watchers. As I will demonstrate below, eggs became one of the flash points in this clash of cultures as oologists came under increasing fire for their collecting practices.

Cultural Conflict: Egg Thieves and Damned Audubonites

With the rise of bird watching in the 1880s and 1890s there were not one, but two amateur groups that ornithologists relied upon and which came into increasingly conflict with each other. In this period both collectors and bird watchers existed in similar spaces. Indeed, when the *Ornithologist & Oologist* was first launched in 1882, its expressed intent was to "collect and disseminate a knowledge of Bird Life, and cultivate a desire for observation in Ornithology and Oology in the rising generation." While the new publication advocated for the "taking of specimens", which was common practice among collectors, it would also "suggest other methods equally practicable to those who object to destroying life", which bird watchers had increasingly come to decry, and cultivate a "desire to increase rare birds by introduction rather than kill off those that venture among us."[39] Along with catering to interests in collecting, the *Ornithologist and Oologist* was one of the first publications where information about migration, an interest among bird watchers, was shared by ornithologists. As such it was one of the first places where bird watchers could use their skills to study living birds and also produce scientific data. The following image comes from the 1894 issue of the *Ornithologist and Oologist* showing the locations of

[39] *Ornithologist and Oologist*, preface, accessed from http://www.biodiversitylibrary.org/item/100550#page/14/mode/1up

migration observers with a high concentration in Illinois, Wisconsin, Iowa, and Minnesota which is an indication of the strength of the bird watching community.



This balancing act became increasingly untenable as the interests of collectors and bird watchers clashed. Debates over egg collecting became especially vicious as oologists began to collect in large series, with collections sometimes containing thousands of eggs. Opponents of egg collecting charged that such large collections did not serve any scientific purpose while destroying bird life. Oologists objected, saying that scientific knowledge was necessarily dependent upon collecting in series and that, in any case, egg collecting was far less destructive than the taking of birds. Professional ornithologists who engaged in the collecting of bird specimens found themselves with little room to maneuver as their denunciations of excessive egg collecting opened them up to charges of hypocrisy.

The debate over egg collecting spilled over onto the pages of *The Osprey*, as in the October 1899 issue the editor of the magazine, Mr. J. Parker Norris Jr. responded to Dr. F.H. Knowlton's previous "discussion of the crime of excessive egg-collecting." The father-and-son egg collecting team of J. Parker Norris Sr. and Jr. of Philadelphia was one of the most prolific in the United States at the end of the nineteenth century: their oological collection spanned 573 species and 20,000 eggs.[40] The younger Norris mounted an indignant defense of his collection refuting "Dr. Knowlton's assertion that no information of any value has been published regarding the Norris collection." Norris pointed out that "from 1886 to 1893, a series of about 100 articles on Oology written by J. Parker Norris was published in the *Ornithologist and Oologist*." He went on to say that William Brewster, one of the most prominent ornithologists of the last quarter of

[40] Barrow, *A Passion For Birds*, 29

the nineteenth century and a founder of both the Nuttall Ornithological Club (1873) and the American Ornithologists' Union (1883), had considered these to be valuable contributions before caustically remarking that "possibly Dr. Knowlton may consider Mr. Brewster an authority."[41]

Tensions such as these regarding egg collecting presaged the fact that the previous sharing of space between collectors and bird watchers would soon change dramatically, especially after the passage of the Migratory Bird Treaty Act between the United States and Canada in 1918. The treaty capped a decades long propaganda offensive that bird watchers had waged against the killing of birds. Although the conservation efforts of the Audubon Society, which was founded in 1886, were directed primarily towards the millinery trade scientific collecting also came under increased criticism.[42] Amateur collecting fared even worse.

As a naturalist hobby most amateur collecting had little connection to museums or surveys, but was a community based practice the survival of which depended upon the transportation and trade of specimens of bird skins, eggs, books, and tools. As such it was vulnerable to legislation that criminalized the killing and transportation of specimens. The AOU committee on bird protection was intimately involved in the passage of legislation that increasingly targeted the economy of natural history collecting with regard to the shooting and exchange of birds. One of the most noteworthy pieces of legislation was the Lacey Act, passed in 1900. The law was drafted with assistance from the AOU bird protection committee and vigorously

[41] *The Osprey*, J. Parker Norris, "The Utility of Large Series of Eggs and Nests: A Reply to Dr. F. H. Knowlton", October, 1899 Vol IV, No.2, 28
[42] Barrow, *A Passion For Birds*, 141

championed by members of the various Audubon Societies. The new law provided effective federal enforcement of preexisting state laws and forbade the interstate transportation of "wild animals and birds".[43]

The restrictions on collecting that culminated in the passage of the Migratory Bird Treaty Act in 1918 had a direct impact on the economy of amateur natural history by making it illegal:

> "to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof."[44]

Amateur collecting networks were severely impacted by this legislation as well as a complicated web of state and local statutes that made it increasingly difficult to maintain this economy and the practices that sustained it.

One of the advantages that recreational bird watchers had in this contest was the benefit of support from a large cadre of wealthy Easterners, many of whom were politically engaged women who lobbied on behalf of conservation legislation and largely funded the early Audubon Society.[45] In the popular literature of the period, we

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[43] Barrow, *A Passion For Birds*, 133

[44] Migratory Bird Treaty, 703. Taking, killing, or possessing migratory birds unlawful. (a) in general. Accessed from: http://law2.house.gov/view.xhtml?req=granuleid%3AUSC-prelim-title16-chapter7-subchapter2&saved=|MTYgdXNj|dHJlZXNvcnQ=|dHJ1ZQ==|5302|true|prelim&edition=prelim

[45] While the Audubon Society mobilized people on behalf of bird protection, not all birds were loved. In "Good Bungalows for Good Birds" a booklet of bird watching miscellany and plans for bird houses issued by the Cypress wood company in 1919 English Sparrows are the subject of much heated invective. In a book which oozes kindness for birds from every pore, the book suggests that one could do good work by building "a sparrow trap from the plans given in this book and serve sparrows for food, thereby cutting

can see the ways in which amateur collectors were targeted as villains in books such as *The Boy With the U.S. Naturalists* by Francis Rolt-Wheeler, published in 1918.[46] The hero of the story, a boy named Shan, becomes converted from egg collecting through the gift of a camera from a federal game official named Baker who worked for the U.S. Biological Survey; the antagonist is an individual who murders birds for the millinery trade. Rolt-Wheeler wrote the book using the advice, (sometimes directly incorporated into the book) of members of the U.S. Biological Survey, individuals involved in the "Bird Sanctuary movement", Gilbert Pearson who was the secretary of the National Audubon Societies, and Frank Chapman, curator of birds at the American Museum of Natural History and the editor of *Bird-Lore*, the Audubon publication.

The book takes the various tensions attendant with this shift to a new kind of ornithology; with new technologies and new laws and new sensibilities and places it in a dynamic between Shan and his Uncle Bull Adam, a hunter with deep knowledge of woodcraft. The contours of the larger debates and cultural changes occuring within ornithology can be seen in the following conversation between Shan and his Uncle after he had taken up photography:

> 'yo've been workin' hard over yo names, an' if it leads yo' to know the birds when you see'em, it ain't waste time. But, if yo want my idees, this photygraph stuff looks to me right smart close to foolishness. If yo' want to know about a bird, shoot it, an skin it an' stuff it. Then yo've got somethin'. But a picture of a bird on a bit of paper—what's the tarnation use o' that?' Shan defended himself as best

down the high cost of meat. This food product will cost nothing and bring a good price when properly prepared." They helpfully include several recipes for "sparrow casserole" (requires twenty sparrows, browned nicely) and a dish where you "gouge out each half" of a potato and insert the cleaned and seasoned bird "between the halves. Tie with threads or toothpick and roast in oven, and you will have a choice morsel fit for the gods." Cypress Pocket Library vol 42 "Good Bungalows for Good Birds", 1919 238-239

[46] It was written after the murder of an Audubon worker.

> he could. 'if I wated till you were dead, Bull,' he said, 'and then skinned you and stuffed you, I wouldn't know as much about you as I do now, would I?'[47]

Shan explained the use photography in life-history studies, using Bull himself as an example. If Shan could take a picture of his Uncle when he shot a bird and when he ate it, the inside and outside of the house in which they lived, of Bull in his boat or in the woods through the entire year he could know much more about how his Uncle lived. In the beginning of the book Shan and his Uncle had both participated in the practice of egg collecting and shared a common language expressing that enthusiasm. Shan's pursuit of photography drove a wedge between himself and his Uncle who struggled to understand the purpose of it. The larger divide between collectors and bird watchers that was occuring on a wider cultural scale is examined here through a generational divide with Shan pointing the way towards new practices and a new language.

Cruelty to birds by young boys engaging in egg collecting and hunting was a frequent topic in stories such as "The Good Marksman", a short story which appeared in the 1919 pamphlet "Good Bungalows for Good Birds" issued by the Cypress Wood Company. In the story a boy who is a crack shot kills a mother bird dooming her family to starvation. The story concludes by asking "do you not think he must be a proud boy? Should you not like to do the same? If you know him, please read this little tale to him."[48] In many of these stories new technologies such as binoculars and cameras are associated with moral behavior in interacting with birds while the older collecting technology of the guns is employed by villainous individuals.

[47] Rolt-Wheeler, *The Boy With the U.S. Naturalists,* 172
[48] Cypress Pocket Library vol 42 "Good Bungalows for Good Birds", 146-149

Reflecting this disparity of tool use in popular literature, publications oriented towards bird watchers largely cease advertising the kinds of things that had been staples of collecting culture such as guns. Instead, there begin to appear advertisements for binoculars, early field guides, and cameras. In addition, many photographs start to make an appearance in these publications creating a interwoven rhetoric about the proper tools that one should use to study birds in way that does not harm them. The championing of these tools can be seen in this illustration of *American Ornithology*, published by Chester A. Reed, a bird illustrator and the creator of many early field guides.

Vol. 3, No. 1. JANUARY, 1903. 10c a copy, $1 a year.

AMERICAN BIRD MAGAZINE

ORNITHOLOGY

PUBLISHED BY CHAS. K. REED - WORCESTER, MASS.

Entered at the Post Office at Worcester, Mass. as second-class matter, Jan. 16, 1901.

The practices that sustained collecting as an amateur culture became increasingly associated with criminality and lower class behaviors. This accords with what both Mark Barrow and Robert Kohler have argued about the ambivalent identity of collectors. For instance, Barrow has pointed to the ways in which collectors evaded local statutes through the use of items such as cane guns. Ornithologist Elliott Coues had a conflicted relationship with the cane gun. On the one hand, complaining that the handle of the gun "always hits me in the face, and I generally missed my bird." But, Coues pointed out, "if you approve of shooting on Sunday and yet scruple to shock popular prejudice, you can slip out of town unsuspected. If you are shooting where the law forbids the destruction of small birds,—a wise and good law that you may sometimes be inclined to defy,—artfully handling of the deceitful implement may prevent arrest and fine."[49] As Kohler, explains in *All Creatures*, the practices that the collectors were engaged in were often indistinguishable from forms of labor such as hunting or fishing. This indeterminacy of labor made it difficult for collectors to gain status and be appointed to important positions within museums. Notably, oology failed to survive this attack and largely died out as a cultural force in the early decades of the twentieth century.

The Migratory Bird Treaty Act criminalized collecting by unsanctioned individuals. In effect, it helped to professionalize collecting and limited participation to those who were affiliated with museums and could acquire proper licenses to engage in the practice. Roger Tory Peterson reflected on this reality when discussing collecting in his field guide remarking that "not long ago, some ornithologists would not accept sight

[49] Eliott Coues quoted from Barrow, *A Passion For Birds*, 36

records unless they were made along a barrel of a shotgun. Today it is difficult for the average person to secure collecting privileges; moreover, a large proportion of the rarities show up in parks, sanctuaries, or on municipal property where collecting is out of the question. There is no reason why we should not trust our eyes—at least after we have a good basic knowledge of the commoner species."[50]

The Migratory Bird Treaty Act was not the cause of amateur collecting's collapse but merely capped a process that was initiated by the attacks from recreational bird watchers, which succeeded in turning collecting into a practice that became viewed as morally outrageous and thoroughly unfashionable. This disapproval is evident visceral reactions bird watchers often continue to have when the subject is brought up that go beyond questions of legality (which has sometimes led to friction between them and the CLO).[51] As a result, collectors were frozen out of the new networks that coalesced around bird watching. For instance, bird watchers will share information about birds among each other, particularly if they are rarities, and will host other bird

[50] Roger Tory Peterson, *A Field Guide to the Western Birds* 2nd ed, (Boston, Houghton Mifflin Company, 1961), xx

[51] Collecting kicked off the very first controversy in *The Living Bird* when Pete Dunne, a well-known birder and columnist for the magazine wrote an article in the Spring 1988 issue titled "Putting a Dead Bird to Roost" where he questioned the continued need to use dead birds for the AOU checklist. It prompted a vigorous response with many letters coming from professional ornithologists condemning him for his remarks. (Many of these from museums interestingly enough). John William Hardy, Curator of Ornithology and Bioacoustics at the Florida State Museum wrote in the Autumn 1998 issue "I regard it as an indictment of bird collecting in the name of science" before skeptically inquiring as to the legitimacy of sight records "who is to decide which observers should be trusted". The Vice-President of the AOU and chairman of the checklist committee, Frank B. Gill was contributed a whole article in the magazine repudiating Dunne's views. He claims that Dunne's comments "threaten the foundations of the fundamental partnership between birders and ornithologists". Gill also claims that even the experience of "super birders" could potentially bias them in issues of field identification. However, Dunne had some support. Helen Hoffman, a bird bander complained that her "banding group has been scoffed at because we refuse to snuff out or squeeze a captured bird for one reason or another." Collecting would become an issue again in later years when Fitzpatrick placed new focus on systematics and genetic information as Lab Director. *The Living Bird*, Autumn 1988, 4-6. This incident is also indicative that *The Living Bird* existed at the intersection where ornithologists and bird watchers met.

watchers in their homes. Collectors were not privy to this information and were regarded with suspicion by this newly emerging community of bird watchers.[52]

Hatching Bird Watchers

The creation of a new community also entailed the creation of new rituals and a new language. The Audubon Christmas bird count is a major bird watching event that has happened annually for over a century. The first Christmas bird count was organized in 1900 by Frank Chapman. an ornithologist working at the American Museum of Natural History in New York, Chapman was also the editor of the Audubon Societies' *Bird-Lore,* a publication dedicated to promoting recreational bird watching and the cause of bird protection. As a practicing ornithologist (which at this time still entailed

[52] An example of this is when George Sutton, a former graduate student of Allen's and who was the curator of the Cornell ornithological collection, travelled to Oklahoma to collect specimens in 1937. He had arrangements with the proper state authorities, but members of the Audubon Society were also informed. In a previous trip to Black Mesa in 1933 it had been reported that Sutton took some rare birds and the Audubon members wanted to keep tabs on him to prevent that from happening a second time. However, Sutton arrived a week early and collected his specimens and was gone again before anyone knew he was there causing consternation in Audubon circles and among bird lovers generally. Margaret Morse Nice, the most well-known Oklahoman ornithologist was not impressed with the "Cornell group" and the surreptitious way that the expedition had proceeded, intentionally or not. Hugh Davis, the director of Tulsa's Mohawk Zoo, was particularly enraged, exclaiming that "after the way they've done I believe they would have taken an Ivory-billed Woodpecker if they had a chance." This remark was especially cutting considering the expedition Allen had undertaken just two years earlier to the Singer Tract in Louisiana to record and film the bird and raise awareness of its impending extinction. As the tenor of the debate indicates it was Cornell itself that was identified as being at fault. It also points to the division between Sutton and Allen's visions for ornithology and the role of collecting. Jerome A. Jackson, *George Miksch Sutton: Artist, Scientist, Teacher*, (Norman, Univsersity of Oklahoma Press, 2007), 113-114. Norma Stillwell, in her memoir about her recording activities with her husband Jerry, wrote about this network of information exchange and how collectors were left out of it. "Terry and Maurine Gill, gas engineer and businesswoman, hospitably share, with everyone except collectors, their knowledge of where to find the rarer birds. They had several unpleasant experiences with professional collectors, such as having the only individual of a species known to be nesting in the United States shot to extinction in their own backyard!" Norma Stillwell, *Bird Songs: Adventures and Techniques in Recording the Songs of American Birds*, (New York, Doubleday, 1964), 18. Another time, when seeking the whereabouts of a Hermit Thrush, they were forced to assure the woman they were asking they were only interested in recording its song and not shooting it.

collecting) and as a bird watcher and conservationist Chapman straddled two very different social worlds that became increasingly at odds with each other. This was a tension that was internal as well as external, as Chapman, while he engaged in the practices of collecting and supported the AOU from the most strident attacks from Audubon members was nonetheless often guilt-ridden about his role in the extinction of species.[53] From its humble beginnings in 1900, when a small handful of bird watchers from New York participated in the event, it soon became one of the nation's most important bird watching events with Christmas counts being organized in other cities across the United States.

The event also helped to standardize one of the most prominent elements of bird watching culture: listing. To record the counts, and make sense of them from year to year bird watchers began using checklists for species. Checklists soon became one of the most ubiquitous technologies of bird watching culture. Listing endowed recreational bird watching with the characteristics of a sport by allowing bird watchers to compare various kinds of lists. As a practice, listing formed an important point of contact between bird watchers and ornithologists. The lists could be used to provide important data about migration or be used in conservation efforts. However, more fundamentally, ornithologists participated in bird watching culture by engaging in listing.

Another compelling example of the creation of a bird watching culture was the establishment of Bird Day. First established in 1894 by Charles Babcock, the superintendent of schools in Oil City, Pennsylvania, Bird Day was made an official day in twenty-five state legislatures. Children participating in Bird Day "researched and

[53] Barrow, *A Passion For Birds*, 167-169 & Scott Weidensaul, *Of a Feather: A Brief History of American Birding*, (New York, Harcourt Inc., 2007), 148-149

wrote about birds, performed plays and recited poems that underscored the aesthetic quality of avian life, and engaged in practical conservation by building bird boxes and planting trees."[54] Through engagement in events like Bird Day children were introduced to the elements of bird watching culture inculcated with a new moral ethic regarding the value of bird life to dissuade them from collecting. The effect of Progressive education and nature study in introducing children to new practices and sentiments regarding birds was a further blow to the culture of collecting as the children who had once engaged in oology were told it was morally wrong, and encouraged to turn to bird watching as a non-destructive way to interact with nature.

The Fight For Sight (Records)

The shift of professional ornithologists towards bird watching practices hinged upon establishing the legitimacy of sight records to verify the identity of bird species without having to shoot them. The push for the verification of visual identification was driven in improvements in optical technology that made binoculars both cheaper and more powerful. New optical technology, combined with revised sensibilities over the shooting of birds raised by those involved with bird protection created a push to validate the identification of birds in the field without having to shoot them. Witmer Stone, the editor of the *Auk* (the journal of the American Ornithologist's Union) reflected on this new reality within ornithology in a review of Ludlow Griscom's *Birds of the New York City Region* in 1923 remarking that "while neither Mr. Griscom nor the writer oppose

[54] Kevin, C. Armitage, The Nature Study Movement: The Forgotten Populizer of America's Conservation Ethic, (Lawrence: University Press of Kansas, 2009), 93

the collecting of birds when science requires it, we realize the necessity for collecting in the eastern states at least, has been greatly lessened….Powerful binocular glasses now bring the birds reasonably close and constitute the instrument for the work and it remains to teach the observer what characters to look for under these conditions and how to use his collected data for the best interests of ornithology."[55]

Sight records were not uncontested, however. There was a vigorous debate about the usefulness of such records throughout the teens and twenties. One of the most vehement supporters of sight records was Ludlow Griscom. Griscom's push for field identification was based in his graduate work at Cornell. He became Arthur Allen's first graduate student in 1914 and completed his Master's degree in 1915 with a thesis on the "Identification of the Commoner Anatidae of the Eastern United States in the Field*"*.[56] Though he would not go on to earn a doctorate, Griscom was one of the most important ornithologists working in the period, not least because it was his field identification techniques that would help to create bird watching with its modern accoutrements.

Griscom, like Chapman—whom he would later work underneath at the American Museum of Natural history,— is a fascinating and complex figure. He was the "Dean of the Bird Watchers" mentoring the Bronx County Bird Club, a young cadre of enthusiastic bird watchers in New York City, including its most famous member, Roger Tory Peterson, whose famous 1934 field guide took the techniques that Griscom had taught orally and experientially and put them to printed text. Peterson later would write that "we learned all about field marks from the master and in turn we became the

[55] William E. Davis, Jr., *Dean of the Birdwatchers: A Biography of Ludlow Griscom*, (Washington D.C., Smithsonian Institution, 1994), 31
[56] Davis, *Ludlow Griscom*, 13

avant-garde of the birding elite, refining field techniques and setting new standards. It was logical that we should choose Griscom as our role model because he represented the new field ornithology. He bridged the gap between the shotgun ornithologist and the modern birder."[57] But he was also deeply ambivalent about the bird watching culture he had helped to create and, in which he participated. He complained that "thanks to the automobile, super highways, fine binoculars, a horde of guides and text books, bird watching instead of being an adjunct of natural history is developing into a game or sport. A score is now kept…"[58] Ludlow's complaint is a testament to the extraordinary growth of the culture he himself had helped to create and in which, his ambivalence notwithstanding, he was an eager participant.

Bird Watching at Cornell

When Arthur Allen was promoted to professor of ornithology in 1915, the shift from collecting to bird watching was well underway and was beginning to impact the practice of ornithology itself. Allen himself was very much a transitional figure. His doctoral thesis was an ethological study of the red-winged blackbird and he would work at the American Museum of Natural History under Frank Chapman. In 1912 he was sent on behalf of the museum on a collecting expedition to Guatemala before returning to the United States and assuming teaching duties at Cornell University in the department of Entomology. While at Cornell he would continue Chapman's efforts to popularize ornithology and he soon became famous for his public bird walks around Ithaca as well

[57] Roger Tory Peterson, "A Difficult Tightrope Act", *The Living Bird*, Summer 1984, 6
[58] Davis, *Ludlow Griscom*, 137

as for his many publications, photography, and records.[59] In addition to Allen's own efforts, "he encouraged his graduate students to write articles for immediate publication and to give illustrated talks before the local citizenry; and he arranged for many of his graduate students to lead the bird walks sponsored on early Saturday mornings in May by the Cayuga Bird Club."[60]

Under Allen, Cornell became "by far the most productive site for graduate training in ornithology".[61] Unlike the previous generation of ornithologists which had been embedded in collecting culture, these graduate students were trained in the techniques of bird watching and would carry this training to their new institutions and pass it on to their own students. For instance, when Olin Sewall Pettingill Jr. wrote his *A Laboratory and Field Manual of Ornithology* in 1939 while teaching at Carleton College in Minnesota he stated that the development of bird watching skills "is one of the primary objectives of a beginning course in ornithology."[62] However, Allen's influence was even greater among those he taught who did not go on to receive graduate degrees. Over the course of his career Allen taught thousands in his undergraduate classes who did not go on to become ornithologists but simply wanted to learn about

[59] Tim Gallagher "The Lab that Doc Allen Built" *The Living Bird*, Autumn 1996, 23
[60] Olin Sewall Pettingill Jr. "In Memorium: Arthur A. Allen" *The Auk*, Vol. 85 April, 1968, 197. Accessed from www.scricciolo.com/in.memoriam.A.A.Allen.pdf
[61] Barrow, *A Passion For Birds*, 188. Barrow notes that by 1933 Allen had personally supervised sixteen of the thirty doctoral degrees in ornithology in the United States up to that year.
[62] Olin S. Pettingill Jr., *A Laboratory and Field Manual of Ornithology* revised edition (Minnesota, Burgess Publishing Company, 1947), 123

birds.[63] These were students such as Mildred Clark who was a bird watcher all her life since she "took a course with Dr. Allen in 1928."[64]

The anxiety that attended this remaking of ornithology was palpable in those who still regarded collecting as the essential purpose of the science. For these individuals the new legislation, and, perhaps even more, the attacks from bird protectionists upon those who engaged in creating were putting the profession in danger of extinction. A.K. Fisher, a founding member of the AOU who was appointed to head the bird protection committee (and who used his position to advocate for more liberal collecting privileges and did not do much in the way of protecting anything) expressed this concern at a 1909 council meeting. "Boys should be allowed to collect if they can make bird skins." If, he stated, this was not done young men would not be able to "fit themselves as ornithologists" leading to the "annihilation" of ornithologists.[65] To Fisher and those who thought like him, the practices of collecting: skinning, taxidermy, and taxonomy *were* ornithology. The disappearance of these skills in the face of "opera-glass students", in the words of Joseph Grinnell in his essay "Conserve the Collector", was a disaster.

Nor were they wrong, the collapse of amateur collecting meant that ornithologists now came from the community of bird watchers. They were people like Richard Prum who received a copy of Peterson's guide and a pair of binoculars when he was ten allowing him to discover the "challenges and joys of field identification, the

[63] A great many of those who took Allen's undergraduate classes or summer school course were women such as Dorothy McIroy who attended Allen's summer school in the 1920s while majoring in physics and math at the University of Rochester. She would go on to become a prominent birder in the Ithaca region. Alison Childs Wells, "Ithaca's First Lady of Birding", *The Living Bird* Winter 1997, 8
[64] Mildred Clark, Letter to the Editor, *The Living Bird*, Autumn 1995
[65] A. K. Fisher quoted from Barrow, *A Passion For Birds*, 144

insatiable desire to see new birds, and the great joy finally seeing a bird you had long hoped to find."[66] Not all bird watchers become ornithologists, just as not all collectors had a done over a century before. But both communities provided the material, the support, the techniques, and eventually the ornithologists themselves. The anxiety that collecting ornithologists felt at the loss of this community with which they shared a common culture, and did not share with bird watchers, is a reflection of the deep awareness they had of their dependence upon this community. When the culture of collecting disappeared it made collecting an insular practice and one that often put ornithologists at odds with the bird watchers upon whom they were forced to rely.

Until the 1940s Cornell was the only place to offer graduate education in ornithology. Its emergence as an academic institution that was focused on bird watching gave it a unique position within the landscape of professional ornithology, which was composed of museums and federal and state government positions. When a rival graduate program emerged at the University of Michigan, that program was built upon their preexisting zoology museum maintained by Alexander Ruthven. This was the opposite of what had happened at Cornell. There was no preexisting museum out of which the ornithology program was established. The building of a collection, the central focus of museum based ornithology, was largely an afterthought at Cornell. Early on the program at Cornell established its identity though its engagement with motion pictures, photography, and sound recording. The graduate students that were trained there would form the next generation of practicing ornithologists, taking their training to newly developed academic programs in the 1950s.

[66] Tim Birkhead, Jo Wimpenny, Bob Montgomerie, *Ten Thousand Birds: Ornithology Since Darwin*, "Richard Prum interview", (New Jersey, Princeton University Press, 2014), 39

Chapter Two: Collecting the Sounds of Nature

Introduction

In this chapter I will use the history of sound recording at the Cornell Laboratory of Ornithology as a way to investigate the relationships between scientists and amateurs. Bird song recording is a vastly understudied subject in both the history of the science of ornithology as well as histories of amateur bird watching. As an academic field sound studies is a relatively new area of study, and natural history sound recording has been largely ignored within it.

Physically, the media involved present their own difficulties. While the sound library of the CLO that was created from the original sound recordings has been digitized, the records that were produced by making use of the library have not, nor do they exist in any kind of collection. As no archive existed I had to make one myself. Furthermore, the earliest records in my collection, including all of the records made by Albert R. Brand, are 78 rpm records that require a specialized system to be able to play them. As a result of the difficulties of working with older media, the records that were produced by this network are underutilized primary source material for understanding the history of ornithology. Histories of bird watching are focused primarily on field guides and despite the fact that the guides themselves discuss the importance of learning bird songs to identify birds the history of audio receives little attention.

The recording of bird song was one of the most important activities that took place at the Cornell Laboratory of Ornithology. Indeed, when the Lab was built as a

separate institution in 1957 it was conceived of as a place to house the Library of Natural Sounds. Today this library, now renamed the Macaulay Library, is the largest repository of animal sounds in the world. This was not an inevitability. The library was able to achieve this preeminent position because the Cornell Laboratory of Ornithology was able to leverage its position in the network of sound recorders and entice bird watchers to support them by donating their recordings to the library. In turn the recordings would be edited and placed upon a record and then recirculated through the network. In this way the CLO benefited from both the ownership of the songs when they were donated as well as financial support through the sale of the records.

Because sound recording has played such an integral role in the development of the Lab from the 1930s to the present it is an ideal way to study how the ornithologists at Cornell have interacted with amateurs over a long time span. Focusing on this relationship demonstrates the difficulty of adhering to models of professionalization that presume a separation of "scientists" and the "public" in order to facilitate this transformation. Within this model the "laboratory" is conceived of as a space that isolates researchers and encourages the pursuit of esoteric avenues of study. Implicit within this conception of the laboratory is a diffusionist model of science communication, because the laboratory is a space that detaches scientists from the public where they engage in research out of public sight or understanding. Popularization bridges the gap between scientists and the public and, if it does not adequately explain the science, it at least provides a rationale for supporting it.

This professionalization model is woefully inadequate to explain the situation at the CLO. The ornithologists working at the CLO were a part of this public and not

separate from it. Far from serving as an isolating space, the CLO integrated scientists and the public into a single coherent community of bird watchers with a common culture and a common language. It was where songs were donated and records produced. It was where Allen led his bird walks around Ithaca and gave public lectures. Finally, the CLO itself was a product of this inseparability. It was the result of a gift that had its genesis in a letter Lyman K. Stuart wrote to Allen inquiring about tips for bird photography. Allen visited him in Arizona and when Stuart won a photo contest in *Life Magazine*, he bought Sapsucker Woods and donated it for the future location of the CLO.[67] Popularization at the CLO was not an afterthought, it was vital to its very survival. In addition, popularization was conducted through the common language of bird watching and relied upon the same sets of practices. The embeddedness of the CLO in the network and the way that the recordings and the records moved through it points to circulation rather than diffusion as providing a better model to understand the dynamics of the relationships between ornithologists and amateurs.

Albert R. Brand was the most prominent of the early song recorders at the CLO and the first iteration of the library was named in his honor as the Albert R. Brand Bird Song Foundation. However, after Brand's death another one of Allen's graduate students, Peter Paul Kellogg, took over this work. Like Brand, Kellogg was both a naturalist and someone with knowledge of electrical engineering which he used to make a number of technical improvements to the recording process. He would end up sharing this expertise with others in the Cornell network who wanted to make their own recordings of bird songs.

[67] Tim Gallagher, "Sapsucker Woods" *The Living Bird*, Autumn 1996, 21

For all the efforts of Allen, Brand, and Kellogg, Cornell's sound library was built by a much larger network of collaborators who, crucially, had their own interests in mind when choosing to collaborate with the ornithologists at Cornell. The Cornell Network was part of an economy in which bird songs became a medium of exchange with a market value attached to them due to copyright. So when recorders donated their songs to the library the Lab acquired ownership over them. The records produced by the CLO turned this ownership into a financial gain by selling them back into this economy which both profited the Lab directly, but also advertised to other members of the network that they too could have records produced on their behalf by the CLO if they donated their recordings. In a sense, calling this the "Cornell Network" is an anachronism (although a useful one) because it presupposes the end of the story: that the CLO is home to the largest repository of natural sounds in the world and glosses over the fact that there were at least two other important nodes in the network. I use the term here as a framing device to focus on the position of the Lab within a much larger network than as a true representation of the landscape even into the 1960s. As with most things the truth turns out to be rather more complicated.

1934 was an important year for bird watching, it not only witnessed the publication of Peterson's famous guide but it also saw the founding of the Hawk Mountain Sanctuary by Rosalie Edge. It was also the year that the Cornell Laboratory of Ornithology released the first of its commercial bird song record-book collection, *Songs of Wild Birds* recorded by Albert R. Brand, another of Allen's graduate students. In 1929 Allen was able to achieve the first recordings of bird song in the wild. The

"wildness" of these recordings became one of their chief selling points as there had been songs made from birds in captivity earlier.[68]

Technology and Techniques

Recording birds in the wild was also a massive technical challenge. Part of the difficulty for Brand lay in the fact that with the recording technology available at the time there was no way to individuate and focus on the calls of particular birds. Thus, whatever you were attempting to record would simply become part of the background noise. Brand and an undergraduate in Cornell's electrical engineering department tackled this problem by developing a parabolic microphone that would gather sound from a narrow area and bounce it back to the microphone. In this way individual birds could be singled out and their songs could be clearly recorded. This technique rapidly became the standard for how future bird song recording would be conducted, especially moving into the 1950s and 1960s when bird song records became more closely integrated with field guides.

In *Songs of Wild Birds*, Brand gives a detailed overview of the technology involved in sound recording. Sound recording, at least in this early period, was essentially a way of photographing sound. It was a technique directly taken from early experiments with cinematography. Brand describes the "movietone" method as

[68] According to Brand, the issue with recording bird songs in captivity was that most birds to not sing normally out of their natural environment. Albert R. Brand, *Songs of Wild Birds*, (New York: Thomas Nelson and Sons, 1934),17 Norma Stillwell also said that in general they refused to take recordings of birds in captivity remarking that "we had sentimental notions against recording birds tamed or in captivity. They were contrary to the unwritten rules of our game." Norma Stillwell, *Bird Songs: Adventures and Techniques in Recording the Songs of American Birds* (New York: Doubleday, 1964), 128

"transforming the vibrations that affect the microphone first into electrical energy and then into light. The varying intensity of this light is then photographed on sensitized film." After being amplified in the microphone, the vibrations are carried through a cable to yet another amplifier located in the sound truck and conducted into a glowlamp: "an elongated electric-light bulb about an inch thick and eight inches long" where the sound vibrations "register as flickering light" which are then photographed onto film. After this process the film may be "played on the same machine that is used in motion-picture houses." The "sound mirror" itself as Brand referred to it, was a later development to assist with the amplification of specific sounds. As described by Brand, the device consisted of a parabola which could either be scavenged from war surplus stores (which had much more equipment to sell after WWII) with a microphone that was anchored to the parabola and rested at the focal point of the reflector. The microphone itself was pointed inward towards the center of the parabola which gathered sound waves and bounced them back to the microphone. This had two complementary effects: it greatly reduced ambient noise while simultaneously amplifying the sound of whatever the parabola happened to be pointing at. The result was a clear song of an individuated bird. According to Brand, his experiments with the sound mirror had resulted in an amplification of twenty or twenty-five decibels.[69]

Much of this equipment was bulky and very difficult to use in the field. As Brand's reference to the "sound truck" makes clear, whole vehicles were often rigged to house the necessary recording equipment. Even as late as 1946, when Arthur Allen travelled to Mexico on behalf of the National Geographic Society he brought along a

[69] Brand, *Songs of Wild Birds*, 23

station wagon that was driven by his son David, that served as a portable sound studio. This set-up had its own complications: with the growth of highway travel different kinds of vehicles were needed for different kinds of terrain. While a car was suitable for sound recording on the Pan American Highway, to penetrate the swamps of Louisiana and record the Ivory-billed Woodpecker in 1935 the sound equipment had to be fitted onto a wagon.

The nature of the equipment had important implications for doing field work which necessitated a series of compromises between technical sophistication and practicality. For instance, the size of the parabola itself was an issue: the larger the size of the parabola the better it was able to pick up low frequency sounds. However, too large and it would become unwieldy in the field. After some experimentation it was found that a parabolic reflector with a diameter of forty inches was a good compromise between ability to gather low frequency sound and still be able to be used in the field.[70] Other trade-offs included material and color.

Norma Stillwell, a sound recorder who was a part of the Cornell Network, expressed this in an anecdote where she and her husband Jerry were recording birds in a field when there were approached by members of the Atomic Energy Commission who were curious about what they were up to. After buying one of their records on the spot they were given some impractical advice: "he said our reflector should be silver-plated on the inside, because sound waves are reflected by the same laws as light. We had painted our aluminum black in order to make it less conspicuous to the birds." In this case the demands of field craft determined in what ways the technology was

[70] Peter Paul Kellogg "Recording in Nature" in *Techniques of Magnetic Recording*, Joel Tall ed., (New York, The Macmillan Company 1958), 98

employed.[71] A better sound mirror would have been worthless if the reflection happened to scare away all the birds.

But the technology had its own demands too, demands which informed how field craft was conducted and where it was conducted. As the multidisciplinary team that led the initial experiments in sound recording with Brand at Cornell indicates, electrical engineers and technicians became vital parts of the recording network as well. With the possible exception of Brand, Kellogg was the only person who engaged in sound recording while also having an intimate knowledge of electrical engineering and the ability to fix the complicated mechanical problems which inevitably arose. This is one of the reasons that the Stillwells turned to his assistance in the first place. However, they could not, and did not, rely exclusively upon Kellogg's help and turned to local sources of technical assistance wherever they found themselves. Norma's account contains many instances such as the following one: "Jerry enlisted the aid of Ed Devine…Jerry gave Mr. Devine an outline of how he wanted to use the devices and the results desired. Devine asked for a few days to study the matter. On our next visit he said he had located a ready-built switch box that would do part of the job; he designed and built the auxiliary equipment to meet our full needs."[72] This example is remarkable only in the sophistication of what the Stillwells requested, more often they would have recourse to technical assistance for simpler mechanical repairs.

All this technology created an interesting conflict between having access to technological infrastructure and the ability to service the equipment on the one hand, and having access to nature on the other. Recording bird songs required a degree of

[71] Stillwell, *Bird Songs*, 114
[72] Stillwell, *Bird Songs*, 74

isolation from the noise created by cars and highways, as "too close proximity to a traffic road or to electric wires" was "fatal" according to Brand, but moving too far from the transportation network would have prevented the Stillwells from gaining access to the new and improved apparatus that Kellogg was sending to them or to necessary facilities for routine maintenance.[73] Also, before they were liberated from the need by a new portable recorder designed by Kellogg in 1949, they required a constant supply of electricity. To balance these competing demands the Stillwells made extensive use of trailer parks that catered to a clientele interested in camping and nature recreation. Oftentimes they would make such places a kind of headquarters and use them for months.

Ultimately, it was the birds themselves that set the rhythms of recording. As a general rule, birds are much more vocal in the hours before dawn necessitating an early start and a great deal of stumbling around in the dark carrying bulky equipment. As the Stillwells also learned over twelve years in the field, the best season for bird song recording was from February to July so they settled into a routine of travel and recording for six months then headed home where they worked on the development of their library and the incredibly tedious work of cutting and splicing pieces of film together.

Paying close attention to the habits of birds increased the likelihood of gaining a good recording. For instance, Brand suggested taking advantage the purpose of bird song in establishing a bird's territory to locate its "singing tree", a location which the bird will return with some frequency.[74] Other tricks Brand mentions include imitating

[73] Brand, *Songs of Wild Birds*, 26
[74] Brand, *Songs of Wild Birds*, 41

bird calls by whistling "the 'Pewee call of the Chickadee can be imitated by almost any one; and the bird responds to it very well" and "squeaking" which involves licking the back of one's hand and kissing it, imitating a distress call.[75]

The Network: Centers of Collection

Throughout the life of Brand, Allen, and Kellogg, the CLO was merely a single node in this network. In fact, there were at least two other North American institutions engaged in sound recording within this network that both partnered with the CLO and were rivals to in the creation of a sound library. The first was Donald Borror, professor of entomology at Ohio State University. Borror became a recognized expert in the study of avian communication. He donated recordings to the CLO and worked with Kellogg create a record album *The Songs of Insects*. The sound library at Ohio State University would eventually contain over 34,000 animal sounds, making it second only to the Library of Sounds in North America for the number of animal recordings it contained.

The second institution, or rather, a separate but overlapping network centered in Canada, was the Federation of Ontario Naturalists (FON). It was established in 1931 with the goal of promoting conservation issues within Canada. Because records were seen as a valuable medium to promote conservation and education they mobilized their own network to develop a record series of their own. They would also partner with the CLO to sell the records developed from donations of other members of the Cornell Network. The partnership between the Lab and Canadian conservationists would have

[75] Brand, *Songs of Wild Birds*, 44

important implications for the development of citizen science at the CLO. Project FeederWatch, which Lab publications point to as being their first citizen science project and providing a model for subsequent efforts, was actually begun as a Canadian endeavor in 1976 before it became centered at the CLO in 1987 which made it, in effect, the central repository for migration data in the North America.

Thus the network of which Allen, Brand, and Kellogg were embedded within was expansive and messy. What distinguished the CLO, and the places which competed with it, was that it was a center of donation and distribution. While other amateur recorders could, and often did, release their own records they could not match the resources of the CLO in having a dedicated (albeit small staff) to look after the Library of Natural Sounds and ready access to technical advice. The CLO also offered recognition as research associates to those who donated their recordings, which gave scientific legitimacy in exchange for ownership over the recordings.

The Network: Sound Recorders

The Cornell Network provided the CLO with a much broader representation of bird songs outside of the Eastern United States. Songs from the Western United States, Mexico, South America and Africa gave it a global scope which helped it appeal to bird watchers by offering the songs of exotic birds. For sound recorders the CLO provided material and technical support as well as access to a community for individuals working on the periphery of ornithology. Because of the small number of individuals involved in recording this was a network based on personal relationships. Kellogg cultivated close

friendships with many of the people in the network, and the support he gave was a form of gift.

Since the network was built and maintained by personal relationships it was horizontal rather than vertical in its orientation, particularly as members of the network were linked to each other as well as to Kellogg. For instance, the Stillwells worked closely with L. Irby Davis, William Gunn visited Paul Schwartz and collaborated with him to produce some records of South American birds, and the McChesneys and Myles E. W. North both worked to create *More Voices of African Birds*. The horizontal nature of this network means that information and techniques circulated through it rather than being diffused from a central location in the hierarchical manner that would be expected if there was separation between the CLO and the bird watching community of which it was a part.

Norma and Jerry Stillwell were sound recorders who benefitted from working with Kellogg. Having been avid birdwatchers, the Stillwells became interested in recording bird songs rather serendipitously when Norma noticed that the equipment that they were using to record songs from the radio picked up a mockingbird in the distance.[76] They quickly began to experiment with the technology and techniques for recording songs which they would then use to make their own tapes. They would arrange parties with their birdwatching friends and play the songs for them, sometimes accompanied with a poetry recital. They eventually sold their house, bought a trailer, and began pursuing their new hobby in a road trip that lasted for three years before they settled in Arkansas, turning their new home into a base of operations for their recording

[76] Stillwell, *Bird Songs*, 6

activity. In 1953 the Stillwells paid a visit to Peter Paul Kellogg in Florida where Jerry and Paul spent two weeks experimenting with recording equipment. This two-week period had important consequences for both the Stillwells and for Kellogg's ambitions for the CLO. They began their sound recording activity in 1948 and had been perpetually plagued by problems with the equipment, including a residual "hum" that affected the quality of the recordings that they were able to make. The meeting with Kellogg in 1950 helped them to resolve these issues and subsequently gave them access to better equipment such as a portable recorder and recording tape.

L. Irby Davis was an important figure in this network as he was a birder with extensive experience in the birds of the American Southwest and Mexico. In contrast to the birds of the East and North, the birds of the West and South were less well known and certainly less familiar to the recreational birders who would begin travelling to these areas in greater numbers in the 1950s and 1960s after the expansion of the highway system and the growth of the family vacation. Making field guides for birds west of the Mississippi was still such a comparatively difficult task that Roger Tory Peterson initially turned down the project.[77] In comparison to the Eastern regions of the United States, the West was not as densely catalogued, had fewer museums in which to study collections to paint the plates for western birds, and had a much less dense network of bird watchers. Peterson's guides were essentially collaborative works and there was a much shallower pool of expert bird watchers in the West that he could turn to for advice.

[77] Peterson, *A Field Guide to Western Birds*, v

This imbalance between East and West can also be seen in the way record sets are put together as well. Records of eastern birds make up a vast majority of the Brand corpus which makes a great deal of sense as he was located in Ithaca. Western bird songs only begin to be seen in the 1950s, and are often part of a specialty set. As an example: in the trilogy of records by the Stillwells only the last is exclusively focused on Western bird songs, which is interesting as they actually started recording in the West while they still lived in Texas. However, this also meant that there was opportunity. A particular motivation for the Stillwells to create a western guide was that, as Norma stated, "we would be pioneering, for the most part. Cornell had published one disc of western songs, recorded by William Fish, presenting ten species of birds, and had previously included about that many western birds on their first record of "American Bird Songs." All were of excellent quality, but, obviously, there was not enough species to really represent the west." The participation of the Stillwells and of L. Irby Davis in the network through the creation of records and donating recordings to the Lab meant that a crucial area of the continent was represented in the Library. The records themselves also played a vital role in familiarizing traveling bird watchers in the songs they would be likely to encounter.

Other sound recorders associated with the CLO I know much less about, despite the fact that they seemed to play some important roles. Donald McChesney and his wife Marian were research associates who worked on the behalf of the CLO in several locations including South America, Hawaii and Africa. In 1956-1957 the McChesney's traveled to Africa under the auspices of the CLO to record the African bird songs and

were accompanied by Kellogg.[78] The expedition to Africa was significant because they met another important figure in the network who would end up collaborating with the McChesneys and the CLO: Myles E. W. North.

North is a rather mysterious figure, I know that he was a district commissioner in Kenya and very little else.[79] Somehow, "he became associated with the Laboratory of Ornithology at Cornell University; and a generous grant from another member of the Laboratory of Ornithology, Mr. Walther Buchen, of Chicago, enabled the laboratory to purchase and loan to Myles North the best American field and study equipment available. When he acquired this he began systematically to record East African bird voices."[80] North was a British amateur naturalist who was a member of the Cambridge Bird Club and later contributed to a journal of mountaineering. While in Africa he apparently developed an interest in bird vocalizations and contributed a paper to the Ibis in 1950 entitled "Transcribing Bird Song". North's recordings were used to produce the CLO record *Voices of African Birds* which appeared in 1958. In 1960, more recordings of North's and the McChesney's (from his early expedition to Africa in 1956-57) were used in *More Voices of African Birds*. This was an interesting collaboration as it required coordination over 7,000 miles between Donald McChesney in the United States and North in Kenya.

Another member of the network was William Gunn. He is another somewhat obscure figure and most of what I know about him comes from an obituary written by

[78] Apparently it was Marian McChesney rather than Donald who made most to the recordings on the expedition. *More Voices of African Birds*, record cover back
[79] In my conversations with Dr. Nancy Jacobs, a professor of history at Brown and the author of *Birders of Africa*, she told me that she also had no idea who he was. I did manage to locate an obituary online from the *Ibis* (the main British ornithological journal imitated by the *Auk* of the United States) in 1968.
[80] "Obituary: Miles Edward Wentworth North, 1908-1967" Ibis Vol 110, Issue 3, 1968, 364 accessed from: http://onlinelibrary.wiley.com/doi/10.1111/j.1474-919X.1968.tb00050.x/pdf

an employee of the consulting company that he founded.[81] Unlike many of the other sound recorders involved in the network, Gunn had a Ph.D., having completed a dissertation on bird migration at the University of Toronto in 1951, he would later go on to be the director of FON. One of the most interesting features of Gunn's career is that despite the fact that he had a doctorate, he did not choose to work in an academic environment. Instead he became a self-employed naturalist selling records and doing consulting work. As an important member of the FON network, Gunn provided a vital point of contact between it and the CLO and he donated songs to both institutions and worked with them to produce his own records. In 1967 Gunn was the first recipient of the Arthur A. Allen award given by the CLO and presented to him by Roger Tory Peterson.

Paul Schwartz, a sound recorder working in South America, rounds out the Cornell Network. According to Gregg Gorton, in a piece for *Birding* magazine, Schwartz was one of the key figures in the development of birding in South America.[82] He was the first to begin recording the songs of birds of South America and his collection remains one of the largest bodies of such work and also the first to study South American bird songs with audio spectrograms. It was in 1953 on a visit home that Schwartz somehow (an irritatingly reoccurring word) met up with Kellogg, "an indefatigable proselytizer for avian sound recording, who through his many public lectures…prompted many of the earliest bird recordists to take up microphones and lug

[81] W. John Richardson "In Memoriam: William Walker Hamilton Gunn, 1913-1984" accessed from: *https://sora.unm.edu/sites/.../p0318-p0319.pdf*

[82] Gregg Gorton "Remembering Paul A. Schwartz (1917-1979) Pioneer Neotropical Bird Recordist and Taxonomist" *Birding*, September 2010, 40. This piece is also interesting for the fluidity of the terms "ornithologist" and "birder" further confirming permeability of the boundary between them.

heavy "portable" recorders into the field."[83] In 1955 Kellogg provided Schwartz with a portable magnetite recorder for his work on South American birds. In 1957 he was named a research associate of the CLO.

As this brief overview shows, the Cornell Network was a widespread one that enrolled members from outside of the United States. For some of these people, especially Schwartz and North, affiliation with the CLO would have brought them some important benefits. Both were operating in regions that had not been well studied by ornithologists. While ornithologists in the United States and Europe enjoyed access to large museums with extensive collections which provided the basis for the production of field guides North and Schwartz labored under much more difficult circumstances. Even the western United States had been much more thoroughly catalogued than either Kenya or Venezuela. In addition, specimens that were taken from either place tended to go back to sites such as the American Museum of Natural History (recall Allen's expedition to Guatemala in 1912). Crucially too, the lack of large museums and collections also meant that the networks to support such work in South America and Africa were also lacking. There were very few ornithologists and even fewer bird watchers in either place in the 1950s. Working with the CLO gave Schwartz and North a place in the larger community of bird watchers while they, in turn, provided that community with the songs of exotic birds fueling a drive for tourism.[84]

[83] Gorton, "Paul Schwartz", 43

[84] The first bird tours in South America began in the 1960s, many of them made a point of visiting Schwartz. They also imported bird watching culture with them (arranging Christmas Counts, field guides, etc.) Gorton "Paul Schwartz", 47

Experiencing the Network: The Stillwells and Kellogg

During the 1950s Kellogg was attempting to consolidate the position of the CLO as a repository for natural sounds. Elsewhere Kellogg had pitched the idea that:

> Cornell University, as a result of 35 years of natural-history recording, has a large collection of sound recordings that could serve as a basis for this kind of library, but it is hoped that others doing field recording would wish to store copies of their recordings in the library. This procedure would automatically make their work more widely useful and would also provide a degree of permanence and a workable system of preservation and use not ordinarily available to such material. Ownership protection would be given to the respective contributions of recorded material. Users of the material would understand that the primary purpose of the collection was for scientific study and that the material might not be used commercially in any manner—whether for radio, television, motion pictures, or as illustrative material of public lectures—without written permission from the owner of the original recording.[85]

To make this vision a reality Kellogg was actively seeking for those who could supply him with recordings to help grow the library.

The Stillwells were exactly what Kellogg was looking for: dedicated, proficient, and self-funding. For their part, the Stillwells gained access to better equipment and training in new techniques that deepened their enjoyment of their hobby and dramatically improved the audio quality of their recordings. This benefitted both the Stillwells and Kellogg as the recordings enabled the Stillwells to sell commercial records and to donate them to the CLO's at a later date. The Stillwells themselves also engaged with a number of issues involving bird song. For instance, when discussing the problems associated with the representation of bird song Norma writes that the musical staff system developed by Frederick Schulyer Mattews was inadequate. However, she

[85] Peter Paul Kellogg "Recording in Nature" in *Techniques of Magnetic Recording*, Joel Tall ed., (New York, The Macmillan Company 1958), 123

argues that the system contained in Aretas A. Saunders' *Guide to Bird Song*, which "used a combination of lines, curves, dashes, and curlicues, coupled with phonetic syllabication" was absolutely indispensable based upon their own field experience in recording thousands of bird songs.[86]

Experiencing the Network: Road Trip!

The Stillwells' recording expeditions across the country reveal the complexity of the birdwatching network of the United States in the 1950s. During their travels they stayed with fellow birdwatchers who advised them on the best places to find and record birds. They also relied to a great degree upon the productions of this community. One such guide were the two volumes released by the ornithologist Olin Sewall Pettingill Jr. Pettingill had been a graduate student of Arthur A. Allen's before becoming the state ornithologist of Minnesota, he would later become the director of the CLO. In the early 1950s Pettingill, with the help of nearly three hundred collaborators across the country, developed a handbook that described the best birding locations in each state.[87] This remarkable publication represented an invaluable "database" of community knowledge, which was to benefit birdwatchers across the country as to how and where to find birds. The instructions in the book are often remarkably detailed, an indication of the importance of local knowledge.[88] The Stillwells relied upon this local expertise and

[86] Stillwell, *Bird Songs*, 96
[87] Olin Sewell Pettingill Jr., *A Guide to Bird Finding [West]*, (New York, Oxford University Press, 1953), vii
[88] For instance, the tip for Bozeman, Montana State College (now Montana State University) reads: "the Hatchery is easy for newcomers to find because of its proximity to Montana State College's giant block-letter 'M,' a conspicuous landmark on a slope visible from the city. To reach the area, turn north from US Route 10 on Rouse Street (becomes Bridger Canyon Road) and drive north and then east for 5 miles to a

would not have been able to achieve what they did without such local knowledge. Likewise, professional ornithologists, also relied extensively on this kind of expertise and, as in the case of Pettingill, played active roles in its construction to make it useful to the entire bird watching community of which they were a part.

The Stillwells were frequent guests of L. Irby Davis at his home in Harlingen Texas. Harlingen seems to have been an area of the West that attracted many bird watchers due to being located in the vicinity of some of the best birding spots in the country, including Padre Island at Port Isabel, right in the central flyway migration route. Jerry spent two weeks with Davis in 1955 assisting him in copying his Mexican bird songs. After listening to them Allen agreed to sponsor the publication of a long-playing record. This record was published in 1958 as *Mexican Bird Songs*.[89]

Managing the Network

The way CLO (or more specifically Kellogg) managed this network was informal, and relationships were based on personal interactions. He worked with the Stillwells in Florida and helped them improve their equipment. He travelled to Africa to record birds with North and South America to visit with Schwartz at his research station. It was a relationship based on friendship, face-to-face contact, and the exchange of gifts. He gave recorders, they gave him songs. Not all of the people Kellogg cultivated produced records with the CLO. Some, like the Stillwells and Schwartz,

sign marking the Federal Fish Hatchery. Drive through the Hatchery grounds and out the stone exit gate, then turn left, continue about a hundred yards, and park the car. Examine the telephone wires overhead for an occasional Calliope Hummingbird. Beyond, to the left is Bridger Creek." Ibid, 305

[89] Stillwell, *Bird Songs*, 147

would create their own. But the songs themselves all eventually ended up being stored in the Library of Natural Sounds. The Cornell Network was small. Sound recordists comprised only a small handful of the bird watching community which made it easier to manage with informal relationships. Later, as I will show in the next chapter, the dynamics of the relationship changed as it became more impersonal and conducted through the pages of *The Living Bird*.

Listening to the Sounds of Nature

I have been able to acquire twenty of the records that were produced by the CLO from 1932 to 1964.[90] The earliest are those that were made by Albert R. Brand: *Songs of Wild Birds* in 1934, *More Songs of Wild Birds* in 1936, and *American Bird Songs* in 1940. Brand's records are all 78 rpm and as a result I have not been able to listen to them yet.[91] Despite this, I know from looking at them (and from Brand's own commitment to "let the birds speak for themselves") that these early records were not able to hold a large amount of information and, consequently, only a handful of species and calls are contained on the record.[92] *Both Songs of Wild Birds* and *More Songs of Wild Birds* are in the format of books with a substantial amount of text with the records placed in the back in which Brand gives an overview of the technical aspects of sound recording as well as a brief history of Cornell's involvement with it.

[90] Tragically, the 1932 record arrived in a broken condition. Life is a valley of tears.
[91] I have been digitizing these records in the Fine Arts Library. They recently acquired a player that could do 78 rpm records, however, it has not integrated into their digitization system.
[92] Brand, *Songs of Wild Birds*, 51

American Bird Songs, and a subsequent volume, *American Bird Songs Volume II*, would each receive a number of releases. Advances in record technology meant that more audio could be placed on each record. This had a material impact on the records themselves. Whereas the first edition of American Bird Songs had been distributed across six records, in the later rerelease version all of the bird songs are condensed down to a single record and contain both more songs and a greater amount of narration than the previous versions. The record sleeves themselves also show a greater degree of illustration in the later versions of these records, featuring art work from Louis Agassiz Fuertes.

The CLO did not confine itself to collecting the bird songs of North America. Even during the construction of the physical lab building the CLO had engaged Donald S. McChesney to lead an expedition to Africa in 1956 and 1957. At the same time, the CLO was working with a research associate who lived in Africa, Myles E. W. North. Both *Mexican Bird Songs* with Davis and *Voices of Mexican Birds* with North appeared in 1958, from the newly built lab facility in Sapsucker Woods. This was followed by *More Voices of African Birds* in 1964.

A significant difference between the first and the second African records is that the second contains the calls of ninety species while the previous record had included only forty-two. Most of the species are different so that between the two records there are about one hundred and twenty different birds of East Africa presented. While the technology had improved somewhat to allow this many bird songs to be placed on a single record there were some compromises that had to made. For instance, “because of the limitations of time each voice has usually been compressed from a much longer

original recording. In particular, it has been necessary to shorten the time interval between calls. Recorded songs and calls usually sound much closer than they normally would in the field."[93] This reveals an interesting tension between two competing goals of the Cornell records: to authentically reproduce the sounds of the birds being recorded and to have as large a representation as possible for a given region. The constant reissues of previous records with ever-increasing amounts of bird species available to be listened to certainly speaks to this desire for comprehensiveness, but in this case it actually had an impact on the technical production of the record itself.

The production of these three records so soon after the Library of Natural Sounds had acquired a physical home helped to demonstrate that the CLO had a reach that extended beyond North America.[94] In a time when bird tourism to both Mexico and Africa were becoming important (with staff at the CLO eventually leading bird tours to East Africa) these records stimulated the desire to travel and see these exotic birds, as well as provided training to birders to prepare them to identify the songs of the birds that they heard would hear. This mixture of tourism and ornithology is highlighted by the text on the record sleeve which note "the fact that a considerable number of these recordings were made at Nairobi, Kenya or Entebbe, Uganda. Both of these centers possess major airports through which ornithologists constantly pass."[95]

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[93] *More Voices of African Birds*, record sleeve back. Many records engage in editing tricks. For instance, the demonstrations of the song repertoire of a bird are more than likely to come from different birds than a single individual simply because birds are not that cooperative. But this kind of editing seems to be somewhat unique and I do not hear it in later records. The CLO may have decided that fidelity to the song in its entirety was more important in the end than sheer variety.

[94] As a result of ornithological history, Mexico is not a part of North America. The birds don't know that however.

[95] *More Voices of African Birds*, record sleeve back.

Allen and Kellogg continued to produce records at a brisk pace in the early 1960s. Some of the them, such as *Evening at Sapsucker Woods* or *Dawn at a Duck Blind* were made right at home in Ithaca or literally at the lab itself. Records like these helped to fix the presence of the CLO in the minds of those who listened to the them. The records also reinforced the rhetorical identification the CLO had to the bird watching community by reproducing the sounds of the bird life that Allen and Kellogg encountered in their work space at Sapsucker Woods or on Cayuga Lake. They also rhetorically placed the listener alongside Allen, who provided narration for the records, as a bird watching companion at the woods or at the lake.

In the introduction to *Evening in Sapsucker Woods,* Allen gives an aural bird tour of the place explaining that "there is a charming spot in the Finger Lakes country of central New York that we know as Sapsucker Woods. Friends have given it to Cornell University to be set aside in perpetuity as a bird sanctuary." Allen places the listener inside the woods, explaining that Sapsucker Woods was named after the Yellow-bellied Sapsucker, before playing the rat-tat sound of the bird pounding on a tree. Eventually, attention is drawn to the edge of the pond

> where an unusual ranch type building with broad picture windows overlooks a scene of quiet beauty especially as the sun drops below the horizon and the soft sunset colors are reflected in its mirrored surface. It is Cornell's Laboratory of Ornithology. Microphones, beneath the wide eves capture all the sounds of nature as the creatures of the day give way to those of the night. We now invite you to sit with us at the west window as the shadows lengthen and listen to the changing calls of the wild.[96]

The way Allen introduces the CLO is noteworthy. He begins by placing the listener within the Sapsucker Woods surrounded by the various sounds of woodpeckers

[96] Arthur Allen, *Evening in Sapsucker Woods*, time code 00:01-02:48

and a hermit thrush. The lab is seen from the outside, before the visitor is invited into the building itself to the observatory windows to gaze outside. Allen's presentation here accords with how the space was actually used. This part of the CLO was (and still is) a public space, where bird watchers and ornithologists participated in a shared activity ("we invite you to sit with us").

In addition to helping listeners conceptualize the space of the CLO as a place for bird watching these records also served as training aids. The first side of *Evening at Sapsucker Woods* contains all of the narration on the record. On the second the same sounds are reproduced, without any identification which gave listeners an opportunity to quiz themselves on the birds to which they were listening. Evidence that the record was used in precisely this way come from an interview with the ornithologist Richard Prum, who received a copy of the record on his eleventh birthday before he "graduated to the exhaustive two-LP set of the Eastern Peterson."[97]

The mixture of aural aesthetics and training is repeated in *Dawn in a Duck Blind*. Notably the record is a part of a large book in which Roger Tory Peterson has included some plates giving the field marks for identifying the common species of ducks. Like *Evening at Sapsucker Woods*, the aural aesthetic of *Dawn in a Duck Blind* is an ecological one which gives them both a sense of place and enables the listener to being present within that space. This effect is achieved through the way the records are edited, especially on the B sides that simply present the calls of the birds without narration.[98] Birds call over each other, giving a sense of dimension to the soundscape,

[97] Tim Birkhead, Jo Wimpenny, Bob Montgomerie, *Ten Thousand Birds: Ornithology Since Darwin*, (New Jersey, Princeton University Press, 2014), 39

[98] The "ecological" aesthetic of the soundscape is a technological construction achieved by blending together the voices of individually recorded birds or groups of birds rather than pulling it straight from

and on the A side of *Dawn in a Duck Blind* they are heard even when Allen is talking, sometimes even threatening to drown out his own voice in the cacophony of calls.[99] The effect achieves the impression of sitting with Allen on the shore of Cayuga Lake.

The ecological focus of these records and the way they build a soundscape to construct a sense of place makes them very different from the format that had been slowly developing for records. The dominant record format, because of the dual demands of comprehensiveness for bird species and for their calls, is much more streamlined and aurally two-dimensional.[100] Narration is parsimonious, usually with words only being used to introduce the name of the species and a description of the call. This goes back to Brand's self-restriction to allow "the birds to speak for themselves". At the time he was dealing with the technical limitations of the amount of information that could be stored on a record, but it seems that greater technology did not actually solve this problem. At the same time, I think that another development that reinforced this already marked trend was the way that records became increasingly intertextual and linked to field guides in the 1960s.

Bird Songs of Garden Woodland and Meadow and *Bird Sounds of Marsh Upland and Shore* (1964 and 1965) are two "singing books" made to accompany a two book set released by the National Geographic Society. The books and the albums that

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nature itself. Peter Paul Kellogg discussed this in his article "Recording Sound in Nature" stating that "it must be remembered that it is always easier to create a medley of found from individual recordings than it is to get the sound of an individual from a group recording. Whenever possible, good recordings of individuals should be secured. Background sounds may be added later." Kellogg "Recording Sound in Nature", 105

[99] In the section of the record where Allen introduces the Mallards he is almost impossible to understand as the duck calls are so loud.

[100] This was the result of using the parabolic reflector. While ambient sounds could never be entirely eliminated, individual noises could be amplified by such a degree that it drowned out the background noise. In *Dawn of a Duckblind* recordings made from the parabolic reflector and layered, giving a sense of foreground and distance which is largely absent from other records.

accompany them are linked together: a musical note symbol in the text indicates that the bird being discussed has an accompanying song. The text gives a brief overview of the bird with a photo and a description of its range and field marks (which are called characteristics). The records mimic the books in that they are divided into particular sections with each section giving the songs of five or six different birds. There are also arrows that point to the songs position on the record, so you can listen to a specific bird. The name of the bird is followed by a page number which can be referenced in the book for more information.

The books contain chapter contributions from Allen, Sutton, Pettingill, and Peterson and is expressly marketed to a bird watching public with hundreds of glossy photographs, (making this book set a major successor to Allen's previous collaboration with the National Geographic Society: *Stalking Birds With Color Camera*). The included album in the back of the books increased this appeal to bird watchers who received it "with equal enthusiasm. A step forward in bird study for us beginners." The description also serves to link the album to elements of bird watching culture: "the six records, presenting the songs of 70 species, take you on a dozen-cross country bird walks with Peter Paul Kellogg, Director of Cornell University's famed Library of Natural Sounds."[101] The use of the phrase "bird walks" here places Kellogg the "Director of the Library of Natural Sounds" into a shared culture that had just as much purchase anywhere else in North America where bird watchers formed a community as it did back home at Ithaca where Allen had led such walks for years, and was famous for having done so.

[101] Alexander Wetmore et al, *Song and Garden Birds of North America*, (National Geographic Society, 1964) front cover flap.

In the same volume, Roger Tory Peterson also highlights the importance of bird song to field identification and points to the value of the modern tape recorder thanks to which "the voices of most North American birds are filed in that great clearinghouse of avian acoustics, the Laboratory of Ornithology at Cornell University."[102] Peterson's statement is noteworthy here for a few reasons. First, it alludes to the importance of the sound recording network which built of the Library of Natural sounds. Secondly, through the action of that network the CLO now had a comprehensive library of most of the bird songs of North America which made it possible for them to produce the record album which accompanied the book. This is a recognition of the vital service that the CLO was performing for the bird watching community by making these records available to bird watchers which ultimately came from the donations of songs to the library by bird watchers.

One interesting feature of this arrangement is the fact that there is a significant disparity in size between the book set, which is rather large, and the "singing book" record albums which are about the size of a CD. The singing book is so-called because the entire object is placed on the turntable, record face up, to play it. Whichever side of the book is underneath the record is the one that will be played. Taken together it is clear that this was a "home system" and not for use in the field. It was not until later, towards the end of the 1960s, that there is a full integration of records and field guides.

It is not surprising that it is with Roger Tory Peterson that there begins to be a much closer intertextual relationship with field guides. The widespread adoption of the Peterson field mark system after the publication of his guide in 1934 had a profound

[102] Ibid., 381

influence on the subsequent development of field guides. The field mark system was a diagrammatic visual rhetoric that shifted the focus away from the whole bird to specific parts for the purposes of identification. Records, for their part, drew attention to the individuated songs of birds for the same reason. In the 1960s these two traditions became linked as records were produced in conjunction with books and field guides.

Peterson had worked with Cornell when he was in the process of revising his Eastern and Western guides. In the 1960s Peterson was facing a new competitive market and a fuller treatment of bird songs would give his guides the edge against new publications from the Golden Guide series or Audubon. In the preparation of his revised second edition of *A Field Guide to Western Birds,* Peterson consulted with Allen and Charles Brand who "spent days with me in their sound laboratory playing off all the recordings they had made on their trips west. In this way I was able to make a final check on some of the more puzzling bird voices and compare closely related species that could not always be compared conveniently in the field."[103] "Bird voice" is a feature that appears prominently in the guide alongside field marks, range, habitat, and where it nests.

In continuing to develop his guides Peterson finally developed a comprehensive record set for both his Eastern and Western books. As large long-playing records (LPs) the records allowed a bird watcher studying their guide the ability to learn the songs in a convenient way. Here the presentation format is fully developed: clipped speech, followed by a series of calls from each bird. The amount of information that the records are able to hold (there are three records which are companions to the Western guide,

[103] Roger Tory Peterson, *A Field Guide to the Western Birds 2nd* ed revised and enlarged, (Boston, Houghton Mifflin Company, 1961), vi.

each of which is forty minutes long) meant that the West could be fairly well represented on the set. In his introduction Peterson explained that "every bird was recorded in the field, and in each case an effort has been made to select the most typical song of the species." This is necessary as "birds, like people, have local dialects" which can "sometimes confuse even the more experienced listener."[104] Allen, rather than Peterson, gives the name of the birds. However, this is not the avuncular Allen who brought people into his duck blind at Cayuga Lake or gave charming descriptions of the calls. He merely states the name of the bird, followed by the call over and over, without even the phonetic phrases that to put bird calls into human language.

The format of these records is a far cry from the ecological aesthetic of *Evening at Sapsucker Woods* or *Dawn in a Duck Blind*. Rather this record is the apotheosis of a kind of bird watching that was becoming hyper-specialized and competitive with its own forms of recognition and expertise. It speaks to the role of the CLO and the Library of Natural Sounds that it was able to serve a community that had such a variety of needs. From aesthetic experience to intense training, the sounds donated to the library could be used to meet the multiple demands of bird watchers and in doing so became an integral part of the community.

[104] Roger Tory Peterson, *A Field Guide to Western Bird Songs*, record one, side A, time code: 00:38-00:53. The emphasis on the "typical song" means that the comprehensiveness of the song repertoire is of less importance here than that of giving the songs of as many birds as possible. It is also a reminder that thinking about "types" was still important. "Type specimens" had played an important role in the era of shotgun ornithology for a similar reason: types were a way to avoid the chaos of huge collections which stopped working when they became too big and spawning ever more subspecies. The sheer size of collections may have played a role in the demise of taxonomy. Early on records had promised a simple way to learn bird songs straight from nature, but they too quickly faced the problem of variety. If records are considered as a kind of atlas similar to those of images then the importance of typical songs as a way to side step the problem of regional dialects seems to be an indication that "mechanical objectivity" as discussed by Lorraine Daston and Peter Galison in *Objectivity*, may have had less purchase on recordings of nature as opposed to traditions of image making and photography.

Expertise

The history of sound recording also points to the sometimes extremely fuzzy boundary that persists between the two groups. Birding expertise could translate into quasi-professional recognition without formal training or qualifications. This further serves to undermine an uncomplicated story of professionalization when applied to the CLO. What we do see is an ever increasing degree of mastery and specialization in birdwatching skills, which is reflected both in the globalization of field guides and in a narrowing of focus on specific kinds of birds such as sea birds Davis was one early example of this as we have seen by the way in which Allen relied upon his knowledge of Mexican birds to conduct his work for The National Geographic. Davis' expertise (and cooperation) were rewarded with being made a research associate of the CLO. A more dramatic example is perhaps that of Ted Parker who, by the time of his death in 1993, had donated over 10,000 recordings of South American birds to the library at Cornell. Despite a lack of academic training in ornithology Parker became the recognized expert on South American birds. He knew how to find them in the jungle, he knew how to identify them through song, and he knew the techniques to lure them out into the open by playing back their calls. After his death, the obituaries in his honor referred to him as an ornithologist.[105]

The individuals who were engaged in the recording of bird song stand at one end of a spectrum of expertise among those whom the CLO used for its various projects. Birding by ear was a further elaboration of the basic skills of bird watching that was

[105] Tim Gallagher, "The Legacy of Ted Parker", accessed from: https://www.allaboutbirds.org/the-legacy-of-ted-parker/

difficult to master. It also involved both technical knowledge and a more difficult to define, but nonetheless important, technique. These individuals represent a small number of birders who have obtained considerable expertise in a specific set of skills. On the other side of the spectrum from the expert birders are the vast majority of casual birders. For a variety of reasons, Cornell made use of the smaller number of expert birders far earlier than they did casual birders. On the one hand, it was a simple convergence of interests. Before the 1980s the kinds of projects the Lab undertook could be conducted with fewer individuals. This community developed alongside the growth of the CLO, and contributed to that grown in material ways. Both Allen and Kellogg were bird watchers themselves and as a part of this community they knew who the experts were as well as the locations in which they exercised their expertise. Those individuals doing sound recording were a smaller subset of this already fairly small community. In short, while the CLO was engaged in this particular kind of activity they knew from experience who had the abilities and the dedication to meet their particular needs.

Conclusion

Sound recording helped to provide the foundation that the CLO was built upon. For most of its history (and indeed for all of Allen's career) the Cornell Laboratory of Ornithology was an aspiration without administrative reality. In the very first issue of *The Living Bird* in 1962 Allen reflected upon this circumstance, comparing the Lab to the shifting taxonomy of the robin as it moved from the Department of Entomology,

where he began the Lab in his office in 1915 "without official status in the administrative complex of the University", then to the Department of Zoology and later to the Department of Conservation in 1948.[106] Sound recording helped transform this aspiration into a physical space through the sheer presence of the sound library that the CLO had acquired over twenty years. At the same time this recording activity was one of the important ways in which Allen and Kellogg interacted with members of the birdwatching community who provided the funding to construct it.

To pay the way for the new lab building Allen and Kellogg "presented to Cornell University their personal interests in the Library of Natural Sounds, which had built up through the years, and transferred to the University all the income from royalties received on the phonograph records they had produced and would produce from the recordings."[107] In the included list of objectives for the new CLO no less than four out of the twelve given are directly related to sound recording, including the encouragement of "bird and other natural-sound-recording studies by others than the staff of the Laboratory through grants-in-aid or loan of equipment."[108] The importance of sound recording to the history of the CLO is also underscored by the fact that the first article in the first issue of *The Living Bird* is a historical piece by Kellogg entitled *Bird Sound Studies at Cornell*. Prominently featured in the article are the contributions of the CLO's research associates, including Davis and North.[109]

Sound recording is a rarified aspect of bird watching. It required expensive equipment and specialized techniques, but the results of their labor could be shared

[106] *The Living Bird*, 1962, 7
[107] Ibid, 11
[108] Ibid, 11-12
[109] Ibid, 46-47

across the network of bird watchers who could enjoy them for aesthetics and use them to improve their craft.[110] The new projects of the CLO would require a far greater number of participants and to get them the CLO would be forced to fold its technical journal, *The Living Bird*, and transform it into a glossy special interest birding magazine. The new magazine created a new kind of relationship between the CLO and the rest of the bird watching community. Whereas Kellogg had used his personal relationships with sound recorders to help build up the Library of Natural Sounds the kind of dynamic between the CLO and its audience through *The Living Bird* was much more impersonal and the way that the network of participants was managed became more hierarchical in nature.

[110] The sound library and records played an important part in later citizen science projects developed by the Lab. For instance, participants in Project Tanager were provided with audio tapes to train them in identifying different species of Tanager. Rachel Dickinson, "A Library of Sound" *The Living Bird*, Autumn 1996, 18

Conclusion: Lists, Data, and the Future of the CLO

Listing at the Lab

As he looked back on his time as a graduate student at Cornell from 1930-1933, Olin Sewall Pettingill Jr. recalled a weekly ritual over which Arthur Allen, the founder of the Cornell Laboratory of Ornithology, presided over at McGraw Hall at Cornell University: the Monday night seminar which was "already a traditional program of the Laboratory of Ornithology" at the time of Pettingill's arrival. There is little that seems to be remarkable about the existence of a seminar in a graduate student program. Pettingill, however, explained that this seminar was not just for graduate students but that "anyone else interested in birds, whether on the campus (student or teacher) was welcome. Whatever the program…it began with a reading of the local bird list on which were checked off the species seen in the past week by persons present in the room."[111] The reading of the weekly checklist of the birds of the Cayuga Lake Basin by Allen at a public event preceding a program to train graduate students in the pursuit of doctorate degrees is revealing of the deep link between amateur bird watching and professional ornithology at Cornell. The checklist is one of the most recognizable artifacts of bird watching culture and the participation in the creation of these lists by Allen and his graduate students linked them to the community of bird watchers both in the vicinity of Ithaca, but also to the network of recreational bird watchers growing throughout the country.

[111] Olin Sewall Pettingill, Jr. *My Way to Ornithology*, (Norman, Univsersity of Oklahoma Press, 1992), 134.

This inclusive seminar shows that at Cornell, professionalization did not create an exclusive space for scientists. As participants in, (and in most cases having emerged from) the bird watching community ornithologists continued to engage with them on a number of issues. Ornithologists *were* bird watchers and formed a common community of practice with recreationally inclined bird watchers. They are able to speak to each other in a bird watching vernacular that consists of a shared language, a common tool set (binoculars, field guides, lists), and common cause for conservation issues. When Stanley Temple, who would eventually become a graduate student at Cornell, visited in 1962 he noted how the reading of the list made the CLO as familiar ground as "the Kirtland Bird Club back home in Cleveland, Ohio, began its meetings in the same way."[112]

The eventual fate of the checklist tradition at the CLO is also revealing. By 1970, there were mutterings among the participants of the seminar that the reading of the checklist should be abandoned as it was old fashioned. Temple, by then a Ph.D. student, objected and in a bid to save the tradition tracked down all of the checklists stored at the CLO. Fortunately for Temple, Allen had saved every weekly checklist from when he began the tradition in the 1920s and so he was blessed with a prodigious dataset from which to work. After entering the checklists into a computer he was able to do some rudimentary statistical analysis of the data to track the presence of specific species. He presented the results of his project both at the CLO's Monday night seminar, which saved the tradition, and at the annual meeting of the American Ornithologists' Union.

[112] Stanley Temple, "The Checklist Connection", *The Living Bird*, Summer 1996, 19

The checklist tradition was a point of contact between bird watchers and ornithologists within a space (the graduate seminar) that has been seen as a place where boundaries are created between scientists and non-scientists. The attempt to abandon the tradition, just like other attempts to professionalize the CLO (such as the establishment of the technical journal, failed. But it was a creative failure, because it pointed the way to a new kind of science in which the CLO would come to play a leading role: the collection and analysis of massive amounts of data which required them to rely upon amateurs to gather. As a result, the checklists themselves began to change. Allen had not foreseen the ways in which this data might be used, which meant that the kinds of analysis Temple could perform upon them were very basic. But that experience enabled Temple and others to conceive of projects which used data forms that took into account such questions as how many of a particular species were seen as opposed to just noting that an individual of the species was present, or metadata about the location it was seen. Using the insights gained by the CLO checklists Temple created the Wisconsin Checklist Project in 1982.[113] This kind of work pointed the way forward for the CLO. 1987's Project Feeder Watch and the subsequent explosion of citizen science projects in the late 1980s and 1990s were dependent upon these insights. They were also dependent upon an open line of communication between the CLO and the bird watching community which would provide that data. It was through the pages of the revamped *The Living Bird* that this connection was maintained.

[113] Temple, "The Checklist Connection" 21

Double Feature! Night of The Living Bird and The Return of The Living Bird

The Living Bird began as the CLO's in house technical journal in 1962 and ran for twenty years until its eventual collapse in 1981. The life span of *The Living Bird* in its technical incarnation lasted throughout the second phase of the CLO's history. Like the failed attempt to get rid of the reading of the checklist at the Monday night seminar, the creation of a technical journal for the CLO was an attempt to professionalize by creating boundaries between themselves and non-scientists. Also, like the debate over the checklist, it ultimately failed. What these twin failures reveal is that the CLO was largely dependent upon the continued interaction of bird watchers to sustain itself. Thus, the creation of boundaries at the CLO, far from being a benefit, almost resulted in the financial ruin of the institution. The forbidding nature of *The Living Bird* for the first twenty years of its existence had the result of driving away members (and their financial support) at a time when the CLO could ill-afford to lose them. To reverse this trend, the technical journal was scrapped and it was reborn as a popular magazine in the style of *National Geographic.* In its current form *The Living Bird* places an emphasis on photography, bird tourism, and conservation issues. Continuing in the tradition of similar special interest publications for birders the magazine contains features a plethora of advertisements which are fascinating to study in themselves.

Thanks to its new glossy photographs and essays that appealed to birders membership rebounded and by the late 80s the CLO was able to crawl out of the financial hole it was in. This is clearly indicated in the Autumn 1983 issue of the Living Bird to members of the CLO. "Two years ago our membership barely reached 3,000.

With so little money coming in our research and education programs had to be stripped to the bone. Then we decided to suspend publication of our technical journal, *The Living Bird* in order to found a new magazine which would be geared to a larger audience. Our idea was that people interested in reading the *Quarterly* might want to become members. And the larger our membership, the more extensive and effective our research and publication."[114]

It is in the late 1980s, when the financial situation of the CLO stabilized *The Living Bird* became a vehicle for molding the audience in specific ways useful for scientific goals. For instance, besides the appeals for funding the periodic product reviews there begin to appear in the pages of the magazine articles enjoining bird watchers to practice good note taking, both to allow them to become better bird watchers but also to be able to produce usable meta data for data driven science. *The Living Bird*, along with *FeederWatch News* and *Birdscope* (two smaller publications used specifically for communicating information to participants in citizen science projects) was used by ornithologists at the CLO to enroll the birdwatchers who subscribed to the magazine to the citizen science projects it would later develop. In essence the "popular" literature became part of a pipeline which ultimately led the funneling of vast amounts of data back to the CLO. This data, in turn, led to a vast increase in professional output in scientific journals such as the *Auk* about migration data, population declines, species eruptions. Thus the popular publications of the CLO formed a crucial part of the scientific infrastructure of the institution, allowing its ornithologists to produce professional research.

[114] *The Living Bird* Autumn 1983, 26

As with the records discussed in the previous chapter, the popularization activities of the Lab ended up benefiting the institution scientifically as well as financially. In the case of the Lab the professional was enabled by the popular. The data driven approach to science that became increasingly common at the CLO in the late 80s and 90s was entirely reliant upon mobilizing large numbers of people to collect the data. Mobilization was ineffective in the previous iteration of *The Living Bird*, which alienated members with its technical style. However, by falling back upon a shared culture and language of birdwatching the CLO was able to connect with its audience and gradually shape them in beneficial ways. Readers of the magazine found their own reasons to join these projects and derived their own benefits from them. It was the common culture of birdwatching that allows each group to extract their own benefits out of a shared endeavor.

The technical journal phase of *The Living Bird* spanned a twenty-year period from its establishment in 1962 to its collapse in 1981. Even from its inception, however, it was never a purely technical endeavor. This is reflected in the genesis of the journal itself which was named by Roger Tory Peterson who had become a board member at the CLO. *The Living Bird* was really a hybrid creature which had professional aspirations but at the same time did not want to abandon the birdwatchers who formed the bulk of its memberships. In the end however, the arrangement proved to be unsatisfactory and when the CLO faced financial stress the disjointed focus of the journal led to it being relaunched in 1982 as *The Living Bird Quarterly* which piloted many of the features that have since become standard in the magazine's 34 year run. Most noticeable of all was the photograph that graced the cover page. The old journal,

in contrast, had rarely used photographs and when they were present it was largely for a technical or descriptive purpose rather than an aesthetic one.

Another prominent feature that was quickly introduced in the early issues was a product review of leading optical technologies: binoculars, spotting scopes, and telescopes. The product review sections remain some of the most popular articles that continue to appear in the magazine. These product reviews point to the intersection of ornithology and birdwatching. As optics are tools fundamental to both groups the product reviews provide an extremely valuable service to birdwatchers who, because of the vast expense involved, must commit to a pair of binoculars for years at a time. This is an example of the ways in which the magazine allowed the ornithologists working at the Lab to be removed from their scientific context and situated within the community of birdwatchers with which they are actively engaged.

This is also true of the participation of the Lab's birding team, the Sapsuckers, in the World Series of Birding, an annual event held in New Jersey in which teams compete to see who can rack up the largest Big Day list (numbers of bird species seen in a 24-hour period). The event has succeeded in raising millions of dollars for conservation charities. The CLO team has been a regular participant in the event since it was first established in 1984. Every year the magazine dutifully reports on the success of the Sapsuckers who gradually became one of the best teams competing in the event, regularly winning the top prize. After John Fitzpatrick became the director of the CLO in 1995 he was an active participant in the event. The World Series of Birding is a logical culmination of trends within birdwatching that gave it the aspect of a sport. Listing, big days, and big years became a highly visible and defined way of doing

birdwatching in the sixties and seventies with a subculture of its own imbuing birdwatching with a competitive ethos. Like the ever more specialized focus of field guides themselves, the competitive nature of sport birding has pushed the development of birdwatching skills even further. The World Series of Birding showcases these sills and the participation of the CLO team gives it visibility within the community.

Citizen Science

In addition to the magazine itself, there are two smaller publications which follow a newsletter format and were specifically devoted to the projects themselves. It is in these publications where we can see how the CLO attempted to develop a framework for reporting data and how that framework developed historically to meet various challenges. In these publications the staff of the CLO began to speak directly to the participants in their projects.

One of the best examples of this process and the importance of the newsletters occurred in *Birdscope*. It came at a bit of a crisis point in the seed preference test project where, despite vast numbers of people enrolling to take part the Lab received far fewer data forms than they had originally expected.[115] The reason, it was thought, was that participants had an aversion to sending in data forms when they had nothing to report. As a result, participants reported feeling discouraged and felt that their data was not valuable. In response to this crisis Rick Bonney, who had been one of the most

[115] Over 17,000 people had enrolled in the SPT but only 5,000 returned data a return of around 29%. Participants were frustrated when the birds didn't show. Rick Bonney, "SPT Shows How Science Works" *Birdscope,* Autumn 1994 Vol. 8 No. 4, 9

influential developers of citizen science at the CLO, spoke directly to the participants emphasizing the importance of negative data in the scientific process.[116] What becomes clear in reading the piece is that Bonney was animated by a much deeper concern than simply lost data. This is one of the earliest and most pointed arguments about the role amateurs can play in the scientific process, and makes the explicit claim that the participants were scientists. Bonney's concern here was not so much scientific as it was social: he seems to have been deeply worried that an early negative experience participating in a citizen science project would make them reluctant to participate in others in the future. This would obviously have an impact on the CLO itself, but, being involved with education, he did not want people to become alienated from science as a result to be a result of participation. The experience of the event went on to inform how the CLO would talk about projects in the future by front-loading the importance of negative data at the start to avoid discouragement in the project later.[117]

One of the reasons why this episode in particular was a crisis was that it was the results of the SPT project which was a part of the National Science Experiments developed in 1992 which were funded by the NSF with the goal of promoting science education. If it failed, it may have jeopardized other grant efforts in the future. Also because science literacy through participation was the purpose of the project the CLO

[116] Bonney begins by emphasizing that "No one who attempted this experiment failed. Nobody washed out as a scientist, even those of you who failed to attract birds. Instead you learned an important lesson—that the scientific process is a bumpy road." He also goes on to note that failure is an important, and part of science which is not adequately discussed. Ibid, 9-10. The value of negative data carries on in the issue to reports on other projects such as project Tanager on page 11.

[117] A neat example of this can be seen in the Celebrate Urban Birds kit which includes a Zero Means A Lot sticker which "will remind you to send in your data even when you see none of the target species, because it's just as important to know where birds are seen as where they are not seen." Celebrate Urban Birds kit, "Welcome to Celebrate Urban Birds!" It's not as pithy as "nothing means something" but it gets the point across. The idea gets expressed again in an article written by Andre Dhondt "Negative Data Have Positive Value" *Birdscope* Spring 1997 Vol. 11 No. 2, 10

aggressively promoted the "you are a scientist" line which may have had the unanticipated effect of deepening a feeling of scientific inadequacy in the face of failure. In this regard too, the SPT represents something new that we see in the activities of the Lab: moving beyond birds to embrace a larger conception of science literacy which would help shape how the Lab employed citizen science in the future. It would also create a sense of tension as participants who care about birds often proved ambivalent to these wider science literacy goals.

However, attempts to move outside this framework have had decidedly mixed results. What makes the citizen science projects of the CLO work effectively is that they employ practices that birdwatchers are already familiar with and make use of recreationally. Take the data form for example. It is essentially a checklist of birds, an object which is innately familiar to birders. EBird works on the same principle: it is a massive repository of bird migration data that has immense scientific value. But, at the same time, it was built with bird watchers and their needs in mind.[118] They can use it to import their lists and update them, they can use it devise competitions among themselves, there are leaderboards all of which appeals to the sportive nature of bird watching.[119]

When the projects have been used simultaneously to educate their participants about climate change or to improve scientific literacy the results have been disappointing. A study conducted by Bruce Lewenstein and Rick Bonney found that the participants in the Labs citizen science projects take part in them because they are far

[118] Bonney & Dickinson, *Citizen Science*, 7
[119] When I attended the AOU conference this summer I attended the EBird session and these were the kinds of questions the presenter was being asked by the audience who wanted to know how they could use it to support their own interests in bird watching.

more interested in birds than science or the intricacies of the climate.[120] This problem is referenced again in *Citizen Science: Public Participation in Scientific Research* when John Fitzpatrick, the CLO's director concludes on a somewhat ambivalent note by admitting the failure of citizen science to improve scientific literacy. The "dirty little secret" of citizen science, Fitzpatrick says, is that "despite numerous promises to the contrary in public talks (my own included) and funded grant proposals (again, mine included), these projects have neither found the formula nor achieved the scale required to improve science literacy in any element of society."[121]

Conclusion

The citizen science projects of the CLO were built on a long history of engagement with the bird watching community. Through its long history the CLO has been a recognized feature of the landscape of this community and has participated in it. Professionalization at the CLO did not entail a separation of scientists and the public, and attempts to create boundaries between ornithologists and amateur bird watchers ended up failing and placing the survival of the institution itself at risk. Instead, what the CLO reveals is a model of professionalization through popularization. In the first phase of its history dealing sound recording provided a common space for Allen and Kellogg to interact

[120] The paper was evaluating the effectiveness of the Nest Box Network. They conclude that "Because participants' interest in the subject of the study…may move contemplation of the more general scientific process to the background of the project, citizen-science projects that hope to increase understanding of the scientific process should be framed in a way that makes participants particularly aware of the scientific process in which they are becoming involved." Dominique Brossard, Bruce Lewenstein, & Rick Bonney, "Scientific knowledge and attitude change: The impact of a citizen science project," *International Journal of Science* Education Vol 27 No. 9 (July 2005), 1117

[121] Bonney & Dickinson, *Citizen Science*, 239

with bird watchers, and in doing so, helped to build up the Library of Natural Sounds that created the justification for the building of the CLO as a physical institution. At the same time, the existence of the library provided a site for the production of bird song records that could be used by the rest of the bird watching community in their field craft. Later, the popular relaunch of *The Living Bird* gave the CLO a lifeline to a large membership base which helped to stabilize its finances. At the same time, the magazine was turned into a recruitment tool to enroll those members in projects focused on data collection, leading to professional publication. Access to the bird watching community, enabled through the pages of *The Living Bird* which spoke to them in a common language and catered to their interests, had the result of raising the professional profile of the Cornell Laboratory of Ornithology. Attempts to emulate its model of citizen science have to contend with the fact that very often the kinds of historical relationships have formed with amateurs that have allowed the CLO to grow and thrive may not exist in other areas which has implications for the viability for the explosion of citizen science projects that have been developed in the past decade.

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Appendix: Important Figures

Arthur A. Allen 1885-1964

Worked under Frank Chapman at the American Museum of Natural History. Received his doctorate in 1911, became a professor of ornithology at Cornell in 1915 where he would train over 100 graduate students. His prominent activities included sound recording and photography. Retired in 1953.

Donald Borror 1907-1988

A professor of entomology at Ohio State University, Borror became interested in studying avian acoustics and became a recognized expert in this area. Borror, both donated songs to the Cornell Laboratory of Ornithology and developed his own sound library at OSU which would be second only to that of Cornell's.

Albert R. Brand ?-?

A graduate student of Arthur Allen. Brand pioneered much of the technologies involved with sound recording in the 1930s and introduced the parabolic reflector/microphone system. The earliest record collections of bird songs in the wild were made by Brand. He went on to work at the American Museum of Natural History, but remained deeply connected to Allen and Cornell. The first phase of the sound library was called the Albert R. Brand Bird Song Foundation in his honor.

Elliott Coues 1842-1899

One of the most prominent ornithologists working in the United States in the second half of the nineteenth century. Coues' *Key to North American Birds*, which was published in 1872, was celebrated as a major advance in taxonomic science. He would

later go on to become one of the founding members of the American Ornithologists Union.

Frank Chapman 1864-1945

Straddled the world of collecting and bird watching as a prominent ornithologist working at the American Museum of Natural History, where he was appointed as the curator of birds in 1908, and as the editor of Bird-Lore the magazine of the National Audubon Societies. Chapman organized the first Christmas Bird Count in 1900, and was the author of numerous field guides.

L. Irby Davis 1897-1988(?)

Davis was a bird watcher with expertise in the birds of the American Southwest and Mexico. He, along with others in the area, turned Harlingen Texas into a major hub for travelling bird watchers. Davis assisted Arthur Allen in 1946 when he travelled to Mexico. Davis began sound recording in 1950 and his record Mexican Bird Songs, was the first produced by the CLO in 1958.

Louis Agassiz Fuertes 1874-1927

An influential bird artist who lived in Ithaca. Fuertes rained many of the next generation of prominent bird artists including George Sutton. Later he would become very good friends with Arthur Allen and became a lecturer in the ornithology program at Cornell. His artwork would be prominently displayed in the main lab building after its construction in 1957.

Ludlow Griscom 1890-1959

The “Dean of the Bird Watchers” and Allen’s first graduate student. After graduation he would go on to work at the American Museum of Natural History and later Harvard’s

Museum of Comparative Zoology. Griscom was a major figure in the validation of sight records and the establishment of recreational bird watching. While in New York, he became a mentor to a prominent group of young bird watchers, most notably Roger Tory Peterson.

William Gunn 1913-1984

A Canadian recorder who, as the President of the Federation of Ontario Naturalists, represented an important link between the Cornell Laboratory of Ornithology and Canada. Gunn made use of both networks to help develop his own records. Was the recipient of the first Arthur A. Allen award given by the Cornell Laboratory of Ornithology in 1967.

Peter Paul Kellogg 1899-1975

Graduate student of Arthur Allen, and one of his closest colleagues. Kellogg is credited as the cofounder of the Cornell Laboratory of Ornithology. A naturalist with training in electrical engineering, Kellogg continued the development of technologies for sound recording including the design of a new portable sound recorder in 1949. It was largely Kellogg who articulated a vision for a library of natural sounds, and would eventually become its curator when the physical lab was built in 1957.

Marian & Donald McChesney ?-?

Sound recorders who travelled extensively recording for the Cornell Laboratory of Ornithology. In 1956-57 they were sent to Africa under the auspices of the CLO to record songs of African birds in southern Africa. They would later collaborate with Myles E. W. North create More *Voices of African Birds*, published by the CLO in 1964.

Myles E. W. North 1908-1967

A district commissioner in Kenya. North worked closely with Kellogg and Marian and Donald McChesney to produce two records: *Voices of African Birds* & *More Voices of African Birds*.

Roger Tory Peterson 1908-1996

As a member of the Bronx County Bird Club in New York City, Peterson learned techniques of bird identification from Ludlow Griscom and elaborated upon them in *A Field Guide to the Birds* (1934), which introduced his field mark system. Peterson's field guide had a tremendous impact on the development of bird watching. He would later become a board member at the Cornell Laboratory of Ornithology.

Olin Sewall Pettingill Jr. 1907-2001

A graduate student of Arthur Allen from 1930-1933 who later began working with motion pictures of birds. After graduating from Cornell Pettingill became the state ornithologist of Minnesota. In 1962 Pettingill returned to Cornell to assume the directorship of the Cornell Laboratory of Ornithology during its second phase.

Norma and Jerry Stillwell ?-?

The Stillwells started to record bird songs in 1948 and would end up travelling all across the United States to record bird songs. They were well connected with bird watchers all across the country and were good friends of L. Irby Davis, Peter Kellogg, and Arthur Allen.

George Miksch Sutton 1898-1982

A bird artist who had studied with Louis Agassiz Fuertes and who later became a graduate student of Arthur Allen from 1929-1931. During his time at Cornell he became

close friends with Olin Pettingill Jr, a fellow graduate student. Sutton remained very invested in collecting and became the curator of Cornell's collection. He left Cornell for Michigan over conflicts with Allen and Brand and their disinterest in supporting the collection and focus on sound recording. He became professor of ornithology at the University of Oklahoma.

Paul Schwartz 1917-1979

A South American sound recorder who made contact with Peter Paul Kellogg and began donating his recordings of South American birds to the Library of Natural Sounds. Schwartz and Gunn also worked closely together to create some records.