

The Juvenal Plumages of the Finch Genera *Atlapetes* and *Pipilo*.—In recent years several ornithologists have been turning their attention toward a long-needed analysis of relationships among certain genera and species of New World emberizine finches. One of the characters which have been employed in some of these studies is the pattern of the juvenal plumage (cf. Storer, 1955, on *Aimophila*). In my recent revision of the races of *Atlapetes brunnei-nucha* (Parkes, 1954), in discussing the close superficial similarity in adult plumage between that species and *Pipilo ocai*, I pointed out that their respective juvenal plumages were quite different. This fact had also been mentioned by Chapman (1923: 258). Neither Chapman nor I actually described the differences between the juvenal plumages of *Atlapetes* and *Pipilo*; I propose to do so in this note. I shall also discuss the evidence afforded by the juvenal plumage in determining the species to be included in the genus *Pipilo*, and describe the hitherto unknown juvenal plumage of *Atlapetes brunnei-nucha apertus* Wetmore.

The basic difference between the juvenal plumages of *Atlapetes* and *Pipilo*, in general, lies in the fact that young *Atlapetes* have essentially the same pattern as the adult, although sometimes differing conspicuously in color, while in young *Pipilo* the adult pattern is much less evident. In some species of *Atlapetes* the underparts of the juvenal plumage are streaked, but the back is never streaked. These generalizations are true of both *Atlapetes* (*sensu stricto*) and "*Buarremon*," a genus which I merge with *Atlapetes* in accordance with current practice.

In *Pipilo* the juvenal plumage is definitely streaked both ventrally and dorsally, the streaks being least pronounced in *P. ocai*. In young birds of this genus, the anterior ventral streaking reflects the areas which will be black (or dark brown in the case of some females) in the adult; thus the throat of juvenal *ocai* is buffy yellow (with a few blackish-tipped feathers), contrasting with heavy streaks in the area of the adult's black pectoral band. In the *erythrophthalmus* group, the streaking is continuous from the base of the bill to the pectoral region or beyond, *except* for a median zone of varying width in the throat, corresponding to an area in which the feather-bases are frequently white in adult *erythrophthalmus* (and the entire feathers white in *ocai* × *erythrophthalmus* hybrids). Interestingly enough, the *least* streaking on the throat in this species is exhibited by the juvenal plumage of *P. e. erythrophthalmus* and its close relatives, which are geographically most distant from the white-throated *P. ocai*.

In a recent paper, Sibley (1955) has expressed his belief that the Green-tailed Towhee ("*Chlorura*" *chlorura*) should be assigned to the genus *Pipilo* of the Red-eyed Towhees, while following Davis (1951: 100-102) in casting doubt on the correctness of placing the three species of "Brown Towhees" in this genus. Although comparisons of juvenal plumages were mentioned by neither Davis nor Sibley, this criterion gives added weight to their arguments. The juvenal plumage of *chlorurus* conforms precisely to the *Pipilo* pattern: uniformly streaked above, with no indication of the contrast in color between back and crown of the adult; unstreaked on the throat (which is white in the adult); streaked on the remainder of the underparts, with the markings heaviest across the chest, where the adult has a gray band with a poorly-defined posterior edge. The juvenal plumages of *fuscus* and *aberti*, on the other hand, are quite unlike *Pipilo*. There is no sign of dorsal streaking, and the ventral streaking is rather faint or even virtually absent. In some of the subspecies of *fuscus* (i.e., *senicula*) the throat of the adult is quite heavily streaked, that of the juvenile almost immaculate. The only character in which the juvenal plumage of *fuscus* conforms to the *Pipilo* pattern is exhibited by those subspecies

of *fuscus* in which the adult has a reddish crown contrasting strongly with the dorsum; this contrast is scarcely if at all visible in the young bird (juveniles of *mesoleucus* and *albigula* examined).

The little-known "*Pipilo*" *albicollis* (= *rutilus auctorum*; see Stresemann, 1954: 91) is a particularly interesting species. Davis (1951: 81), after examining a larger series which included the ten I have before me, considered individual variation in color to be "minor." After allowing for the effects of wear, I would judge the individual variation in ventral coloration to be quite marked. This is manifested particularly in the extent of the orange-buff band on the throat and of the spotting or mottling of the breast. The posterior border of the throat-patch, described by Davis as "a narrow, unbroken dark line," is, in some specimens, not only broken but virtually obsolete. I am not as impressed as was Davis by the "remarkable" similarity in coloration of *albicollis* and *fuscus*. In fact, upon first examining *albicollis* I was immediately reminded of *Melozone kieneri* (excluding, for this discussion, the well-differentiated *M. k. biarcuatum*); further comparison strengthens this impression. Many specimens of *albicollis* show a tendency of the blackish markings of the breast to coalesce in a position corresponding to the black spot of *kieneri*. Except for the head markings, the general coloration of the two species is decidedly similar (dorsum, wings, tail, sides, flanks, crissum). The basic color of the underparts of *albicollis* is white, like *kieneri* and unlike *fuscus*. The orange-buff throat of *albicollis*, although paler, is similar in color to the top and sides of the head of *kieneri*. Particularly striking is the similarity between *albicollis* and *kieneri* in the color and pattern of the under wing-coverts, axillars and alulae. The bend of the wing is conspicuously white in both species, the lesser under wing-coverts blackish with white tips, the median under wing-coverts pale rufous, and the axillars pure white externally, shading to gray medially. In fresh plumage the outer edge of the largest alula feather is sharply white in both *albicollis* and *kieneri*.

Although the adults of *Melozone kieneri* lack the white-tipped median wing-coverts of *albicollis*, juveniles have a buffy suggestion of such markings. This phenomenon, however, is quite common in young birds and is probably of no particular significance in this case.

Only one juvenile specimen of "*Pipilo*" *albicollis* (Moore Collection 32696) has been available to me for examination; it is possibly the only such museum specimen in existence. This bird, when compared with series of juvenal *Melozone kieneri*, "*Pipilo*" *aberti*, and various races of "*Pipilo*" *fuscus*, shows a decided resemblance to the *Melozone*. As previously mentioned, juveniles of *fuscus* and *aberti* completely lack any dorsal streaking or spotting. In juvenal *Melozone kieneri* the crown feathers have black central streaks which expand at the tip. On the dorsum, the central streaks are faint or absent, but the black tips are emphasized, giving the back a barred rather than streaked appearance. The single juvenal *albicollis* shows no streaks on the crown, but a faint barring is visible on the dorsum.

Comparison of the underparts of the juvenal *albicollis* specimen with *Melozone kieneri* of approximately equivalent age shows an even more striking similarity. Unlike *fuscus*, the ventral streaking of which is fine, even, and often faint, juveniles of both *kieneri* and *albicollis* are heavily and unevenly spotted below, except on the throat, which is chiefly white as in adult plumage. The markings on the young *albicollis* are heaviest in the pectoral area corresponding to the black spot of *kieneri*.

It would thus appear that "*Pipilo*" *albicollis*, judging from skins, may be as closely related to *Melozone kieneri* as to "*Pipilo*" *fuscus*, in some respects seeming

to link the two. I do not wish to propose any realignment of genera at this time, since evidence of other kinds should be assembled before such a step is taken. I believe, however, that the plumage characters described above, especially those of juveniles, are highly significant.

To return to *Pipilo* proper, Dr. Sibley has pointed out to me in correspondence that the pattern of the post-juvinal molt in *P. erythrophthalmus* is such that all the feathers of the "pectoral band" area are replaced before any new feathers appear on the throat, thus giving the young molting *erythrophthalmus* an appearance somewhat reminiscent of *ocai*. Dr. Sibley believes that this is an indication that the throat and the pectoral band area are under separate genetic control, so that color changes might evolve independently in the two areas, with selection leading to the white throat of *ocai* as opposed to the black (at least black-appearing) throat of *erythrophthalmus*. This molt pattern, by the way, is a further indication that the resemblance between adults of *Pipilo ocai* and *Atlapetes brunnei-nucha* is convergent rather than a matter of close relationship. In the post-juvinal molt of the latter species, new feathers appear scattered indiscriminately in the white throat and black pectoral band areas.

If we are to accept the evidence assembled by Sibley, Davis, and myself that *Pipilo* should include the Green-tailed Towhee but not the "Brown Towhees," it would appear that the pattern of post-juvinal molt to which Dr. Sibley calls our attention is *not* a character of *Pipilo* as a genus. Specimens of *fuscus* and *aberti* which I have examined show a post-juvinal molt pattern similar to that of *erythrophthalmus*, in that a complete band of new feathers appears in the pectoral area before feather replacement starts in the throat. In *chlorurus*, however, a portion of the heavily-streaked pectoral area is the *last* of the underparts to acquire new feathers.

This study was initially prompted by the attempt to clarify the relationship (or rather, lack of close relationship) between *Pipilo ocai* and *Atlapetes brunnei-nucha*, so a more detailed contrasting of the juvenal plumages of these two may be in order. Conforming to the condition typical of their respective genera, juvenal *ocai* shows little or none of the difference in ground color between crown and back exhibited by the adult, while *brunnei-nucha* has the color contrast definitely foreshadowed, though much less pronounced than in the adult. In juvenal *ocai* an apparent color difference between back and crown is caused by a difference in streaking, not in basic ground color. The streaks are more definite on the crown, while on the back the central streak tends to be poorly defined, but expanded into a rather well-marked black tip.

Typical adult *ocai* apparently lack light tips to the greater and median wing-coverts; these are present in adults of the western and Mexican races of *erythrophthalmus* and in the juvenal plumage of *ocai*. They are completely absent in the genus *Atlapetes*.

There is a tendency for the lower mandible of young *Pipilo* to be light-colored, though not the rather bright yellowish often attained by juveniles of *Atlapetes*. The significance of this point in indicating relationship of the two genera is doubtful, however, as this phenomenon occurs in a number of passerines.

At the time I wrote my revision of *Atlapetes brunnei-nucha*, the juvenal plumage of none of the three subspecies which lack the black pectoral band (*inornatus*, *allinornatus*, and *apertus*) had been described. Carnegie Museum has subsequently obtained a series of five adult and three juvenal specimens of *A. b. apertus*, collected by Ernest P. Edwards and Richard E. Tashian at Coyamé, Veracruz, México.

Although the black pectoral band characteristic of adults of the other six subspecies of *brunnei-nucha* is, indeed, absent, its location is marked in *apertus* by dark gray feathers which are white at the tips. Wear or disarrangement of the feathers of this area results in a vaguely banded appearance in the pectoral region.

It will be recalled that, in the juvenal plumage of the banded races of *Atlapetes brunnei-nucha*, the breast and abdomen are heavily streaked with dull olive on a white or dull yellow background. It should be pointed out that Chapman (1923: 248) erred in describing the throat of juvenile *brunnei-nucha* as darker than the remaining underparts; the exact converse tends to be true. There is quite a bit of variation in saturation in juveniles of this species, so that some (lighter) individuals appear more distinctly streaked than others. In juveniles of the banded races, the pectoral band is represented by a poorly-defined unstreaked zone of dull olive between the throat and the streaked portion of the underparts. It is thus interesting to note that the juvenal plumage of *apertus* exhibits exactly the same unstreaked band in the same location; in fact, our juvenile specimens of *apertus* are virtually indistinguishable in color from a juvenile of *A. b. alleni* from Honduras (the only banded race which, like *apertus*, lacks yellow lines at the border of the crown). I would take this as evidence in favor of the banded pattern being the ancestral condition rather than the derived condition as has been suggested by Dr. Wetmore (see Parkes, 1954: 130).

I am indebted to Herbert Friedmann, Robert T. Moore, Charles O'Brien, Robert T. Orr, Frank A. Pitelka, Charles G. Sibley, and Robert W. Storer for lending me pertinent specimens from the collections under their care. Dr. Sibley and Dr. John Davis also provided valuable advice and suggestions.

LITERATURE CITED

- CHAPMAN, F. M. 1923. Mutation among birds in the genus *Buarremon*. Bull. Am. Mus. Nat. Hist., **48**: 243-278.
- DAVIS, J. 1951. Distribution and variation of the Brown Towhees. Univ. Calif. Publ. Zool., **52**: 1-120.
- PARKES, K. C. 1954. A revision of the neotropical finch *Atlapetes brunnei-nucha*. Condor, **56**: 129-138.
- SIBLEY, C. G. 1955. The generic allocation of the Green-tailed Towhee. Auk, **72**: 420-423.
- STORER, R. W. 1955. A preliminary survey of the sparrows of the genus *Aimophila*. Condor, **57**: 193-201.
- STRESEMANN, E. 1954. Ferdinand Deppe's travels in Mexico, 1824-1829. Condor, **56**: 86-92.
- KENNETH C. PARKES, Carnegie Museum, Pittsburgh 13, Pennsylvania.

Transplantation of a Shrike Pair.—On April 21, 1956, a pair of Migrant Shrikes (*Lanius ludovicianus*), one of which was carrying nesting material, was trapped and banded in Section 26, T22N, R7E, Wisconsin. They were released 10 miles away in Section 8, T20N, R8E. Their nest was found in Section 17 in the latter township, 9/10 of a mile from the release point and 10¾ miles from the original point of capture. It contained 4 eggs on May 13, 6 eggs on May 25, and 5 young on June 8, at which time both adults were retrapped and their band numbers verified.—FRANCES HAMERSTROM, Wisconsin Conservation Department, Plainfield, Wisconsin.