

## SIX YEARS WITH A BREWSTER'S WARBLER

BY T. DONALD CARTER

*Plates 4, 5, 6*

In the 'Auk,' volume 40, July, 1923, R. H. Howland and I published an account of our discovery of a male Brewster's Warbler, *Vermivora pinus*  $\times$  *chrysoptera*, mated to a female Golden-winged Warbler, *Vermivora chrysoptera*. We located his nest and brood and later captured and banded him and three of his young. At the time of the writing we supposed that our story was closed, but it proved to be the first chapter of a six-year acquaintance with this same bird. Although little of scientific interest was accomplished during this period, we both made some interesting notes of our experiences. Howland has placed his written observations in my hands and I am incorporating them along with mine.

I believe that a brief summary of the earlier article would be in order here so that we may have the full story.

The Wyanokie Plateau, in north-central Passaic County, New Jersey, is about forty miles northwest of New York City and two miles northwest of the town of Wanaque. Chiefly woodland, there are numerous clearings, swamps, and second growth, ideal country for the nesting of Blue-winged (*Vermivora pinus*) and Golden-winged Warblers, and as both of these species are common breeders here, the Brewster's and Lawrence's Warblers (*Vermivora pinus*  $\times$  *chrysoptera*) would be expected to occur.

1922

On June 4, a Brewster's Warbler was observed where a wood road entered a clearing about five hundred feet in extent. At this point a branch road turned to the west, down a grassy slope and into an open swamp through which flowed a small brook. The swamp, about four acres in extent, was surrounded by second growth and was locally known as Hook Meadows. This entire area is now submerged by the waters of the Wanaque Reservoir.

The Brewster's Warbler evidently had a nest in this immediate vicinity, for he was carrying a green caterpillar. In a short time he flew down among some blackberry bushes and almost immediately reappeared without the worm. The nest was discovered with a brooding female Golden-winged Warbler upon it. On being flushed, she revealed five nestlings about one day old.

On June 10, six days later, accompanied by Mrs. Carter and Dr. G. Clyde Fisher, we returned to the nest to find that it had been

disturbed by a mountain blacksnake, *Elaphe obsoleta*. After a search, three of the young birds were discovered, caught, and banded. Upon catching the first of these, we noted the color of the plumage, put on its right leg band number ABBA 48864 and placed it in a small folding trap as an attraction for its parents. The male Brewster's Warbler entered the trap without much hesitation and was captured. Band number 48866 was attached to the left leg of this bird. Little did we guess that we would gaze on that band with intense interest in years to come. In color this bird was like a Golden-winged Warbler except that it lacked any sign of the black throat and had the narrow black mark, similar to that of a Blue-wing's, through the eye. He had no trace of any yellow on his breast and his wing-bars were as bright a yellow as in any Golden-winged Warbler. He was photographed and then liberated. During the afternoon he entered the trap and was caught on four different occasions. At no time did the female Golden-winged Warbler enter the trap. The two remaining young birds were banded with numbers 48865 and 48867. It has been our custom to band all young birds on the right leg and all adults on the left. As we examined these three young birds we noted a marked difference in their color. Number 48864 was a bit darker and colored as follows: Head and crown uniformly olive-green; back olive-green; rump brighter olive-green with yellow; tail olive-green like the head and back, with the feathers just breaking through the sheaths; under tail-coverts yellow; throat uniformly olive-green, becoming darker on the breast; sides and flanks whitish with a tinge of yellow; belly like the sides; wings bluish-gray, with outer webs slightly margined with olive-green and with two distinct, bright yellow bars. Numbers 48865 and 48867: Upper parts, wings and tail as in number 48864; throat and breast much lighter olive-green, almost grayish; breast somewhat darker than the throat but slightly tinged with yellow; sides and flanks whitish with a tinge of yellow; belly yellow.

On June 18, Howland again visited the spot. The Brewster's Warbler was again found and was seen to feed a young one which was flying well at this time. On July 8, we made another visit and were successful in finding only one young. This bird would not give us a view adequate enough to enable us to observe its plumage in detail.

### 1923

On June 3, Howland made a short visit to our clearing but saw no sign of our bird. On the southern end of Hook Meadows he found a singing, unbanded Brewster's Warbler. This bird appeared restless and did not remain in any definite locality.

On June 10, Mrs. Carter and I proceeded to the old nesting site of number 48866 and, finding no trace of him, we spent some time in the locality where Howland had observed the other Brewster's Warbler the week before. Not finding this bird, either, we returned to a spot about two hundred yards south of our clearing and sat down to eat our lunch. While we were watching some young Worm-eating Warblers and their parents, our attention was attracted to a bird above our heads. Its colors were difficult to observe in the poor light but there was something about it that held our attention. It finally flew down into a near-by bush and we could then see that it was a Brewster's Warbler, and almost immediately we saw its leg band. It soon found a green caterpillar and was joined by a female Golden-winged Warbler which also carried food. The Brewster's Warbler, the male, flew to the nest and fed. We had no difficulty in finding this nest at the base of a small birch sapling amidst a growth of ground pine, and found that it contained six young birds. After photographing the nest and young, we waited for Howland since he was expected that afternoon. After his arrival, we banded the young, numbers 24744-49. We judged these to be about six days old. After placing two in the trap, we soon had number 48866 again in our hands. We checked his number and photographed him. Looking at our watches, we observed that it was one year ago to the hour that we had had him in our hands before. We also captured his mate but she escaped before we could band her. Her breast and sides had a yellow wash showing that she was not a pure Golden-winged Warbler.

On June 14, Howland again visited the nest but found it empty. A short distance along the trail he discovered the female and later the male, and finally five of the young. All could fly and would not allow a close approach. On June 17, the parents and one of the young were observed by us. On this same day, Howland discovered a male Blue-winged Warbler and a female Golden-winged Warbler feeding a brood of young about two days out of their nest. He managed to catch and band the four young, numbers 48900 and 17012-14. Later, we returned to the spot with the traps and the female was taken and banded number 17015. The male, although he approached the trap, would not go in. This took place about two miles north of Hook Meadows. These young appeared identical in coloration. Their description follows: Crown and back of head olive-green; sides of head more yellowish olive-green; eye ring yellow; back grayish olive-green; throat like sides of head; breast the same but grayer; belly and sides greenish yellow, yellower on the belly; wings with primaries

and secondaries grayish, their outer webs edged with olive-green; inner webs margined with white, continuing over tips; upper wing-coverts grayish, with outer webs tinged with olive-green; tips, which form widely separated wing-bars, yellowish white; rump grayish olive-green; under tail-coverts yellow.

On June 30, accompanied by Mrs. Carter and Rudyerd Boulton, I returned but could find no evidence of the Brewster's family. A number of Golden-winged Warblers were about and one fledgling in particular was of interest. The breast was yellow on the sides with a grayish white streak down the center. The back of this bird appeared to be more greenish than the olive-green of the young of the typical Golden-winged Warbler. The bird was evidently going through its post-juvenal molt and showed a distinct black patch on its throat. It was being fed by a typical Golden-winged Warbler. On July 4, Mrs. Carter and I were still unable to find any of our family although the trees seemed alive with young warblers. We figured that there were about fifteen birds in the flock. There were at least three adult male Golden-winged Warblers and one Blue-winged Warbler feeding young birds. Unfortunately, we were unable to note the color of the young fed by the latter. The young Golden-winged Warbler males now appeared similar in color to the adults.

#### 1924

On May 30, Mrs. Carter and I returned to our hunting grounds. We found a male Blue-winged Warbler which had evidently usurped the old nesting site, for he was observed chasing a Hooded Warbler (*Wilsonia mitrata*) and also other small birds. A little discouraged, we vainly searched the near-by territory.

On June 1, 7, and 8, we scoured the country but with no success as far as number 48866 was concerned. We did discover a singing Lawrence's Warbler in a cedar field about a quarter of a mile away and saw it give chase to a female Golden-winged Warbler.

On June 14, Mrs. Carter and I arrived at Wyanokie ready to spend the night. After a search along the trail, we walked into an opening about fifty feet from the path and one hundred feet from the original nest site. Here we were greeted by a scolding bird and, looking up, saw the Brewster's Warbler for the third consecutive year. After a wait of about fifteen minutes, he flew into the underbrush and we soon found the nest with six well-developed young. Again his mate was a Golden-winged Warbler. As Howland was expected at day-break next morning and as it was too dark for photography, we de

cided not to disturb the warblers at this time. The next morning, June 15, Howland arrived and we told him the good news. As it was still rather dark, we decided to pay the Lawrence's Warbler a visit and return when there was better light. A fleeting view of the Lawrence's Warbler was all we obtained that morning. Returning to the Brewster's Warbler nest, we found it empty; the young had left. After a diligent search, five of the young were captured and banded, numbers 46518-20 and 46522-23. Number 46522 was a bit brighter underneath and a bit greener above than its nest-mates. After setting the trap, we soon caught the female Golden-winged Warbler and banded her number 46521. She showed no trace of yellow on her breast as was the case with last year's mate. Later, number 48866 was caught and photographed and his number checked.

On June 18, Howland went to Wyanokie alone. He found the Brewster's Warbler and his mate near their nest site and then went over to see if he could find the Lawrence's Warbler. In this he was successful, not only in finding the male but also in finding and capturing three of the young and both parents. The female proved to be a Golden-winged Warbler. All of these were banded. The female had her lower breast and belly washed with yellow. All the young appeared to be similar in color: Crown and back of head rich olive-green; cheeks grayer olive-green; back like the crown; rump a bit yellower; tail blue-gray; until tail-coverts yellow; throat grayish olive-green; breast brighter than the throat, slightly yellowish; sides yellowish white; belly bright yellow; primaries and secondaries bluish gray, their inner webs and tips margined with whitish, outer webs margined with olive-green; upper wing-coverts bluish gray, outer webs tinged with olive-green; tips bright yellow. The Lawrence's Warbler was heard to sing, besides a typical Blue-winged Warbler song, a more prolonged song approaching that of a Golden-winged Warbler. Howland also found a pair of Blue-winged Warblers with their young near the spot where number 48866 had nested the previous year. He managed to capture two of the young, which must have left the nest two or three days before. These two were banded numbers 82415-16. Their description follows: Crown and back of head dull olive-green; cheeks brighter; back and rump the same as the crown; throat, breast and sides the same as the cheeks, very little brighter (yellowish) than the upper parts; belly yellow; under tail-coverts yellow; tail the same as the wings; upper wing-coverts dull slate, outer webs olive-green, tips pale yellowish white; primaries and secondaries dull slate, their outer webs tinged with olive-green, inner webs margined with whitish.



NEST OF BREWSTER'S AND GOLDEN-WINGED WARBLER: WITH EGGS, JUNE 14, 1925; WITH YOUNG, JUNE 21, 1925.

On June 19, we went up to the Wyanokie Plateau but accomplished nothing as far as number 48866 was concerned. On June 21, Howland, Howard Cleaves and I again went up and found the Brewster's Warbler and his mate near the site of the 1923 nest but could discover none of the young birds; and another visit on June 22 accomplished nothing.

## 1925

On May 24, Mrs. Carter and I again visited Wyanokie Plateau and arrived at the Brewster's 1922 nesting site at 11:15 A. M. A chipping sound attracted our attention and we discovered a female Hooded Warbler, which proved to be a bird I had banded in 1923. She also has had an interesting history which I published in the 'Bulletin of the Northeastern Bird-banding Association,' 4(3): 95-97, July, 1928. While watching her, our attention was attracted to a flock of small birds in a white oak tree a little farther down the path, very near the 1923 nesting site of number 48866. Almost the first bird we picked out was a Brewster's Warbler and before we focused the glasses on him we were sure that we recognized him. And then we saw his leg band. We also noted that the feathers on his crown had a roughened appearance, which was especially noticeable when he was seen in profile. He then flew across the path and joined some Redstarts, Black and White Warblers, Worm-eating Warblers, and other small birds feeding in the trees. Soon he was back over our heads, later to disappear. Before we left, he again returned to the tree. By this time it was raining, so we moved over to the cedar field where we had found the Lawrence's Warbler the previous year. We located five singing Golden-winged Warblers and, upon hearing an odd Blue-winged Warbler's song, we investigated and discovered a Blue-winged Warbler which had distinct, yellow wing-bars. Two good views of this bird showed us that it was unbanded and that the wing-bars were separated as in a Blue-winged Warbler but that they were distinctly yellow. By this time it was raining so hard that we decided to return home. On May 30, accompanied by Howland and Charles Breder, Mrs. Carter and I returned to our 'stamping grounds.' The Brewster's Warbler was located in the same tree in which we had found him on May 24. He later disappeared but was found again and was heard to sing for the first time since our introduction three years before. He sang but the first two and three notes of a Golden-winged Warbler's song, instead of the accustomed four notes. Continuing down the trail, we heard a Golden-winged Warbler's song of three and four notes. Upon investigating, we found a Golden-winged

Warbler whose breast was strongly washed with yellow. Across the brook we discovered another Golden-winged Warbler with yellow on its breast, which was banded on the right leg, one of the birds we had banded as a fledgling on a previous year. He sang the regular Golden-winged Warbler's song. There were also another Golden-winged Warbler and a Blue-winged Warbler in this locality. We now returned to the Brewster's Warbler and found him singing the chattering song that usually is heard late in the season.

On May 31, it was late before we could look for our warblers and little was accomplished. The Brewster's Warbler was not seen. On June 6, we did not arrive until 3:15 P. M., but found the Brewster's Warbler almost immediately between his 1923 nesting place and the swamp. It was very hot and few birds were singing. I saw the unbanded, yellow-breasted Golden-winged Warbler found the previous week, singing in the same tree. However, we did not see the banded one. On June 7, Howland and I were at the site by daylight. We heard number 48866 singing as we neared the spot. We then moved on to the cedar field and again found the yellow-winged Blue-winged Warbler. Returning to Hook Meadows we discovered at least four male Golden-winged Warblers, two of which had some yellow on their breasts. None was banded. The Brewster's Warbler was singing when we returned to him at about 5:00 P. M. His song consisted mostly of two syllables, *zu-e-e ze*. Once in a while he added a second *ze* on the end, making a three-syllabled song.

On June 13, Bertram Bruestle accompanied Mrs. Carter and me to visit the Brewster's Warbler. Shortly after arriving, we heard the bird singing his three-note song. We watched him for some time and concluded that he was not feeding young. After a careful search in the likely places near-by, Bruestle flushed a Golden-winged Warbler from a nest, which we found contained four eggs. This nest was about twenty-five feet from the main path and about one hundred feet south of the 1923 site. The Brewster's Warbler was not perturbed by our finding this nest, so we decided to wait until the next day to discover whether the nest might be his.

On June 14 there was rain, and it was not until 1:00 P. M. that we again visited the nest discovered the previous day. The sun came out as we approached. The female flushed as we came near, and the Brewster's Warbler immediately joined her in notes of distress. Before we were forced to leave for home on account of a heavy shower, we were all well-satisfied that the nest belonged to the Brewster's Warbler. On June 20, Mrs. Howland, Mrs. Carter, Howland and I



visited the Brewster's Warbler locality at a little after 3:00 P. M. but rain prevented our accomplishing anything. The Howlands went home, but Mrs. Carter and I camped for the night.

On June 21, Bruestle came up in the morning. The eggs of the Brewster's Warbler had hatched and the young were about three days old. I took a photograph of the young birds in the nest. A brood of Golden-winged Warblers was flying about the locality but they were too old to be caught. Another rain forced us to leave for home.

On June 24, I missed the early train and Howland was already making observations when I arrived. All was well at the Brewster's Warbler nest and I set up the umbrella blind with the hope of securing some pictures. In an hour's time I went into the blind and after a short wait, number 48866 came down and fed the young. I had a very clear view of him, being about six feet away. I also had an opportunity to examine his crown, which showed a distinct scar, with roughened feathers. He had evidently met with some accident since last year. The female was more timid but eventually came. She proved to be a very dark Golden-winged Warbler; her breast was a very dark gray, quite in contrast to the white breast of the male. Just before she fed, she gave a series of very soft *zees*, repeated about five times. In the two hours I was in the blind, the female fed only three times; the male made three trips to her one. As it had now clouded over, making photography impossible, we banded the young numbers 46532-35 and left for home.

On June 27, Mrs. Carter and I arrived late in the afternoon but saw nothing of our birds. The young birds had left the nest. Later we were joined by Bruestle and camped out for the night. The next morning, June 28, Howland joined us and we soon discovered one of the banded young. It was placed in the trap and number 48866 was soon afterward made captive. His number was checked again and he was photographed to show the scar on his head. The young bird also was photographed. The young Golden-winged Warblers, which had left the nest about two weeks before, were passing through their post-juvenal molt and many of them showed the black throat of their parents.

#### 1926

On May 30, alone, I visited Hook Meadows. It was very warm, few birds were singing, and it was not until 5:00 P. M. that I heard a note from a Blue-winged or Golden-winged Warbler. Nothing was accomplished.

On June 6, it was raining when I arrived at Hook Meadows. I

waited for about twenty minutes until the weather had cleared and then heard a bird give the three-note song which had a familiar sound, and I discovered the Brewster's Warbler in the old dead tree, near the gate, where he had spent much of his time the year before. In the afternoon, Howland joined me and he, too, saw the bird and the band. For the fifth year number 48866 had returned.

On June 13, Howland had arrived and left before Mrs. Carter and I put in our appearance. I found a note from his as follows: "Don—No nest. 48866 has been singing almost the whole length of the bog, centering at the big tree at foot of bank, occasionally ducking into the woods just north of path leading to spring. But here is news! There is another Brewster here. Have not been able to see any band, in fact feel sure there is none. The two birds have been mixed up quite a bit, 48866 frequently chasing. The new bird ranges farther north. Have seen no females. A Blue-wing, across the meadow, is of no interest. Have not looked into your Hooded but have heard song. New Brewster rather gray throat but both birds singing alike, three and four-note Golden-winged song. The new bird mostly four, 48866 mostly three. It is up to you to find out what is what around here. R. H."

The first bird I found was the new Brewster's Warbler. He soon flew south, and then a bird sang the three-note song near the spring, and I located number 48866. The scar on his head was still noticeable. I decided that I would spend my entire day trying to track down his nest. He would fly from the spring to the swamp, a distance of perhaps two hundred rods, and back again. He generally sang the Golden-winged Warbler's three-note song, but at times the four. I kept the Brewster's Warbler under observation all afternoon, and from his actions I knew that he was not caring for a family of young. There was a possibility that his mate was still sitting but, if so, she would be rather late. I saw no sign of a female Golden-winged Warbler.

On June 20, Mrs. Carter, Howland and I returned to find number 48866 acting as he had on June 13, still singing. Howland left early but we stayed on and, after another day similar to that of the week before, we came to the conclusion that the bird had no home ties. I believe that if he had tried earlier in the season his nest had been broken up.

On June 27 and July 5, we made two more visits and did not find our bird on either occasion.

1927

On May 30, Mrs. Carter, Howland and I arrived at Hook Meadows at 9:15 A. M. Much of our old territory had been cut away for the



BREWSTER'S WARBLER AT NEST, JUNE 24, 1925. (Left) FEEDING YOUNG; GOLDEN-WINGED WARBLER IN UPPER RIGHT CORNER. (Right) PAUSING AFTER FEEDING YOUNG.

coming Wanaque Reservoir. Two of the Brewster's nesting sites were gone. We were therefore doubtful as to our ever finding number 48866 again. Almost as soon as we reached the spot we heard a three-note Golden-winged Warbler's song. Following it, Mrs. Carter found the singing bird. It was a Brewster's Warbler and as it flew, I was very sure that I saw the glint of a band. A few minutes later a bird flew into view and proved to be an unbanded Brewster's Warbler. I felt sure that this was a second bird. Howland followed this male as it flew to the southern end of the swamp. A moment later I heard the three-note song in a nearby tree and with my glasses I obtained an excellent view of the band and also of the scarred crown. There was no denying it this time. Throughout the afternoon, number 48866 spent most of his time in the swamp, ranging occasionally back into the east woods.

On June 4, Howland paid a short visit in the rain and found both Brewster's Warblers in the swamp but was unable to make observations on account of the weather.

On June 5, Mrs. Carter and I were back to our old 'stamping grounds' and saw both Brewster's Warblers and an unbanded Lawrence's Warbler on the ridge not far away. Howland later was with us. He had made a visit to a spot about a mile and a half from Hook Meadows and there made the discovery of a Brewster's Warbler with a band on the right leg. This bird was undoubtedly one of the young we had banded, but whether it was descended from number 48866 we had no way of making sure. He also found a female Golden-winged Warbler on her nest with four eggs. A male Golden-winged Warbler also was there. No time was left to investigate that afternoon but we hoped that the nest would prove to belong to the Brewster's Warbler so that we could catch him and secure his number.

On June 12, I arrived with Mrs. Carter and Howland. Number 48866 and the other Brewster's Warbler were in the swamp. Number 48866 divided his time between the east woods and the meadow. On the southeast corner of the east woods, Mrs. Carter found a nest which contained two warbler eggs and one egg of a Cowbird. No bird was near. Somewhat earlier, at the edge of the woods, I had found a male Lawrence's Warbler with yellow wing-bars. This bird was later seen by Howland and had no band. I also discovered, on the hillside northeast of the swamp, a male Golden-winged Warbler with yellowish under parts. This, too, was unbanded. After removing the Cowbird's egg, we visited the place where Howland had observed the banded Brewster's Warbler. We found the nesting Golden-winged

Warbler and her mate proved to be a Golden-winged Warbler. There was no sign of the Brewster's Warbler about.

On June 13, Mrs. Carter, Howland and I returned to Hook Meadows and found an unbanded female Golden-winged Warbler on the nest that Mrs. Carter had discovered. There were now three eggs, and the female appeared to be sitting. Number 48866 was in the swamp, circling into the east woods. He seldom sang near his nest. It took considerable time for us to establish the fact that the nest belonged to him but eventually he came and fed the female while she was on the nest. This he did several times while we were watching. We all saw the band, and the scar on the head was unmistakable. He was singing as usual. The other Brewster's Warbler was now ranging on the other side of the swamp. The woods were rapidly being cut from the north and we were sure that the nest would be destroyed, so we spent the afternoon trying to find a Golden-winged Warbler's nest which contained eggs, into which we could transfer the Brewster's Warbler's eggs. All the nests we found now contained young birds.

On June 19, Mrs. Carter, Howland and I went to Hook Meadows. The woodmen had made greater progress than we had expected. All was gone. We searched for the nest but no trace of it remained. Number 48866 was in the swamp singing the three and four-note songs. He flew to the old spot, alighting in the one remaining tree near-by, and sang. It began to rain hard and we left, sick at heart.

On June 26, Howland and I visited Hook Meadows for about one hour and a half directly after dawn. No signs of number 48866 or any other hybrids. More of the woods had been cut away. On July 4, Howland paid one more visit. The woods of the locality were all down and no birds remained.

The following spring the whole region was flooded.

#### SUMMARY

In the six years that this Brewster's Warbler was under observation, his nest was discovered five times, he was captured and had his number checked four times, and eighteen of his young were banded. In each of the five years that his nest was discovered, he was found to be mated to a female Golden-winged Warbler. Two of these females were captured and examined and one was banded. A third was watched at a distance of six feet. The three had distinct characteristics. As far as we could judge, he had a different mate each year. A male Lawrence's Warbler, his Golden-winged Warbler mate, and their young were banded. Two other Lawrence's Warblers were observed as well

as four other Brewster's Warblers. A female Golden-winged Warbler mated to a male Blue-winged Warbler was banded and also her young. Numerous birds were observed, which were not pure-blooded, such as Golden-winged Warblers with distinct yellow coloring on their breasts and a Blue-winged Warbler with distinct, yellow wing-bars. Two birds that had been banded previously as young birds were noted, a Brewster's Warbler and a Golden-winged Warbler with a distinctly yellow breast. However, we were unable to prove that either of these was the young of our Brewster's Warbler.

Howland and I both owe a deep debt of gratitude to John T. Nichols for his interest and help to us while we were carrying on our observations. Consequently, I asked him if he would read over my manuscript and comment upon it and, if he thought that there was enough material contained in the article, write a short hypothesis. His conclusions follow:

"We assume that Brewster's and Lawrence's Warblers are dominant and recessive hybrids by alternative inheritance, a justifiable assumption in view of our present knowledge, though it still leaves interesting observed facts about them to be explained. A second assumption for the analyses of the above data, that Blue-winged and Golden-winged plumaged birds involved were essentially homozygous, and that the Brewster's Warbler (No. 48866) was a first generation hybrid, is no more than probable. Hence conclusions reached are variously tentative. The Golden-winged banded as a young bird, observed in 1925, might have been one of fourteen Brewster's  $\times$  Golden-winged young, or of three Lawrence's  $\times$  Golden-winged young previously banded. The Brewster's banded as a young bird, observed in 1927, might have been one of eighteen Brewster's  $\times$  Golden-winged young or of four Blue-winged  $\times$  Golden-winged young previously banded. There would seem to be about four chances to one that either of these would be of the Brewster's  $\times$  Golden-winged young, and better than two to one that both were. The frequency of Golden-wings with more or less yellow breasts and occurrence of a Blue-wing with yellow wing-bars in this area of active hybridization indicate a limited amount of blending in characters of the two which go mainly by alternative inheritance. The fact that Brewster's No. 48866 male, likely a first generation hybrid, had clear white under parts, and that the Golden-wing banded as a young bird (probably the young of the Brewster's but certainly with hybrid parentage) had yellow on the breast suggests that such blending is greater in later than in first generation hybrids, a matter of theoretical interest.

"Unfortunately, these hybrid Warblers have nondescript nestling plumages, olive-green above, more or less so on throat and breast; belly more or less yellowish; under tail-coverts yellow; wing-bars yellow or yellowish white. They do not declare themselves until the post-juvinal molt, at about which time it becomes impossible to keep track of banded young. A study of nestling plumages, however, has some interest.

"In the eighteen Brewster's  $\times$  Golden-winged young that were handled, colors of three of the first brood of three were carefully noted, and those of five of another brood less carefully compared; and no new differences were noticed in other broods. These nestlings all had yellow wing-bars. They were of two differentiable types. In the first, the throat was uniform olive-green, darker on the breast; the belly whitish with a tinge of yellow. In the second, the throat and breast were lighter olive-green; the breast had a slight tinge of yellow; belly yellow. In the 1922 brood there were one dark and two bright birds; in the 1924 brood, four dark and one bright; total, five dark and three bright. Supposing a first generation Brewster's and a homozygous Golden-winged, the young should average half Brewster's and half Golden-winged.

"A brood of three Lawrence's  $\times$  Golden-winged nestlings were alike, and in no essential respect different from the bright Brewster's  $\times$  Golden-winged nestlings.

"For data on the Golden-winged  $\times$  Golden-winged nestling plumage, we have a single collected specimen in the American Museum from this same hybridization locality. It is very like the dark Brewster's  $\times$  Golden-winged described, with back and rump somewhat grayer than the crown; under tail-coverts (some feathers may be lost) less yellow. Its wing-bars, however, are yellowish white, not yellow!

"Two young Blue-winged  $\times$  Blue-winged nestlings of the same brood were alike. They had pale yellowish white wing-bars; crown, back and rump dull olive-green; cheeks, throat, breast and sides a little brighter, more yellowish; belly yellow. Compared with Brewster's and Lawrence's nestlings as described, their upper parts were duller and more uniform. A specimen of comparable age from Yonkers, N. Y., in the American Museum, is evidently yellow—yellowish olive-green, throat paler, belly yellower, wing-bars pale yellowish white.

"Now for the description of a brood of four Blue-winged  $\times$  Golden-winged nestlings (the two forms whence the original cross). These are alike, but instead of resembling either of the Brewster's  $\times$  Golden-winged types, they had yellowish white instead of yellow wing-bars,



(Above) ADULT BREWSTER'S WARBLER WITH SCAR ON HEAD (SEE TEXT), JUNE 27, 1925. (Below) YOUNG OF BREWSTER'S & GOLDEN-WINGED WARBLER, JUNE 10, 1922.



and were also yellower on the side of the head, with a yellow eye-ring; grayer on the back and rump; throat yellowish olive-green; the belly yellower. This is a fair-blended intermediate between Golden-winged and Blue-winged nestlings.

“These Blue-winged  $\times$  Golden-winged nestlings should have been Brewster’s. But so should one of the types of Brewster’s  $\times$  Golden-winged nestlings. That their plumage differed markedly from either indicates that nestling and final plumage are not clearly linked in heredity, and suggests that with nestling plumage, blending is less in later than in first generation hybrids.

“Incidentally, we find an entry in our notes concerning a young Lawrence’s (male)  $\times$  Blue-winged (female) Warbler nestling on Long Island (Blue-winged territory), that it was olive in color, green above, yellow below, wing with two narrow, grayish white bars.

“Lawrence’s (in final plumage) is the recessive hybrid, but it should be noticed that, mated with a Golden-winged which has yellow wing-bars, it gave a nestling with yellower wing-bars than the nestling Golden-wing, mated with a Blue-wing which has grayish wing-bars, a nestling with grayer wing-bars than the nestling Blue-wing.

“The Brewster’s Warbler locality was Golden-winged territory, although a few Blue-wings nested there and there was Blue-wing territory not far distant. This is usually the case where Blue-wing  $\times$  Golden-wing crosses occur. It should be noticed that in all mixed nestlings observed, the female was a Golden-wing; the male, a Brewster’s (five times), a Blue-wing (once), a Lawrence’s (once). In the few mixed nestings that have come to our attention in true Blue-wing territory, the female has been a Blue-wing, the male usually a Lawrence’s.”

*American Museum of Natural History*  
*New York, N. Y.*

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## THE LIFE-HISTORY OF THE PRONG-BILLED BARBET

BY ALEXANDER F. SKUTCH

THE Prong-billed Barbet (*Dicrorhynchus frantzii*) is an odd, attractive, little bird belonging to a family far better represented in the tropics of the Old World than in the New. In Central America, north of Panamá, only two species of barbets are known: the brilliantly colored Salvin’s Barbet (*Eubucco bourcierii salvini*), which I have nowhere found common, and the more plainly attired Prong-bill,