Wright on Fish

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Synopsis

Albert Hazen Wright (1879-1970) was a prominent herpetologist, but began his biological career studying the relationship between fish distribution and habitat. His innovative study resulted in a thesis in 1906, but the results of the thesis work did not appear as a peer-reviewed publication. The edited manuscript and printing plates for a planned publication were discovered at the New York State Museum. Documents at the State Museum, NYS Archives and Cornell University Library revealed that the manuscript was accepted, reviewed by peers and prepared for publication. However, it was never published. The publication would have been a valuable one for the discipline because it is an early effort of the study of ecology of fishes.

Introduction

Research projects are initiated for countless reasons but usually have circumscribed goals and products. For most, regardless of the goals, the ultimate product is a written, peer-reviewed publication that describes the project, lists its results, and then assesses those results, placing them within the framework of the discipline. On occasion, something happens that alters this simple plan. This is the story of a research project, the scientist that initiated it, and the process of the publication of its results—a process that ultimately failed.

One can argue that failure to publish the results of scientific inquiry is always a tragedy. In this particular case, however, the study examined the relationship between fish distribution and habitat. Because it is among the first studies to recognize and document the relationship between these two characteristics, it is, or would have been, a classic study. Had it been published, it should have become a core publication in fish ecology.

One morning I found on my desk an old, faded cardboard box. In the box were zinc printing plates, and on it were the words “Rochester fish”. I learned that a secretary had put it on
my desk because of the word “fish” penciled on its lid. She had noticed it a few weeks earlier in her office but knew nothing of its provenance. About 15 years ago, a package wrapped in brown paper and tied with cotton twine also had found its way there. It too had “Rochester fish” penciled on it and held zinc printing plates, and it too lacked a provenance. The plates would have been puzzling had I not found, a few years earlier, a manuscript in a little used museum file cabinet. However, it wasn’t until the second set of plates turned out to be the ones needed to complete a set, that I realized there was something unusual connecting all these artifacts.

The manuscript was prepared for printing: it was blue-lined and the introductory pages, the front matter, were formatted. It was clear that this manuscript was ready to be sent to the printer. With the discovery of the complete set of printing plates for the illustrations, it became obvious that the manuscript was ready to metamorphose into the next phase of existence—a publication. Why was it never published?

Unraveling the answer to this question has led me to explore archives, libraries, and various uncatalogued items associated with the collections of New York State Museum. At the time the second set of plates surfaced and migrated to my desk, a large part of the Museum’s history collection was being moved to a larger storage space. It is likely that the box of plates had been uncovered and, because the items were not recognized as being a part of NYSM’s history collection, the box had been left where somebody else might recognize its value.

The Artifacts

The manuscript is entitled “The Fishes of the Vicinity of Rochester, New York” (Figure 1). It had been submitted for publication as a New York State Museum Bulletin. It was typewritten, author’s corrections had been made in pencil, and the editor’s comments in blue pencil. The manuscript is 100 pages long and includes 15 figures. The text and table of contents
are typed on linen bond with a Cornell University watermark and measurements of 8 x 10.5 inches. The type is elite. These pages were supplied by the author. The front matter, which was standard for all NYSM Bulletins, is from several sources, perhaps indicating that certain pages were reused from earlier publications. The page size was the same, type was pica, and the stock was either Smith Premier Linen or Sheridan Bond. The entire contents were stored in a heavy manila envelope, secured with string. On the cover of the folder is the date Jul 16 1927.

There are 16 printing plates ranging in size from 35 X 83 mm to 298 X 275 mm (Figure 2). Two plates are of a map of Monroe County, showing streams, roads, and the city of Rochester. One plate is devoted to each of the 14 streams studied. Each plate is zinc and tacked to a piece of hardwood approximately 25 mm thick. The Monroe County plates, which first appear to be identical, differ in that one had been inked and may have been used previously in a different publication. Only a few plates have any manufacturer's mark on them; if present, “H.J. Ormsbee Eng. Co., Syracuse, NY” is stamped on the side. There is also a remnant of a paper seal on the back of one plate, identifying the work as belonging to Ormsbee. The plates are intact and appear fresh. There is some oxidation.

The Author

Albert Hazen Wright (Figure 3) was born in 1879 in Hamlin, Monroe County, New York (Hamilton, 1971). In 1899, he graduated from Brockport Normal School. This teachers college provided Wright with a diploma that qualified him as a primary or secondary teacher. The curriculum at a normal school typically emphasized teaching methods (Harper, 1939). The state school at Brockport, however, evolved from an academy and, after becoming a normal school in 1866, retained a part of its academic tradition. Unlike traditional normal schools, subject matter was not regarded as secondary to teaching methodology. In addition to Brockport’s tradition,
during Wright’s final year in 1898, a new principal, David Eugene Smith, instituted changes that made the curriculum even more academic. He also elevated the rank of the librarian, and this enhanced the school’s attitude toward general learning. These changes must have influenced Wright, who had developed an interest in natural history early in life, and may have convinced him to pursue a career in academia rather than secondary education. He did teach for a year, but then entered Cornell University where he received an A.B., M.A. and Ph.D.

Wright completed his A.B. in 1904, but it was obvious that he planned to continue his education. In fact, he already had begun the research that would lead to a Master’s thesis in the summer between his junior and senior year. In the summer of 1903, he began a fish survey of Lake Ontario tributaries. The bulk of the survey work was conducted in the summer of 1904. In May, 1905, the faculty of Cornell University awarded a Master of Arts degree to the 24-year old Wright; his thesis was entitled “The Fishes of Northern Monroe County, N.Y.”

Wright's successful career at Cornell University continued. He completed his Ph.D. dissertation in 1908 and joined the faculty, where he remained as an active or emeritus professor until his death in 1970. However, Wright’s interest in fishes declined after completing his Master’s thesis. He authored a few more articles dealing with fishes (e.g. Wright, 1918; Reed & Wright, 1909; Wright & Palmer, 1920), but his interests, as reflected in his publications, switched to reptiles, amphibians and local history. He became a world-renowned herpetologist, and co-authored with his wife, Anna Allen Wright, the two-volume Handbook of Snakes of the United States and Canada (Wright & Wright, 1957), a volume that is still frequently cited. He was also instrumental in developing the herpetology collection at Cornell University. In addition to his interest in herpetology, Wright conducted research in local history. He compiled information on families, dating back to colonial New York, edited information on historic maps.
and published several papers dealing with the history of Cornell University. W.J. Hamilton (1971), a colleague at Cornell, described Wright as "a man of great enthusiasm," an inspiring teacher and a pioneer in the science of Ecology.

**The Research**

He noted in his masters thesis (Wright, 1905) that the data collected in 1903 were largely observational, although a few sites were actually sampled with nets. Wright's Master's degree research dealt with the distribution of fishes in five creek systems in Monroe County, primarily in the town of Hamlin, where his family home was, and the towns of Greece, Parma, Clarkson, Gates, Ogden, and Sweden. The western tributary system, Salmon Creek, included a survey of the main channel, East Fork, West Fork, a tributary branch of the West Fork, and North Creek, which joins Salmon Creek before it drains into Braddock Bay, a part of Lake Ontario. From the west, he then sampled Buttonwood Creek, two branches of Northrup Creek, Larkin Creek, and Round Pond tributary. All these drain into embayments of Lake Ontario west of the Genesee River. Wright claimed that the work of Evermann & Kendall (1902), a survey of Lake Ontario fishes conducted in 1894, had inspired him to conduct the surveys of these streams (Wright 1905).

The thesis included a description of the physical and biotic characteristics of each of the stream systems, an annotated list of the fishes caught and a novel approach to presenting the information that graphically related distribution and, to a lesser extent, abundance to macrohabitat. This graphic representation of the correlation between species and environment is innovative, original and may be the first time in fisheries science that the species-habitat relationship was the prime focus of a research project.
The standard approach during the period was to survey a system and publish a lengthy annotated list of the species caught. This was the approach used in Wright’s inspirational paper by Evermann & Kendall (1902) and also the approach of countless other reports published during the later part of the nineteenth and early twentieth centuries. Wright’s thesis is a hybrid; he caught representatives of more than 50 fish taxa during the survey and included a list, but he also recognized that the presence of these species was dependant upon the physical habitat available to them in the stream. When compared with other fisheries publications of the era, this unpublished thesis appears revolutionary. In 1907, he did publish a description of the graphic method and pointed out its importance (Wright 1907). He offered two very compelling reasons for using this method: first, it is important to relate distribution to habitat and second, because of the complexity of that relationship, a graphic method allowed the researcher to present results “quickly and clearly” (Wright 1907).

An example of this quick and clear guide is the assessment of Buttonwood Creek (Figure 4). From this chart, the reader knows that 26 species of fish were caught in this 11-mile long creek. Depth increased from the shallow headwaters to over 7 feet at the mouth. The steam dropped in elevation from 500 feet to 246 feet, the surface elevation of Lake Ontario. Stream width at the mouth was about 20 feet. Current in the lower four miles of the creek was imperceptible, and the bottom in this stretch was mud. There are several bridges across the creek, but no dams and no tributaries enhance flow. Because of the layout of the creek’s environmental information in the figure, the effect of these variables on the distribution of fishes is obvious. For example, eastern blacknose dace (Rhinichthys atratulus, identified as R. atronasus) is confined to approximately 1 mile of stream in the headwaters where flow is perceptible, where the bottom is either stony or swampy, and where the stream is relatively narrow. Hornyhead chub (Nocomis
biguttatus, identified as *Hybopsis kentuckiensis*) is present in three miles of the midreaches of the stream where the bottom is gravely and velocity perceptible. Several species were present only in the lower four miles of stream; here the bottom was mud, there was no current and stream width was double the upstream width. In fact, at a glance, it is obvious that richness increased downstream greatly, that only five species occurred in the extreme headwaters, and that only white sucker (*Catostomus commersonii*) was found throughout the system. The figure nicely encapsulates information on both habitat and distribution, relates the two, and does so without a computer.

Wright (1907) noted that ornithologists had recognized that a method for relating habitat and distribution was useful. However, I have not found this method used by any other fisheries biologists. Wright seems to have pioneered an innovative and useful method that was completely ignored by the discipline. He did not publish the thesis when it was completed, perhaps because he immediately began his doctoral dissertation or perhaps his interest in fishes had waned. Wright co-authored with Dr. Hugh D. Reed an article on the vertebrates of Cuyugac Lake, which included only an annotated list of fishes (Reed & Wright, 1909). Wright’s only other important contribution to fisheries science was a study of fish succession in streams (Wright, 1918), also an early ecological study that corroborated the results of the more widely cited paper by Shelford (1911). In this paper, he used information from his thesis; he cites Wright (1907) but does not refer to the thesis. None of these fisheries papers has been widely cited. For example, in his opus on New York fishes, Smith (1985) only cited Reed & Wright (1909), and Wright is not cited in Werner’s (2004) field guide. The simple reason that Wright’s works have been omitted from the extensive and thorough bibliographies of these two important works is that the thesis is virtually unknown and the other papers are obscure at best. In fact, I have not found recent citations of the
thesis, Wright (1907) or Wright (1918) in my searches. I first learned that Wright had published at least one article on fishes early in his career because I found a note from Bashford Dean of the American Museum of Natural History, thanking Wright for sending a reprint of his “excellent paper”. Dean (1916) later listed Wright (1907) in his synoptic bibliography.

It is curious that this highly original article published in the American Naturalist in 1907 did not generate interest and that Wright did not publish his thesis early in his career. It is perhaps an indication that ecology remained of little importance to most fisheries scientists at that time. The fact that lists remained the major method of reporting results of survey work well into the 1930s is testament to the lack of influence of this paper. Even monographic treatments of fishes ignored or downplayed the importance of the species-habitat relationship. For example, the species accounts in the second edition of Forbes and Richardson (1920) rarely provide information on habitat use. When mention is made, it is usually a cursory acknowledgment of the likely presence of the fish in a particular type of stream, for example, as large river or headwater stream. Recognition of the importance of the species-habitat relationship does not become significant in the literature until the 1950s and 1960s.

The Effort to Publish

Wright finally did attempt to publish his thesis. In 1926, he submitted a revised version of it for publication as a New York State Museum Bulletin. This series began in 1888 and, by the 1920s, included more than 200 different titles dealing with original research in anthropology, biology, and geology that focused on New York State. What occurred in 1926 that made the publication of a 20-year old manuscript important and timely?
In a letter to Wright dated 19 April 1926\textsuperscript{1}, Emmeline Moore, a graduate of Cornell University and, at that time, an Investigator in Fish Culture for the NY State Conservation Department, in Albany, wrote of a $15,000.00 appropriation by the legislature from the Conservation Fund for a stream survey. The enacting clause of the legislation declared that the purpose of the survey was to “determine the most practical methods of increasing fish production” (Moore\textsuperscript{2}, p. 5). In this letter, she noted that securing the funding to conduct this survey, which she would head, reminded her of his work in northern Monroe County streams. The approach that Wright undertook in his Master’s thesis research obviously had influenced the indomitable Dr. Moore. Wright’s emphasis on habitat use inspired the surveyors to gather information on the suitability of the state’s water bodies to support fishes (Moore, 1927). Nevertheless, the watershed survey reports published only the traditional annotated lists of fishes caught!

Moore apologized that the Conservation Department found itself unable to publish the manuscript, and this indicates that Wright must have become interested in publishing it. In fact, in early 1926 the manuscript was in the hands of Sherman Bishop, who was still on the staff of NYSM. It is possible that Bishop had suggested that Wright approach the Conservation Department or perhaps Bishop himself contacted Moore about publishing it. Bishop left the State Museum in 1928, in part because he often feuded over the publication of his own manuscripts (Hunsinger, 2000). Bishop’s familiarity with the Museum Bulletin program may have prompted his effort to get Wright’s manuscript published elsewhere.

\textsuperscript{1} Albert Hazen Wright papers, 1820-1960. Courtesy of the Division of Rare Books and Manuscript Collections, Cornell University Library, Box 39.
Finally, Moore’s letter outlined the work planned for the first year of the survey and asked Wright if he would serve as one of the ichthyologists; he did. Because the first survey related to the Genesee River, the importance of Wright’s work with Monroe County streams is obvious: these streams drain the area just west of the Genesee River watershed.

**The Bulletin**

The manuscript for the bulletin differs from the thesis in several ways. First, it is updated. Wright collected fishes from these creeks in the summer of 1905, after completion of the thesis, and continued to sample the creeks for many years with students from his university classes. He included some information from later efforts. He updated the names, using Hubbs (1926) and Dymond (1926). He expanded his discussion considerably. Most importantly, he altered the focus to emphasize the importance of the distribution-habitat diagrams.

It is clear in this manuscript that Wright understood the value of correlating distribution to habitat. A detailed description of the charts first appears in this manuscript, largely the argument presented in Wright (1907). This chapter was followed by descriptions of the physical characteristics of the area and each of the creeks, which was unaltered from the thesis. Next are seven chapters that discuss aspects of the results from a variety of perspectives, two of which were included in the thesis. The final chapter is the obligatory annotated list of fishes, which contained information on 71 species or subspecies of fish.

Wright retained a discussion of the distribution of Percidae in Salmon Creek, the largest of the streams sampled. In this section in both the thesis and submitted manuscript, Wright related distribution of six percid species to macrohabitat and noted interactions among them in feeding and habitat use. He included a chapter on fish succession, primarily a rehash of Wright (1918). The point of including this chapter is obscure: data from the original Monroe County
surveys are used, but these data were compared with information from Cayuga Lake and the Susquehanna River system. Furthermore, he did not expand upon the ideas presented in Wright (1918) so there seems little need to have included this information here.

Two chapters assess the effect of the Erie Canal on fish distribution. Retained from the thesis is a description of the effect of canal overflow. The canal traversed the upper reaches of five of the 10 streams surveyed and overflow was common. This resulted in the presence of slow water species, such as common carp (*Cyprinus carpio*) and brown bullhead (*Ameiurus nebulosus*), in headwater reaches of the streams so that the distributions were disjunct within the streams. These species were present just downstream of the canal and in the lower reaches, near Lake Ontario. In 1918, the Erie Canal was enlarged and modernized (Daniels, 2001). Wright does not include any comments on changes caused by the enlargement, although he clearly had information of pre- and post-enlargement conditions. The second canal-related chapter deals with stocking of fishes. The canal was drained every autumn; numerous fishes, including many commercial or game species, were left behind after the removal of the water. Between 1872 and 1888, almost 40,000 individuals from at least ten species were reclaimed and introduced into waters around the state. Wright noted the deleterious effect of the overflow and in this chapter dryly pointed out that “human agency” could have achieved the same results.

The three other new chapters are historical and include an assessment of fish assemblages previously described in letters, reports and diaries of Jesuit travelers and pioneers, the fish culture and stocking activities of Seth Green, who was the Superintendent of Fisheries of New York, and the findings of the U.S. Fish Commission between 1885 and 1894 in Monroe County. This emphasis on the history of fisheries was also innovative. At this time, most surveyors listed only what had been collected in their own surveys. The tally of fishes from Monroe County in
this manuscript included several species not actually collected by Wright or his students; Wright included them on the basis of historical records.

The Process

At some point after April 1926, Wright requested that the manuscript be published as a New York State Museum Bulletin. Museum standards required that bulletins “disseminate the results of high quality, original research, reviews and syntheses to a wide audience of scholars and other interested individuals”, and Wright’s manuscript clearly qualified.

I was unable to find the submittal letter in either the NYS Archives and Record Administration or the archives at Cornell University. The first letter mentioning the manuscript is one from Charles C. Adams, the Director of the Museum, to Wright dated 24 September 1926. Adams wrote that he had “found that Bishop had it (the manuscript) in his file safely stored away.” Bishop appeared to have been an intermediary. However, Bishop had no love for either the Director or the Museum’s publication process (Hunsinger, 2000); he may not have been the best person to promote the publication of this research. Adams went on to say, “after all these years of delay you may wish to make some changes as to nomenclature” and to revise the thesis so that it conforms to Museum publication style. Adams also requested that Wright include a “summary and some conclusions”. Adams noted that Bishop also had the zinc plates and suggested that Wright provide some photographs so that readers would be able to “visualize the character of the streams”.

On 1 October 1926, Adams acknowledged receipt of a letter from Wright dated 29 September in which Wright agreed to the changes suggested in Adams’s earlier letter. Wright then sent a hand-written letter to Adams on 14 November. He noted that he had made all the changes suggested, had delivered the plates on 22 October, and that he had no photographs.
However, he was willing to take such photographs and send them. On 22 November, Adams verified the arrival of the manuscript and suggested one last change: “Would you not change your title to ‘The Fishes of the Vicinity of Rochester, New York’, as county names are usually not known outside of a State?” The title was changed.

What Adams refers to as a “curious turn of affairs” is the topic of his next letter to Wright, dated 22 March 1927. This letter may never have been sent because a second letter dated 24 March 1927 deals with the “curious turn” in more detail. Both letters note that the manuscript was submitted to the Committee on Printing and that the committee rejected it on 8 March because it was “out of date.” Adams sounded distraught in these letters. He previously had assured Wright that the paper would be published as a bulletin and in a later letter avowed that he was “amazed when objections were made to the paper.” He proposed that Needham and Embody should be enlisted to write frank reviews of the work and that Wright should include data that are more recent so that he could return it to the committee and argue that it had been updated and that it had been critically reviewed by peers.

Wright did add more information on the natural history of the fishes and he did secure reviews from Needham and Embody. G.C. Embody and J.G. Needham were both eminent professors at Cornell University, New York State College of Agriculture, and both had sent glowing reviews on 22 April 1927. Needham noted that this was a superb study of the ecology of the fishes in small streams, that it was novel, and that, although the bulk of the work was 20 years old, the information was valuable because the information on the habitats of the fishes had not changed. Needham’s identification of this work as being ecological in nature is telling. Embody’s review is even more laudatory. He refers to it as “an exceedingly valuable contribution to the Ichthyology of this state.” Embody noted that it contains the original results
of Wright’s work as well as the historical perspective derived from comments from early explorers and earlier researchers. He rightly predicted that this type of work would become valuable for later researchers interested in fish distribution.

I could find no later letters dealing with this bulletin in either the State Archives or Cornell University. Obviously, it was never published, but whether this resulted from some direct action of the Committee on Printing, a loss of funding or other vagary of state government is not known. It is interesting to note that the Committee on Printing approved 35 publications in Geology, 11 in Biology and 2 in Anthropology during this decade. Preference in all cases went to publications written by museum staff. The date of 16 July 1927 on the storage envelope may identify the day on which the manuscript was permanently filed away in as much as no further action was planned.

To say that the process simply failed underestimates the magnitude of failure. This novel and innovative study could have been one of the founding pieces of literature in fisheries ecology. The only publication resulting from this research (Wright, 1907) is a methods paper that omits all data. Had the entire document been published, it could have served as a model for numerous future publications. It could have been an often-cited paper. Instead, it was lost to the entire discipline and the ideas and methods it espoused did not become an important field of study for another 30 years.

In 1955, Wright was awarded the title of Eminent Ecologist by the Ecological Society of America (Hamilton, 1971). It is interesting to speculate on whether or not the award committee was aware of his early, important work correlating fish distribution with habitat. A.H. Wright began his career as an inquisitive natural historian. At some very early point, he recognized the
importance of habitat in determining fish distribution and he wrote a pioneering paper that clearly dealt with fish ecology. It is a pity that the impact of the paper turned out to be minimal.

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**References Cited**


Figure captions

Figure 1. Original manuscript of “The Fishes of the Vicinity of Rochester, New York” that was submitted for publication as a New York State Museum Bulletin by A.H. Wright in 1926. Several of the 16 zinc plates are also figured.

Figure 2. A mirror-image detail from the printing plate for Buttonwood Creek, showing the title and information on habitat and species distribution.

Figure 3. Albert Hazen Wright in 1936, taken while conducting fieldwork. Courtesy of James Atz.

Figure 4. Relationship between fish distribution and habitat for fishes collected from Buttonwood Creek, Monroe County, 1904. This figure is Figure 3 from the original manuscript.