Brown Creeper (*Certhia*), Yellow-billed Cuckoo (*Coccyzus*), Kingbird (*Tyrannus*) and Red-breasted Nuthatch (*Sitta*). Some of the smaller sparrows (*Pooecetes, Spizella*), warblers (*Dendroica*) and vireos (*Vireo*) had outer coverts that approached astonishingly close to type-1 size, though probably still in the type-2 category.

In species whose outer primaries were abortive, as in some tinamous (Tinamidae), woodpeckers (Picidae), kinglets (Sylviidae), and thrushes (Turdidae), the outermost primary-coverts were not evident and the coverts of the second outer primaries showed some of the modifications usually expressed by the outermost feather.

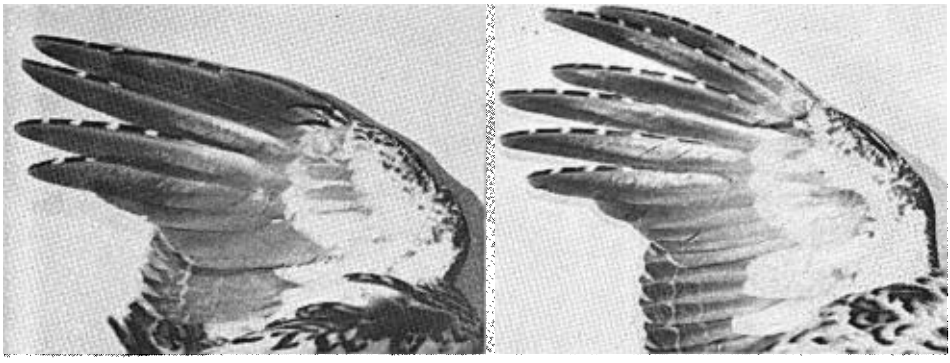
From these data, it was concluded that (1) although some evidence exists indicating that reduction in size or stiffening of the outermost covert is correlated with rapid wing motion in flight, at the present time it is not sufficient to permit a statement of general application; (2) most birds have type-2 outer coverts; (3) large birds of sedentary, sluggish or soaring habits and with slow wing motions characteristically possess large, full-sized type-4 outer coverts; and (4) variation in the size of the outermost covert may be of taxonomic significance.

The author is indebted to Doctors Alexander Wetmore and Herbert Friedmann of the United States National Museum and to Dr. John W. Aldrich of the United States Fish and Wildlife Service for making available the collections under their care.—George A. Petrides, *National Park Service, Washington, D. C.*

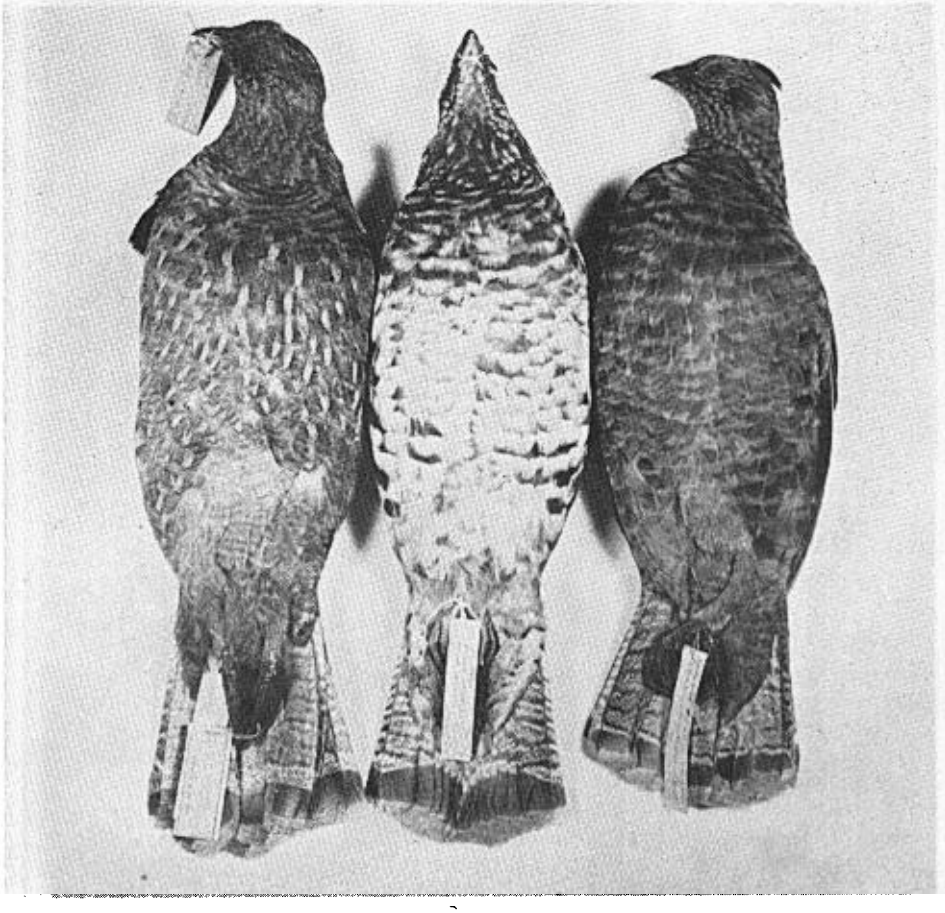
Outer primaries as age determiners in gallinaceous birds (Plate 7, upper figure).—Bent ('Life Histories of North American Gallinaceous Birds,' U. S. Nat. Mus., Bull. 146: 108, 125, 152, etc., 1932) points out that juvenile grouse do not shed the outer two pairs of primaries during the postjuvenal molt. Since these juvenal feathers are narrower and more pointed than those of the adult, it is possible to use this criterion in determining the age of grouse taken during the fall and winter months. Wight (Field and Laboratory Technic in Wildlife Management, Univ. of Mich. Press: 50, 1939), on the other hand, states that it is the adult bird which retains the outer primaries through the postnuptial molt rather than the juvenile.

Upon checking this character in Sharp-tailed, Ruffed, Franklin's and Richardson's Grouse in Montana against the presence or absence of the bursa of Fabricius, the writers find that Wight is in error while Bent is correct in stating that it is the juvenile birds which retain the outer primaries. Moreover, we have found that these grouse when taken in the latter part of September are completing the molt of the remiges. The accompanying figures illustrating the wings of adult and juvenile Sharp-tailed Grouse (*Pedioecetes phasianellus campestris*) taken on September 22, 1942, indicate that in the adult bird (Plate 7, upper left figure) the two outer primaries were growing in. The sheaths surrounding the bases of the growing feathers are clearly seen in the photograph. The juvenile bird (Plate 7, upper right figure), on the other hand, has the outer two remiges complete. The third primary from the outside was growing in, the sheath surrounding the base indicative. If the outer two primaries were to undergo a molt, they would have been shed earlier if the usual sequence of shedding of primaries was followed. Our experience with the above-mentioned species has indicated that when taken late in September, their age may usually be determined without difficulty by merely observing the state of growth of the outer primaries.

Wight states further that this character holds for all gallinaceous birds, and Bent (tom. cit.: 316) states that juvenile pheasants retain the outer primaries during the postjuvenal molt similar to grouse. That juvenile pheasants as well as adults



WRIGHT AND HIATT: OUTER PRIMARIES IN GALLINACEOUS BIRDS.
Sharp-tailed Grouse: (left) adult; (right) juvenile.



UTTALL: TWO ODDLY PLUMAGED RUFFED GROUSE. (Left, A. M. N. H., No. 45,176; (center) normal female; (right) A. M. N. H., No. 36,667.

commonly molt the outer primaries during the postjuvenal and postnuptial molts, respectively, was recently observed by the writers. While employed by the Montana Fish and Game Department on Federal Aid Project 1-R, we had an opportunity to examine 1526 Ring-necked Pheasants (*Phasianus colchicus torquatus*) killed on September 26, 1942, near Billings, Montana, during a special season in which birds of both sexes were bagged. In the great majority of the birds, adults and juvenile cocks and hens, the outer remiges were undergoing a molt. Only a small minority of the juvenile birds had retained the outer one or two pairs of primaries. Most of the juvenile birds were readily distinguished from the adults by a weight difference or by traces of unmolted juvenal plumage. Because of the large number of birds to be examined in a brief period of time it was not possible to search each for the duct of the bursa of Fabricius.

We are anxious to record our findings in order that other investigators may not be misled by the statements of Wight and Bent that pheasants retain the outer primaries during the postjuvenal molt.—PHILIP L. WRIGHT, *Montana State University, Missoula,* and ROBERT W. HIATT, *Montana State College, Bozeman, Montana.*

Two oddly-plumaged Ruffed Grouse (Plate 7, lower figure).—While examining Ruffed Grouse (*Bonasa umbellus*) skins at the American Museum of Natural History, the writer encountered two extremely atypical specimens. Because these mutations are apparently undescribed and are so far outside the usual limits of variation in this extremely variable species, an account of them seems to be in order.

One of the birds, a male, (A. M. N. H. no. 45,176) was taken on Long Island, New York, in November, 1862, and originally belonged to George N. Lawrence. The other (A. M. N. H. no. 36,667) is from the collection of J. G. Bell, and bears no date, locality, nor sex. Its plumage is apparently that of a female. The diversity of this bird is recognized on its label by the word "variety"; that of no. 45,176, by the phrase "melanistic variety." Both birds have a distinctly abnormal brown cast. Most of this is probably basic, though some is perhaps due to the age of the specimens.

Dorsally, both birds are fairly normally patterned except for a reduction of whitish or ochraceous-buff (*B. u. umbellus* in mind). The ruff and subterminal tail-band of no. 45,176 are of a coppery-fuscous shade. The tail-band of no. 36,667 is more of a sepia color, while its ruff (only the right ruff is present), rather poorly developed, is made up of chocolate-brown feathers distally blotched with fuscous, with a subterminal, dark tan bar and a terminal, dark brown bar. Comparable areas in normal birds are usually of a gun-metal shade, though they will occasionally be brown. Such patterning in the ruff of the Ruffed Grouse is distinctly abnormal.

Ventrally, both birds present a decidedly atypical aspect, as is evident on the accompanying Plate 7, lower figure. The general color of the under parts is clay-brown. The pattern of the contour feathers is very different from the normal one, especially in no. 45,176 (Plate 7, lower left). Instead of the feathers being more or less basically whitish with brown-fuscous and buffy bars, as in the normal coloration, each feather of no. 45,176 has a subterminal, inwardly-pointing wedge of pale gray-buff. The rest of the feather is gray-brown in shade, and is crossed from its lateral edges to the gray-buff wedge with fuscous vermiculations. The total effect of these feathers gives the bird a streaked appearance ventrally, as is quite evident on the plate. Indeed, the belly of this bird superficially resembles the rump of a normal grouse. White is everywhere almost totally reduced, especially