SECOND-YEAR PLUMAGE OF THE GOSHAWK

BY RICHARD M. BOND AND ROBERT M. STABLER

Plates 11, 12

THERE are in the recent literature a number of rather contradictory statements about the first adult plumage of the American Goshawk, *Accipiter atricapillus atricapillus.* Swarth (1926: 104) states: "One specimen . . . (No. 44729), a male in adult plumage, almost fully acquired . . . is of interest in view of the argument advanced by Taverner . . . that the goshawk molts from the streaked juvenal plumage into a coarsely barred stage . . . and later into the more finely barred plumage that is considered to be typical of the subspecies *atricapillus.*

". . . This bird is pale colored and finely barred. . . . Some of the breast feathers have rather broad mesial streaks but it is otherwise just like other specimens of *atricapillus* at hand. . . .

"The specimen just described (as well as another similar bird collected by Brooks) shows that differences of coarse or fine markings cannot be explained as different stages reached by the same individual."

Brooks (1927: 113), in commenting on the foregoing, says: "I entirely agree with Taverner that the heavily barred and striated adult plumage of the Goshawks is only one of age and is acquired the second year, the markings getting finer and more uniform with each successive year. This heavily marked stage may not be universal . . . but that it does exist in a large proportion of cases is evident to anyone who has examined many Goshawks. . . . I have not seen the specimen [discussed by Swarth] . . . but the other 'similar bird collected by Brooks' distinctly supports Taverner's theory, as does another light-colored adult taken at Atlin which Swarth has forgotten."

It would be interesting to know what evidence Major Brooks has found to indicate that the markings become "finer and more uniform with each successive year" after the third year. Taverner (1940: 157), in his most recent comment on the subject, writes: "Further investigation indicates that this fineness of pattern is an age, not a racial character. In a series of 53 adult specimens taken across the continent, a number are changing from striped juvenal to gray adult plumage . . . In every such transitional plumage, . . . the . . . new gray pattern is of the coarsely vermiculated type and no finely vermiculated specimen that the writer has seen shows any trace of striped juvenal feathers."

According to our evidence, Bent (1937: 130) seems to come closest to the facts when he says: "The second-year plumage is much like that of the adult, but the crown is streaked with white and the breast is heavily marked with broad shaft streaks and transverse bars or spots of brownish black."

We have some additional data to offer on the subject. First, one of us (Stabler) has kept a female Goshawk, taken as a nestling, in captivity for four years, and photographs of the bird in its first and third adult plumages are presented. This Goshawk came from a nest in the Pocono Mountains in northern Pennsylvania. It hatched about June 1, 1936. Plate 11, fig. 1a, is a photograph taken in the fall of 1937; fig. 1b shows the same bird in the spring of 1940, just before it had lost its third adult plumage. In the first photograph, several unmolted, dark juvenile upper wing-coverts can be seen, and the presence of these seems a much better criterion of the first adult plumage than the juvenile breast-feathers apparently used by Taverner, since the molt of the under parts is often complete as in this case. The pattern and color of the belly, flanks and thighs were identical both years, but the breast the first year had wider shaft streaks and wider cross-bars. Both these wider markings, however, were conspicuously more dilute and browner than they were the following year. This bears out Bent's statement quoted above. The white streaking of the crown was not observed to be noticeably different, however.

We feel that the evidence presented by this bird outweighs a very large number of museum skins, which can be observed at only one stage in their plumage. However, we have examined the skins in the Museum of Vertebrate Zoölogy, Berkeley, California. There are twenty-six Goshawk skins in this collection, either adult or molting into the adult plumage, and of these, six represent the first post-juvenal plumage, as shown by the presence of juvenile coverts. There is marked variation in pattern, both in this group and among the old adults. Some of these are shown in Pls. 11, 12, figs. 2, 3. Of the entire twenty-six, the *lightest* bird below was an old adult, no. 27136 ♂, Mendocino County, California, November 22, 1916; the next lightest was no. 52031 ♂, Roseau County, Minnesota, a *first-year adult,* without unduly wide shaft streaks or bars on the breast. The *darkest* bird below was no. 62354 ♀, Yuba County, California, November 9, 1932, an *old adult.* It was difficult to pick out the next-darkest specimen from among four skins from California, of which only two were first-year adults.

The lightest bird in the series (no. 27136 ♂) is also that with the finest vermiculations, but the bird with the widest and most regular

cross-bars is far from the darkest. This bird, an *old adult,* no. 52032 ♀, Roseau County, Minnesota, October 20, 1937, is nearly equalled in this respect by another bird, no. 70385 ♀ (not shown here), an old adult from Cumberland County, Pennsylvania, November 30, 1935. These two birds most closely resemble specimens of *A. gentilis gentilis* from Finland (no. 72438 ♀) and the pattern on belly and thighs (though the cross-bars are narrower, less regular, and darker) approaches that of the European birds reasonably closely. The breast pattern, however, is very different, as is shown in Plate 11, fig. 2 and Plate 12, fig. 4.

Taverner (1940: 158, 159) mentions a female from the Mackenzie delta, which ". . . is very coarsely marked below, with vermiculations broadened almost to regular bars that approach those of the European *A. gentilis.* The shaft streaking is very heavy and general appearance is typical of the dark Queen Charlotte and Vancouver island phase." We have not seen specimens from the British Columbia islands.

CONCLUSIONS

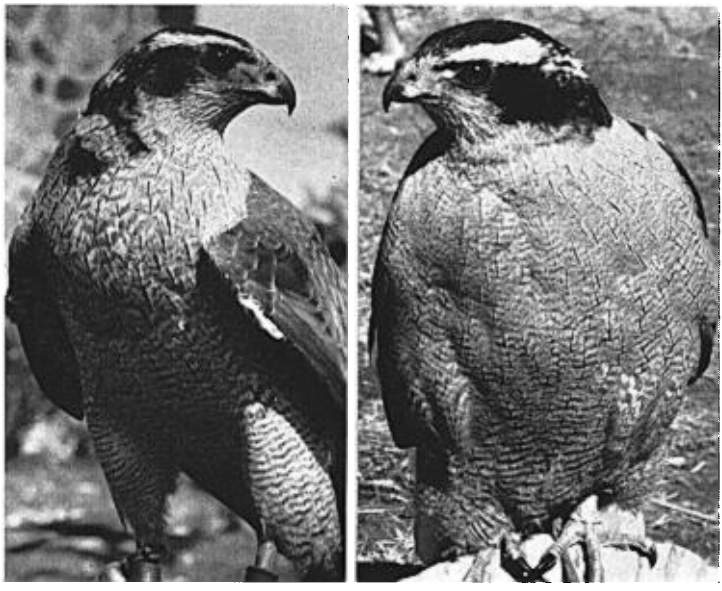
On the basis of the material available to us, we conclude:

1. There is some tendency for first-year adult American Goshawks to have wider, browner cross-bars and heavier shaft streaks on the *breast*-feathers than in subsequent plumages; we have seen no evidence that the pattern of the rest of the under parts varies appreciably with age.

2. The general tone of the under parts (whether light or dark) does not depend directly on the width or regularity (approach to *A. gentilis*) of the individual bars.

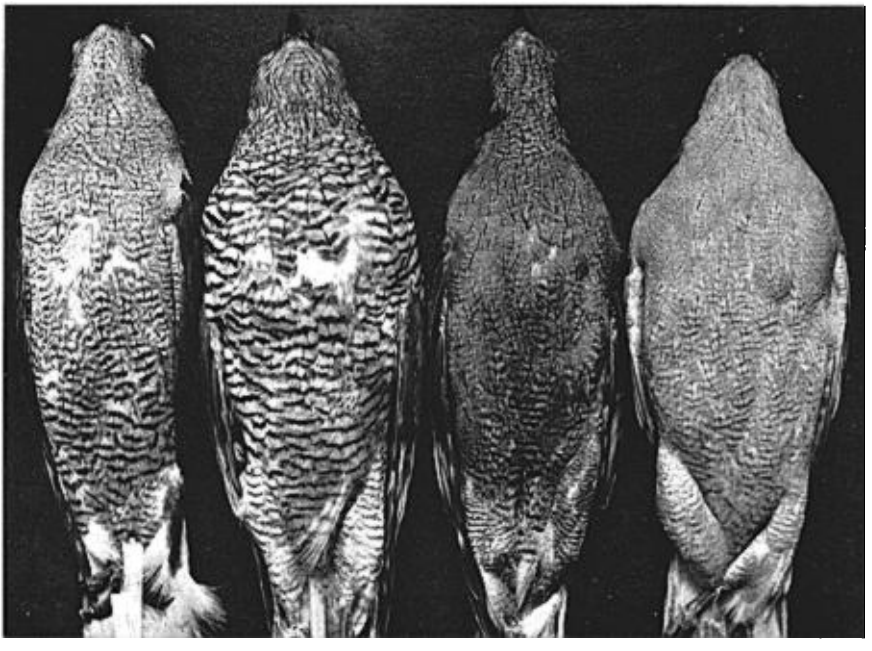
3. Individual variation in adults of the American Goshawk is much greater than age variation, and probably greater than racial variation, as defined either by Ridgway (1874) or Taverner (1940). This means that allocation of individual specimens on other than geographical grounds is of doubtful validity.

We are in entire agreement with Peters (1931: 205) in synonymizing *Astur* with *Accipiter;* and with Taverner (1940), Friedmann (MS.) and others, in synonymizing the race *striatulus* with *atricapillus.* We have not seen among about 100 specimens of Old World Goshawks and a slightly larger number of American Goshawks a single specimen from either group that could be mistaken as to its continental origin, and hence are not ready to agree with Peters (*loc. cit.*) as to the proper name for the American species, which we conclude should be *Accipiter atricapillus* (Wilson).



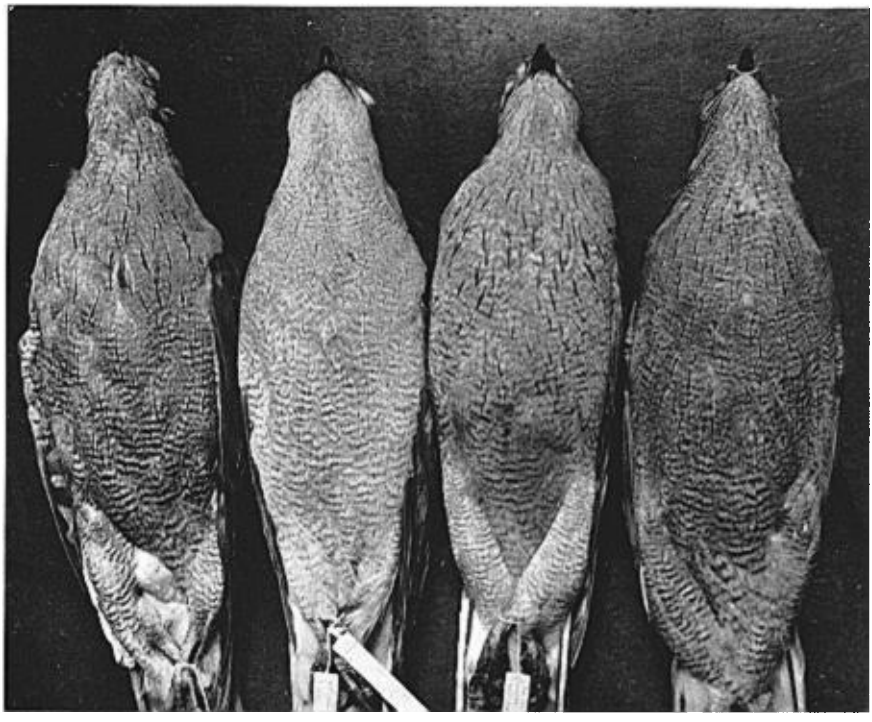
a. b.

FIG. 1. FIRST AND THIRD ADULT PLUMAGES OF GOSHAWK



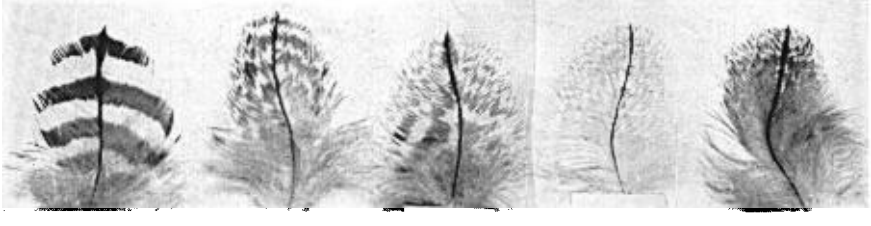
52032 ♀ 72438 ♀ 62354 ♀ 27136 ♂

FIG. 2. VARIATION IN GOSHAWKS OF OLD AND NEW WORLDS



17306 ♂ 52031 ♂ 41729 ♂ 72540 ♀

FIG. 3



72438 ♀ 52032 ♀ 44729 ♂ 27136 ♂ 62354 ♀

FIG. 4

VARIATION IN GOSHAWK PLUMAGE

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EXPLANATION OF PLATES

PLATE 11

Fig. 1.—Goshawk from the Pocono Mountains, Pennsylvania. *a,* first adult plumage; *b,* third adult plumage.

Fig. 2.—Goshawk skins in the Museum of Vertebrate Zoölogy. Left to right: American Goshawk most like European species; European Goshawk from Sibbo, Skyttaskas, Finland; the darkest American Goshawk in the collection; the lightest American Goshawk in the collection.

PLATE 12

Fig. 3.—Left to right: "average" first-year adult; the lightest first-year adult; Swarth's first-year adult from Atlin, British Columbia; "average" old adult (Yuba County, California) with much heavier shaft streaks than those of lightest first-year adult.

Fig. 4.—Feathers from right side of breast (upper part of sternal tract), left to right: European Goshawk; American Goshawk most like European form; Swarth's first-year adult from Atlin; lightest old adult; darkest old adult.

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