

Where The Boys Are

Who figured out the Bobolink?

The solution to the mystery of the Bobolink’s seasonal movements and variable plumages is universally accounted one of the great pioneering scientific accomplishments of Alexander Wilson. “By keeping a live male Bobolink in his room...and by careful dissection,” the Scots immigrant discovered that all members of the species, male and female, young and old, were clad alike in autumn (Burt and Davis 2013).

But Wilson was not the first to crack the puzzle, and he was not the first ornithologist to subject the “rice bird” to systematic study based on careful field observation, captive birds, and extensive dissections. That distinction goes instead to another immigrant, one who had arrived in the U. S. two years before Wilson and who left the country, with his specimens and notes, four years before Wilson even conceived his magnum opus, the nine-volume *American Ornithology*.

Every September the internet comes alive again with mysterious photos of odd, heavily streaked yellowish birds seen in flocks on damp fields and in scrubby marshes. Finches, blackbirds, pipits, sparrows?

The problem isn’t new. The sexual and seasonal variation in plumage exhibited by the striking icterid we call the Bobolink had presented a puzzle since the species was first reported by European naturalists in the 16th century. Francisco Hernández, physician and naturalist to Philip II of Spain, believed that the bird he knew as *maja* had only a single plumage, “tawny yellow in color.” He noted that these birds were especially common on Cuba, where they occurred in flocks and laid waste to the rice fields; the island’s human inhabitants in turn found the birds “wholesome, delicious, and easy to prepare” for the table (Hernández 1651).

Almost a century and a half would pass before

the English artist and naturalist Mark Catesby identified the black-and-white male and the pale yellow *maja* as belonging to a single species, which he called the rice-bird. Like Hernández, Catesby (1729) knew the Bobolink both as an agricultural pest, arriving in September in “innumerable flights” to devour the young rice, and as a culinary treat, “esteemed in Carolina the greatest delicacy of all other birds.” What Catesby found most “singular and extraordinary” was this social species’ unusual behavior on migration:

In the spring, both cocks and hens make a transient visit together...and both sexes [are] plainly distinguishable.

In the southbound flight, however,

when they arrive in infinite swarms to devour the rice, they are all hens, not being accompanied with any cock.

Just to be sure, Catesby intercepted “some scores” of birds on their way to the kitchen; dissection proved that they were all females. Over at least two autumns spent in the southeastern colonies and the Caribbean, he never encountered a male, in the field or in the hand.

Traveling through many of the same areas in the 1770s, the Philadelphia naturalist William Bartram offered another explanation. Bartram’s prose is not

RICK WRIGHT
Bloomfield, New Jersey
birdaz@gmail.com

at its most crystalline in the matter, but rejecting “the common received opinion,” he appears to suggest that both sexes of the species occur in both the “black pied” and the “yellowish clay-colored” plumages, the former worn, by females and males alike, in spring and the latter in fall (Bartram 1792).

Thirty-five years later, Wilson—Bartram’s friend and disciple—would publish the truth: The black-and-white Bobolink and the streaky yellow rice-bird were a single species, and the autumn flocks comprise individuals of both sexes, the freshly molted males and females now virtually identical in plumage (Wilson 1810).

Wilson was still toiling at his loom and struggling under his peddler’s pack in Scotland when Louis-Pierre Vieillot (1748–1830), a French businessman and impassioned amateur ornithologist, ar-

rived in the U. S. (Oehser 1948). From 1793 to 1798, Vieillot spent nearly five years birding New York, New Jersey, and Pennsylvania, gathering material for what would become the four volumes of his *Natural History of the Birds of North America* (Vieillot 1807).

Only the first two of those volumes were published before Vieillot’s death in 1830. Almost two centuries later, volumes 3 and 4 have still not seen the light of day, surviving only in the author’s manuscript fair copy, now presumably held by an unknown private collector (Caldwell et al. 1989). A comparative reading, however, reveals that Vieillot, after his return to France, straightforwardly recycled much of his first two, published volumes for the contributions he made starting in 1816 to the *Nouveau dictionnaire d’histoire naturelle*. It is only reasonable to believe that he did the same with the



Mark Catesby’s Ricebird, from his *Natural History of Carolina, Florida, and the Bahamas* (1729–1732), is the species we today know as the Bobolink. Image from the Biodiversity Heritage Library (biodiversitylibrary.org), contributed by Smithsonian Libraries.

T. 24.

Horulanus Carolinensis.
The Ricebird.



material he had prepared for the second two volumes of his monograph, including his detailed account of the Bobolink.

That entry did not appear in print in the *Nouveau dictionnaire* until 1817 (Vieillot 1817), but it is clear that nearly all of the text here is based on Vieillot's own experiences and observations in North America in the 1790s, experiences that led him to a more intimate knowledge of the Bobolink than any European scientist had had before.

Over four densely printed pages, Vieillot provides a detailed life history of the Bobolink, including notes on the species' range and seasonal movements, feeding habits, nesting behavior, vocalizations, and plumages. We know that in some instances the Frenchman supplemented his *Nouveau dictionnaire* entries with passages, long or short, lifted from Wilson, but in this case, with the exception of one sentence describing the nest—apparently copied verbatim from the *American Ornithology*—and perhaps one phrase at the end of the description of the song, everything here derives from Vieillot's own experience and research in the 1790s. Most strikingly for our purposes, Vieillot writes that his predecessor Catesby was

wrong in claiming that the autumn flocks are made up of only females, as I always found individuals of both sexes then. It is true that at this season the males and females look alike... This species undergoes two molts a year, one in spring and the second in September and October... In autumn, [the males] differ so little from the females that one can hardly distinguish the sexes; I noticed only that the male's colors were more pronounced. —Vieillot 1817

Only the vagaries of early 19th-century publishing kept this description, as astute as it is complete, from appearing in print before Wilson's.

Like his younger colleague Wilson, Vieillot observed Bobolinks both in captivity and in the wild. While Wilson relied on those observations only to answer the question of the male's plumage sequences, Vieillot combined them into a striking and evocative picture of the Bobolink's behavior, including the first mention of what we now know as "migratory restlessness" in this species:

They fly all night; and when their continual calling reveals that they are migrating, one can see them in the moonlight flying high above... The word thuit, spoken in a curt and sharp tone, is their gathering call for departure and when they are disturbed... I observed that during the migration periods they sleep no more in captivity than they do in the wild, and the birds I kept in an aviary frequently gave their flocking calls in the night, especially when they were kept outdoors. —Vieillot 1817

We owe Alexander Wilson a great deal, including, perhaps, the title of Father of American Ornithology. If the history of scientific knowledge of the Bobolink is representative, though (and it is), we must also acknowl-



The adult male Bobolink in breeding plumage (left) is so different from non-breeding adults of either sex (right) that the bird was reckoned two different species by many early European naturalists. Alexander Wilson is widely credited with having figured out the Bobolink mystery, but priority for the discovery belongs to Louis-Pierre Vieillot, who convincingly demonstrated that only one species is involved. Vieillot remarkably documented Zugunruhe in the species and correctly described the nocturnal flight call; he even intuited the species' two complete molts. *Left: Routt County, Colorado; June 3, 2017. Photo by © Ted Floyd. Right: Jefferson County, Colorado; Aug. 24, 2019. Photo by © Mark Chavez.*

edge that not all of Wilson's discoveries were unique. In this case and in others, he was preempted by early America's most undervalued ornithologist, Louis-Pierre Vieillot, who has ever since played the Leibniz to Wilson's Newton and the Wallace to his Darwin.

Wilson certainly never knew that his predecessor had already solved the mystery. Indeed, Wilson may not even have known that Vieillot existed. By the time the Frenchman's Bobolink account appeared in print, the younger man had been dead four years. Now, two centuries later, we owe it to both men to look more closely at how—and by whom—the secrets of our birds were uncovered. 🌍

References

- Bartram, W. 1791. *Travels Through North and South Carolina, Georgia, East and West Florida, the Cherokee Country...* James and Johnson, Philadelphia.
- Burt, E., and W. Davis. 2013. *Alexander Wilson: The Scot Who Founded American Ornithology.* Harvard University Press, Cambridge.
- Caldwell, J. E., J. O. Callahan, J. Dillon, S. Kiffer, M.-J. Kline, and M. Malinowski. 1989. *The Library of H. Bradley Martin, session 1—auction catalogue.* Sotheby's, New York.
- Catesby, M. 1729. *The Natural History of Carolina, Florida, and the Bahama Islands*, vol. 1. Privately published, London.
- Hernández, F. 1651. *Rerum medicarum Novae Hispaniae thesaurus.* Vitalis Mascardus, Rome.
- Oehser, P. 1948. Louis Jean Pierre Vieillot, 1748–1831 [sic]. *Auk* 65: 568–576.
- Vieillot, L. 1807. *Histoire naturelle des oiseaux de l'Amérique septentrionale.* Desray, Paris.
- Wilson, A. 1810. *American Ornithology*, vol. 2. Bradford and Inskeep, Philadelphia.



The Molts and Plumages of the Bobolink

The confusion concerning the Bobolink in eastern North America is similar to what happened with Williamson's Sapsucker in the West, more or less a century later. In the sapsucker's case, a female collected in 1851 was described first, as the "Black-breasted Woodpecker" (*Picus thyroides*), by Cassin (1852), followed by a male collected in 1855 as the "Williamson's Woodpecker" (*P. williamsoni*), by Newberry (1857). It was not until 18 years later that Henshaw (1875) observed a nesting pair and cleared up the matter. Forced by the "rule" of nomenclatorial priority, the scientific species name went to the female, yet somehow the standard English name went to the male. Sheesh.

Why the confusion? The experience of early European naturalists was

PETER PYLE

San Francisco, California
ppyle@birdpop.org

to place things in boxes, based on what was known. In the case of the Williamson's Sapsucker, such a drastic difference in plumage between males and fe-

males was outside the known box: No other Holarctic woodpecker—and maybe no other woodpecker in the world—displays male and female plumages so dissimilar. Even nestlings and juveniles of Williamson's Sapsuckers show the sex-specific colors of their parents, a rare plumage pattern in birds. It would have thus taken some exceptional outside-the-box thinking to have recognized the involvement of only one species of sapsucker based simply on the first few collected specimens.

What about the Bobolink is outside the box? It's not just that males and females differ in plumage appearance. We only have to look to a familiar Icterid associate, the Red-winged Blackbird, to find equal plumage divergence between females and males. Sex-specific size differences are also found in both species, adding to the magnitude of Catesby's (1729) *lapsus*, but not explaining the species conundrum. Rather, adult Bobolinks differ from Red-winged Blackbirds, and are unique among North American passerines, in having two complete molts per year, a *complete definitive prebasic molt* on the North American summer grounds and a *complete definitive prealternate molt* on the South American winter grounds. This is part of the answer, but only part.

In thinking about the natural history of the Bobolink, it is useful to draw comparisons with, of all things, the quite unrelated **Williamson's Sapsucker** (male, left; female right). Both the sapsucker and the Bobolink were for a while considered to be *two* species. Hindsight is 20/20, but figuring out the biology of these birds (and a great many others) required early ornithologists to think outside the box. Clark County, Idaho; May 29–30, 2014. Photos by © Mia McPherson.





You're playing *Jeop-birdy*, and the answer is: "Franklin's Gull and Bobolink." Question: "What are the only two ABA Area breeders with two complete annual molts?" On a serious note, our appreciation of birds is greatly enhanced by understanding the fascinating commonalities and convergences among phylogenetically distant species. In this case, the uniquely similar molt strategies of the unrelated Franklin's Gull and Bobolink likely reflect shared ecologies; both species are long-distance migrants which experience two summers per year and which flourish in habitats with great solar exposure. *Beaverhead County, Montana; June 2011. Photo by © Mia McPherson.*

When teaching molt classes, I've been known to wake up my audience with a quiz: *What two North American species have two complete definitive molts per year?* Hint: they are not exactly related, phylogenetically. Typically nobody gets the answer, unless they are masochistically taking the course for a second time.

Answer: Bobolink and—wait for it—Franklin's Gull! The better part of the exercise is to then ask what attributes these two species share, ecologically, that result in two complete molts per year. On this point, the class does better, eventually getting to the two primary factors: trans-equatorial migration and inhabiting open environments.

But it's not the migration distance *per se*. The primary enemy of feathers is solar exposure. Resident birds are exposed to the sun for an average 12 hours per day each year, but most migrants "follow the sun," resulting in more exposure. This is especially true of those that breed and winter at high latitudes on either side of the Equator, respectively; they may experience around 15–16 hours of sun per day. The excess sun-induced wear results in the need for such migrants to replace more feathers more often. An additional trans-equatorial factor is that these migrants enjoy two summers' worth of foraging time and enhanced food resources per year, which presumably helps with the added feather production.

A primary reason for the confusion by Catesby and others is that

male Bobolinks molt out of their striking alternate plumage in summer, thereby resembling the humble but equally exquisite females and first-fall birds during autumn migration. Naturalists in the European tradition knew few if any landbirds that undergo such a complete sex-specific appearance change through molt. This plumage sequence was outside their box, and they erroneously concluded that two species were involved.

Now wait a second. Males of other North American landbirds change radically to look like females and young birds in fall. Blackpoll and Bay-breasted warblers quickly come to mind. Why didn't these species, described in 1772 and 1810, respectively, also suffer through species-level confusion? Maybe they did! The possibility of multiple early species descriptions of "confusing fall" wood-warblers is a topic for another day. Suffice it to say that drab fall warblers were not on the 18th-century radar as centrally as the Bobolink, which "laid waste to the rice fields" and was "esteemed...the greatest delicacy of all other birds." In my view, there is a second reason for the Bobolink's tangled taxonomic story: Those early European immigrants attempting to interpret bird plumages were, by necessity, more of the economist than of the naturalist persuasion.

References

- Cassin, J. S. 1852. Descriptions of birds of the genera *Laniarius*, *Dicrurus*, *Graucalus*, *Manacus*, and *Picus*, specimens of which are in the collection of the Academy of Natural Sciences of Philadelphia. *Proceedings of the Academy of Natural Sciences Philadelphia* 5: 347–349.
- Henshaw, H. W. 1875. Report upon the ornithological collections obtained from portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873, and 1874. Pp. 131–508 in G. M. Wheeler and A. A. Humphreys, eds., *Report upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian*, vol. 5., Zoology—Chapter III. Government Printing Office, Engineering Department, U. S. Army, Washington.
- Newberry, J. S. 1857. Report upon the zoology of the route. *U. S. Pacific Railroad Reports* 6 (4): 35–110. 🌐

