NOTES ON THE POST-JUVENILE MOULT
AND FIRST-WINTER PLUMAGE IN
THE PHEASANT

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This note has been prompted by a few inaccuracies which have persisted in The Handbook of British Birds on the post-juvenile moult and first-winter plumage of the Pheasant (Phasianus colchicus).

Since its first edition in 1941, another six impressions of The Handbook have appeared, the last one in 1952. In vol. V (p. 238) it is said about the young Pheasant that: (1) the winter plumage is like the adult's; (2) the juvenile plumage is completely moulted, commencing when the bird is about half-grown; (3) the two outer primaries are not full-grown when the inner primaries and body commence to moult; (4) the two distal primaries are like adult primaries except for more pointed tips; (5) they are not shed during the post-juvenile moult; (6) and the moult is often not quite complete in November and even December (British Isles). Several of these statements are not correct.

The information below is not all new, but as the last edition of The Handbook has not incorporated findings dating back to 1942 (Petrides) on the complete moult of the primaries in Pheasants, it was felt that the errors should be corrected.

During a study of the ecology and other aspects of the Pheasant in New Zealand, a detailed investigation was made of the growth, mouls and development of juveniles. The results of this work will be published elsewhere; it will suffice to consider here the questions raised by the above statements in The Handbook. A total of 505 juvenile Pheasants were examined in detail; all birds were wing-tagged, and, when seven weeks of age, were liberated on an island (Mokoia Island, in Lake Rotorua, North Island) where they were later trapped for examination purposes. The total number of birds from which the studied specimens were selected was about 2,500. The work was carried out during the 1953/54 breeding season. The birds examined were pure-bred (or near pure-bred) Phasianus colchicus colchicus, P. c. torquatus, and P. c. mongolicus. The 505 birds examined were divided evenly in weekly groups over the period from hatching till 24 weeks of age when the young Pheasant is fully developed.

WINTER PLUMAGE

The statement that the first-winter plumage in the Pheasant is like the one in adults is correct. As far as it was possible to ascertain during handling and examination of several thousand
Pheasants, there are no plumage differences between immatures (birds-of-the-year) and adults (one year old or older).

These differences are present: the adult cocks have a longer spur than immature birds, as shown in detail by Linduska (1943); immature birds of both sexes retain the bursa of Fabricius till the end of December and frequently into January-February (northern hemisphere) whereas adult birds have no bursa (Kirkpatrick, 1944); a grey sheath around the base of the central tail-feathers is present in most immature birds during their first autumn, but only in few adult cocks; the oviduct in adult hens is convoluted.

**TIME FOR MOULT OF JUVENILE PLUMAGE**

The juvenile plumage is completely moulted, but it is not correct that the moult commences when the bird is about half-grown. A growth curve based on weights of 505 young cock Pheasants of known age showed that they reach their maximum—1400 grams—in 24 weeks. They are half-grown—weighing approximately 700 grams—when about 11 weeks old. The first (innermost primaries) were moulted by the 4-5 weeks old birds, and the five weeks old Pheasant must be considered the typical juvenile having attained its drab grey juvenile plumage.

At this stage the young Pheasant still has natal down left on crown and nape while on the other hand the two innermost primaries in each wing have been moulted and replaced by growing primaries of the first-winter plumage; the first few red breast-feathers of the first-winter plumage appear in the seven-weeks-old cock birds.

The post-juvenile moult in Pheasants therefore begins at 4-5 weeks of age, when the cocks average 150 grams, or about one-ninth of their ultimate size.

In silhouette the bird at this age is only one-quarter of the adult bird. In height, standing, it measures unmistakably less than half the fully developed immature bird.

**MOULT OF PRIMARIES**

At the time when the first edition of *The Handbook* was issued in 1941 it was the general contention that the two distal primaries (nos. 9 and 10) of the juvenile plumage were retained in all Galliformes. This belief dates back at least as far as 1788 when a French author, Magne de Marolles, in his book *La Chasse au Fusil* stated that the two distal primaries in the wing of the Partridge (*Perdix perdix*) were retained during the post-juvenile moult (Bureau, 1911, p. 3).

This moult pattern was found in many of the Galliformes studied and it was thus generalized that all of the gallinaceous birds moulted their primaries in this way.

Heinroth, who studied the growth, mouls and development of birds as much as any contemporaries called the moult of the primaries in the Galli "eine heikle Sache" (1931, p. 182) and further
stated that in all the *Galliformes* the moult pattern is basically the same.

All textbooks and papers followed this concept until Petrides (1942, p. 323) first showed that the juvenile Pheasant—contrary to general belief and to the other gallinaceous birds studied by him—moulted and replaced all ten primaries during the post-juvenile moult. Independently of Petrides, Salomonsen (1946) arrived at the same result. Recently several studies have been carried out to obtain details about this moult for the development of accurate ageing techniques.

My own studies corroborate the findings of these other workers, including the two just mentioned, Buss (1946), and Trautman and Woehler (internal cyclostyled reports).

The two distal juvenile primaries—so much discussed—are shed in the Pheasant when the bird is 13-15 weeks old, and the outermost one of the first-winter plumage is fully developed when the bird is 23-24 weeks old.

It is therefore not correct that the two distal primaries in immature Pheasants have more pointed tips than adult birds as is the case in many other game birds, e.g. the Partridge. The feather tips are alike and can therefore not be used for differentiating between young and old Pheasants.

The report that the two outer primaries are not full-grown at the time the inner primaries and the body commence to moult, is an under-statement. The fact is that in several of the examined four-weeks-old birds the outermost juvenile primary had not emerged yet from the follicle at the time when the innermost primary was shed to be replaced by the primary of the first winter plumage.

The first seven primaries are present in the newly hatched chick; the eighth primary appears during the first week, the ninth during the second week, and the tenth during the third week, or as late as 28-30 days after hatching.

So the distal juvenile primary is only very short—sometimes not even emerged—when the innermost primaries are moulted at 4-5 weeks when also the moult of the body feathers begins.

**COMPLETION OF MOULT**

The young Pheasant must be considered fully developed and mature when 24 weeks old. At this age the cocks—which were studied in most detail—had reached their full weight; the moult of the primaries was completed and the new primaries had attained their full length; the body was covered in the shining plumage of the first winter, being also the first nuptial plumage; finally, Pheasants are sexually mature at this age and will breed if exposed to suitable light conditions. This was shown by Bissonnette and Csech (1938, p. 181) who induced pheasants to lay fertile eggs while only 185 days old.

For practical purposes the 20 weeks old cock Pheasant has the
full appearance of an adult cock from which it only differs by having its tenth primary only three-quarter grown, by the shorter spurs, and by the blue sheaths still present at the base of the rectrices. Its plumage is fully as bright and colourful as in the adult cock.

When it is stated in The Handbook that the moult is often not quite complete in November or even December, it will mean that young cock Pheasants not yet fully moulted by e.g. 15th December—being less than 20 weeks old—must have hatched as late as around 1st August. Such late broods are due to repeat-nesting—the first nests having been destroyed, for example, during hay-mowing.

The Handbook states that the first eggs generally are laid early in April in England, but the majority not till a fortnight later; and fresh eggs have been found in October. If such late nests were successful it would mean that for example a nest in which laying began on 1st October, hatching would not take place till about 8th November (assuming an average clutch-size of 12 eggs, the egg-laying rate of 1.3 days per egg and the incubation period of 23 days). And Pheasants hatched on 8th November would not be fully plumaged (20 weeks of age) till late March the following year.

SUMMARY

Pheasants (Phasianus) attain their juvenile plumage when about five weeks old at which time the post-juvenile moult has begun; the proximal primaries are shed when the birds are 4-5 weeks old. All ten juvenile primaries are shed and replaced in contrast to most other Galliformes. The post-juvenile moult is complete and the immature Pheasant has reached its full weight when about 24 weeks old. Under field conditions young cocks of 20 weeks of age are indistinguishable from adult cocks. As all primaries are shed there is no difference in shape of tips in the two distal primaries in immature and adult birds.

REFERENCES


