

THE MOULTS AND SEQUENCE OF PLUMAGES OF THE BRITISH WADERS.

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PART IV.

GENUS *Vanellus*.

LAPWING (*Vanellus vanellus*).

ADULTS.—Complete moult from August to December. From February to May there is a very partial moult involving the feathers of the head, some feathers of the nape, throat and breast, apparently some scapulars and innermost secondaries and some median and lesser coverts, but not the rest of the body-feathers, not the tail and not the rest of the wings. The summer plumage differs slightly from the winter plumage. The chief differences in the male are that in summer the feathers of the upper-parts are without buff edges; the crown is deep black, glossed green, not tinged brown as in winter, while the lores, the patch in front of, and below the eye, the band across the ear-coverts and chin and throat are deep black, in some intermixed with one or two worn white winter feathers; in winter the chin and throat are white (some feathers spotted dusky-black in some).

The female in summer has the crown intermixed with new black feathers, glossed green; eye-stripe white or light buff streaked black-brown and dusky; lores, patch in front of, and below, the eye and the ear-coverts blackish-brown, some of the feathers with white bases and more or less intermixed with white feathers; chin and throat intermixed with new black feathers. *N.B.*—In the female the moult of the feathers of the head, throat and neck is apparently not so complete as in the male, many of the winter feathers being retained; in many examples the white feathers of the sides of the neck do not appear to be renewed. One female, Tring, Herts, April 20th, had almost completely moulted the feathers of the crown, which resembled that of the male, while the feathers of the chin and throat, except for one or two worn white winter ones, had been completely renewed and the chin and throat were as black as in the male.

In winter plumage, the female differs from the male in having the forehead and crown browner with less gloss, the crest shorter, the upper-parts more olive-green, not so metallic green, the patch in front of, and below the eye browner-black and not so extensive, many of the feathers with buff bases, while the median and lesser wing-coverts have less violet-purple gloss.

Adult males may be distinguished from adult and young females by the shape of the wings. In adult males the 5th primary (the bastard-primary being counted as the 1st) is longer than, or equals, the 4th, while the succeeding primaries decrease gradually in length, making the tip of the wing rather rounded in shape. In adult and young females as well as young males the 5th primary is shorter than the 4th and the succeeding primaries decrease in length more sharply and thus give the tip of the wing a more pointed appearance. Young females may be distinguished from young males and adult females by having the 2nd primary longer than the 5th instead of below the 5th as in young males and adult females. There is considerable individual variation in the wing formula of each sex, but the following abbreviated formulæ appear to be constant.

ADULT MALE.—2nd primary comes between 7th and 8th or 8th and 9th primaries; 4th or 5th primaries are longest; 6th above 2nd.

ADULT FEMALE AND YOUNG MALE.—2nd primary comes between the 5th and 6th; 3rd or 4th primaries are longest, in some equal; 6th below 2nd.

YOUNG FEMALE.—2nd primary comes between 3rd and 4th or 4th and 5th; 3rd usually longest, in some 3rd and 4th equal, otherwise 4th shorter than 3rd; 6th below 2nd.

Mr. F. W. Frohawk, in the *Ibis*, 1904, pp. 446-451, gives a more detailed wing formula for each sex, but owing to individual variation his formulae do not always hold good. He also seems to have overlooked the fact that the wing of the young male is like that of the adult female in shape, while that of the young female is different to both.

JUVENILE.—Like the adult female in winter, but the crown dark sepia, the feathers edged light buff and the crest shorter; nape below nuchal collar ash-brown, the feathers edged warm buff; (in the adult the nape is tinged green and the feathers lack the buff edges); upper-parts, including innermost secondaries and coverts, dull green more or less tinged brown (in some the brown tone predominating), the feathers plentifully edged, and some notched, warm buff; patch in front of the eye smaller, that below eye less extensive and browner; gorget narrower and dull brownish-black, faintly glossed dull-green, the feathers tipped light buff or white; under tail-coverts paler pinkish-cinnamon; tail-feathers (except outer pair) tipped warm buff; primary and greater coverts dull black with little or no gloss, the greater coverts narrowly tipped warm buff, median coverts dull or metallic green with broad warm buff edges (in the adult, only a few of the median coverts have sandy-buff tips); lesser coverts dull brownish-green, some with a metallic green sheen and most with warm buff tips, which are absent in the adult.

The juvenile body-feathers are softer and looser in structure than in the adult. The sexes are alike, but the upper-breast in males appears to be more greenish-black and in females more brownish-black with or without a greenish gloss, in some males some of the median coverts are glossed, and the distal lesser coverts are tinged with violet-purple.

N.B.—In the juvenile the outer pair of tail-feathers are often entirely white with no black marking. I have not yet examined an undoubted adult with a pure white outer tail-feather.

FIRST WINTER.—The juvenile body-plumage (not all the scapulars), very occasionally an odd tail-feather, some innermost secondaries and coverts, some or most median and lesser coverts, but not the rest of the wings, are moulted from July to December. After this moult the birds are very like the adults, but may be distinguished by the shorter crests, the worn buff edges to the tail-feathers, when not too abraded, and the duller wing-coverts; the primary and greater coverts are as in the juvenile, but the sandy-buff tips to all, except the inner greater coverts, are usually worn off. In the male the median coverts have usually less violet-purple gloss and the light buff edges are more numerous than in the adult: the lesser coverts distally are metallic green, more or less glossed violet-purple (not deep violet-purple as in the adult), while proximally they are brownish tinged dull green without, or with only a faint indication of, the violet or greenish-purple sheen of the adult, the innermost with a slight violet gloss, a few edged warm buff (in the adult these edges are absent). In the female the median coverts are like those of the adult female, but more plentifully edged warm buff, innermost brownish-green with brownish bases

exposed and tipped warm buff (in the adult these coverts are more metallic green and the buff edges are less numerous); proximal lesser coverts as in first winter male but with little or no indication of violet gloss (in the adult female these feathers are metallic green with a violet gloss and without buff tips).

FIRST SUMMER.—Only a few spring specimens were examined. Apparently first summer birds are like the adults but distinguished by duller wing-coverts as in first winter.

N.B.—Males collected in summer often have the 5th primary worn down and equalling the 4th in length (in very worn specimens shorter than the 4th), so that it is not always possible to identify a first summer male by the relative length of the 4th and 5th primaries. One ♂, Northern Manchuria 22/5, however, had the 5th primary well below the 4th (wing only slightly worn), otherwise was like the adult; one ♂, Scotland April 25th, the same and like the adult, but the crest shorter.

When the wing quills are not too abraded, first summer females may be distinguished from adult females by the relative length of the second primary.

GENUS *Arenaria*.

TURNSTONE (*Arenaria i. interpres*).

ADULTS.—Complete moult from July to October. From February to June there is a partial moult, involving the body-feathers (not all the scapulars nor all the feathers of the back and rump, nor all the upper tail-coverts), usually the tail-feathers, innermost secondaries and coverts, usually some median and lesser coverts (in some specimens most of the median and lesser coverts), but not the rest of the wings. The winter and summer plumages are distinct. The sexes are alike in winter, but in summer the female has the crown black or black-brown, the feathers narrowly edged warm buff and apparently never edged white as in many males; nape white more or less washed with buff, the feathers spotted and marked with dusky-brown or black (in some the distal portions of the feathers are more or less sooty-brown); in the male the nape is white, in some the feathers tipped dusky and washed with russet; in the female the mantle and scapulars are blacker, the feathers with fewer russet edgings and markings than in the male, while the black patch below the eye is less extensive and the black band across the sides of the neck narrower; innermost secondaries and coverts black-brown glossed olive, or olive-brown narrowly margined, and in some with one or two irregular markings of, russet, instead of more or less russet or plentifully marked with it as in the male; median coverts as in the male, but with less russet and more black, in some intermixed with pale drab feathers (sometimes tinged russet) with black-brown centres.

N.B.—The lesser coverts only occasionally appear to be renewed in spring in the female, while usually fewer new median coverts are acquired than in the male.

One adult male, May, Scotland, has the 2nd primary of each wing in quill, the remaining primaries new; an unusual occurrence in spring: the specimen is in full moult including axillaries and under wing-coverts.

JUVENILE.—*Male and female*.—Much like the adult in winter plumage, but the dark sepia or black-brown feathers of the upper-parts and innermost secondaries and coverts tipped light buff (not shading at the tip into ashy-brown, dusky or buffish-brown, as in the adult, in which some of the feathers also are faintly tipped white); pectoral gorget narrower than in the adult and in some tinged browner,

in some the feathers faintly edged light buff; patch on sides of the breast usually lighter and washed buff, some of the feathers streaked and marked dusky-black (in the adult the sides of the breast are ashy-brown, some of the feathers tipped white); tail-feathers as in the adult, but usually tipped light buff; median coverts dusky-brown, some white as in the adult, but, except white ones, edged warm or light buff, instead of edged buffish-brown (or tawny in some specimens) as in the adult; lesser coverts as in the adult but in some with buff tips.

FIRST WINTER.—*Male and female.*—The juvenile body-plumage (not all the scapulars), usually the tail-feathers, innermost secondaries and coverts, a few median and lesser coverts are moulted from August to November, but not the rest of the wings. After this moult the birds are like the adults, but are distinguished by the buff edges to some retained juvenile scapulars, innermost secondaries and median coverts.

FIRST SUMMER.—Moult as in the adult, after which the birds are like the adults in summer plumage, but are distinguished by the worn buff edges to the retained juvenile wing-coverts, especially the innermost median coverts; the male also differs from the adult male in having the crown more heavily streaked black-brown or black, the feathers narrowly edged warm buff, in some white; the black band from eye to eye narrower and often incomplete; nape more or less streaked dusky; mantle, scapulars and innermost secondaries and new wing-coverts with less russet than in the adult male, and usually with rather more, or about the same, amount of russet as in the adult female. The female resembles the adult female but has less russet on the upper-parts, innermost secondaries and new wing-coverts.

N.B.—Only a few median and lesser coverts and one or two innermost secondaries had been renewed in the female specimens examined.

GENUS *Bartramia*.

BARTRAM'S SANDPIPER (*Bartramia longicauda*.)

ADULTS.—Complete moult from July to January. The body-moult appears to commence in July or August while the moult of the remiges is deferred till later; several specimens examined were moulting primaries in December and January and one in December and two in January the body as well. Only two spring specimens examined were in moult; one February 6th was moulting the body-feathers, tail-feathers and innermost secondaries and coverts but not the rest of the wings, another labelled "Spring" was moulting the same and in addition some median and lesser coverts. There is no difference in coloration between the winter and summer plumages, and the sexes are alike.

JUVENILE.—*Male and female.*—Very similar to the adult, but the feathers of the mantle and scapulars darker, being black-brown edged all round with buff, the feathers practically with no barring, except for some notches of black-brown on the outer edge of the scapulars (in the adult the mantle and scapulars are sepia glossed olive and feathers of mantle shaded black-brown or with subterminal black-brown barrings and edged sandy-brown and buff, and the scapulars with ill-defined black barrings); median coverts sepia or ash-brown broadly tipped and notched with buff or cream and with a subterminal shading, approximating in shape a semicircle, in some a round patch, in some an incomplete barring, notching or bordering of dark sepia (in the adult the median coverts are sepia with broad buff tips and edges and have two or three transverse bars of black-brown, not always well defined);

FIRST WINTER.—*Male and female*.—The juvenile body-feathers, innermost secondaries and coverts, some median and lesser coverts, but not the tail-feathers nor the rest of the wings are moulted from early autumn to winter. After this moult the birds resemble the adults, but are distinguished by the retained juvenile median and lesser coverts.

FIRST SUMMER.—Apparently not to be distinguished with certainty from the adult.

GENUS *Machetes*.

RUFF (*Machetes pugnax*).

ADULTS.—Complete moult from July to December. From March to June there is a partial moult involving the body-feathers (not all the scapulars, not all, and in some not any, of the feathers of the back and rump), usually the tail-feathers, some innermost secondaries and coverts, some median and lesser coverts but not the rest of the wings. A varying number of winter feathers are retained on the upper- and under-parts. The male, as is well known, has a striking summer plumage which is subject to great variations in colour and is characterised by the assumption of a tippet and ruff. The female lacks the tippet and ruff of the male, and as compared with the latter has a sombre breeding plumage. In winter the sexes are alike in plumage, but the female may always be distinguished by her smaller size.

JUVENILE.—*Male and female*.—The upper-parts are distinct but the under-parts are much like the adult in winter plumage. Upper-parts sepia or blackish-brown, the feathers fringed warm or ochraceous-buff, nape pale ashy-brown, the feathers fringed warm buff (in the adult the upper-parts are pale sepia, the feathers with dark shafts and lighter edges, in some the feathers with central shadings of black-brown); lower throat, sides of neck, breast and flanks warm buff (in the adult the lower throat and sides of neck and breast are pale ashy-brown, the feathers broadly edged white; in some the lower throat and sides of neck faintly spotted sepia; flanks white, some tinged ashy); tail-feathers ash-brown bordered and marked blackish and fringed buff (the buff fringes are absent in the adults); wing as in the adult, but innermost secondaries as upper-parts, not pale sepia with one or two irregular black marks as in the adult; greater, median and lesser coverts ash-brown or pale sepia bordered with darker brown and fringed warm or ochraceous-buff (in the adult these coverts are sepia, broadly tipped white, the inner greater coverts in some with a subterminal black patch on each web, the median and lesser coverts pale sepia with dark shafts and lighter edges and faintly tipped white). The sexes are alike in plumage but the female is smaller.

FIRST WINTER.—*Male and female*.—The juvenile body-feathers (not all the scapulars), sometimes the tail-feathers, some innermost secondaries and coverts, some median and lesser coverts are moulted from August to December, but not the rest of the wings. The birds now resemble the adults in winter plumage, but are distinguished by the juvenile median and lesser coverts and one or two worn juvenile innermost secondaries and scapulars.

FIRST SUMMER.—Moult as in the adults, and only to be distinguished from the adults when the buff edges to the juvenile wing-coverts have not become completely abraded.

GENUS *Calidris*.

THE SANDERLING. (*Calidris alba*).

ADULTS.—Complete moult from July to November. From March to June there is a partial moult involving the body-feathers (not all the scapulars, not all, and sometimes not any, of the feathers of the back

and rump, and not all the upper tail-coverts), sometimes the central pair of tail-feathers, usually some innermost secondaries and coverts, some median and lesser coverts, but not the rest of the wings nor of the tail-feathers in the specimens examined. In some individuals some winter body-feathers are retained on the upper- and under-parts. The winter and summer plumages are distinct and the sexes are alike in winter plumage, but in summer plumage the female has the upper-parts greyer, the feathers more plentifully edged with greyish-white instead of pinkish-cinnamon, the cheeks, sides of neck, chin, throat and breast as in the male but usually washed paler pinkish-cinnamon (in some examples these areas are white without any pinkish-cinnamon tinge), new innermost secondaries and wing-coverts broadly edged and tipped white, pinkish-cinnamon markings in some more or less absent.

N.B.—Four adults, all from Cozumel Island, Yucatan, all February specimens, had the 2nd primary in quill and were acquiring winter-feathers on the body, one or two worn summer-feathers still remaining on the back and rump. I was unable to find any spring birds moulting all the tail-feathers, though Mr. F. M. Chapman, in his article on the "Changes of Plumage in the Dunlin and Sanderling" (*Bull. Amer. Mus. Nat. Hist.*, Vol. VIII., page 1), observed one specimen with the outer pair of tail-feathers in quill and thought it probable that all the tail-feathers were moulted.

JUVENILE.—*Male and female.*—The upper-parts are distinct from the adult but the under-parts much resemble the adults in winter plumage. Crown, mantle, scapulars, innermost secondaries and coverts black-brown, the feathers edged and notched creamy-yellow; feathers of back, rump and upper tail-coverts ash-brown with light buff or creamy-yellow tips terminating in a narrow dusky line; ear-coverts streaked dark sepia, feathers edged buff at sides, not white narrowly streaked dusky as in the adult; cheeks and sides of neck in some washed buff; sides of breast creamy-yellow, the feathers faintly tipped dusky and some with sepia marks towards the tip; (in the adult, the sides of the breast are white, some of the feathers sullied with ash-grey and with sepia shafts); central pair of tail-feathers sepia, darker on inner webs and tipped creamy-yellow (not blackish-grey, narrowly edged white as in the adult); wing as in the adult but median coverts light sepia shading into creamy-yellow with a terminal line of dusky, in some with a subterminal spot or bar of dark sepia (not ash-grey edged white with darker shafts as in the adult); lesser coverts dark sepia, a few tipped cream instead of blackish-grey, some tipped white as in the adult.

FIRST WINTER.—*Male and female.*—The juvenile body-feathers (not all the scapulars nor all the feathers of the back and rump), the tail-feathers, some innermost secondaries and their coverts, some median and lesser coverts, but not the rest of the wings, are moulted from September to December. After this moult the birds resemble the adults in winter plumage, but are distinguished by one or more worn spear-shaped juvenile innermost secondaries and scapulars and by the retained juvenile median coverts.

N.B.—One specimen, Durban, March 29th, had the 3rd primary of each wing in quill and the inner remiges new, but was not moulting the body-feathers or tail.

FIRST SUMMER.—Moult as in the adult and the birds are like the adults and only distinguished by the faint dusky terminal border when not too abraded, to the faded creamy edge of the innermost median coverts.

(To be continued.)