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A PRACTICAL HANDBOOK OF
BRITISH BIRDS

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A
PRACTICAL HANDBOOK
OF
BRITISH BIRDS

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PREFACE TO VOLUME II.

Now that our long task (commenced in 1913) is brought to a conclusion, it is the Editor's privilege to return his most cordial thanks to his co-authors for their unfailing co-operation as well as to numerous friends and correspondents, who have helped in various ways to make this work as complete as possible. As was mentioned in the first volume, had it not been for the fact that we were given every facility to examine the bird-skins in two of the greatest collections of birds in the world, viz.: those of the British Museum and Lord Rothschild, the descriptions of plumages and moults could not have been accomplished, and for this privilege we are greatly indebted to the kindness of Lord Rothschild, our co-author Dr. Hartert, and his assistant, Mr. A. Goodson, and to Dr. P. R. Lowe, Mr. N. B. Kinnear, and Mr. T. Wells, Mr. C. Chubb, and Mr. H. B. Usher, of the Natural History Museum. We are also much indebted to Dr. W. E. Clarke and Dr. J. Ritchie for the loan of many specimens sent for examination from the Royal Scottish Museum, and to Mr. T. A. Coward for similar loans from the Manchester Museum. We must also express our gratitude to many others who have assisted us from time to time, and especially to the following: Messrs. C. E. Alford, W. Berry, Dr. P. A. Buxton, Mr. Abel Chapman, Dr. F. M. Chapman, the Director of the Christiania Zoological Museum, Dr. J. J. Dwight, Col. Fraser-Tytler, Miss M. Garnett, Messrs. H. S. Gladstone, Ludlow-Griscom, G. H. Caton Haigh, T. Iredale, Dr. N. H. Joy, Mr. R. Kemp, Prof. E. Lönnberg, Rear-Admiral H. Lynes, Dr. H. J. Moon, Messrs. W. H. Mullens, J. B. Nichols, J. T. Nichols, M. J. Nicoll, the late Heatley Noble, C. H. Oliverson, J. H. Owen, Lord William Percy, Messrs. O. G. Pike, M. Portal, Dr. B. B. Riviere, Messrs. W. Rowan, H. T. L. Schaanning, Dr. E. L. Schiöler, Messrs. R. Shoolbred, J. K. Stanford, Surgeon Rear-Admiral J. H. Stenhouse, Dr. E. Stresemann, Dr. C. B. Ticehurst, and Miss E. L. Turner.

I have also to acknowledge my gratitude to Mrs. Hartert for the care and trouble she has taken over the text figures, almost all of which have been drawn by her from specimens in the Tring Museum, and to Mr. H. Grönvold for the interest he has taken

in making his drawings for the plates accurate in detail, which was so essential for their purpose.

The authors of the various sections of Volume II are as detailed in the Introductory Note (p. *v) to Volume I, but it must be pointed out that besides the descriptions and sections on "Characters and Allied Forms" of the Ducks and Waders, Mrs. Meinertzhagen (formerly Miss A. C. Jackson) most kindly undertook also those of the Swans and Geese, and for this very welcome assistance the Editor, who is responsible for the descriptions and characters of the rest of the birds, is most grateful.

Attention should be drawn here to the list of Additions and Corrections, which bring the work up to date, and to the Systematic List, both of which appear at the end of this volume.

THE EDITOR.

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A PRACTICAL HANDBOOK OF BRITISH BIRDS.

VOL. II.

ORDER CYPSELI.

This Order consists of the Swifts only. Three subfamilies are generally recognized, but two only are represented in Europe, the third being entirely tropical and oriental, and now often looked upon as a distinct family.

Palate ægithognathous ; cervical vertebræ 13 or 14 ; basi-pterygoid processes absent ; humerus very short ; ambiens muscle absent ; sternum with short spina externa and interna ; phalanges (digit-bones) of middle and outer toe in many cases reduced. Ten primaries, the first longest ; wings very long and pointed, secondaries short. Always ten rectrices. Gape very wide, bill small. Feet short and strong, hind-toe more or less reversible. Salivary glands strongly developed and very active during nesting season. Skin very strong. Palæarctic species migratory. Eggs usually two, white unspotted. The most aerial birds ; young helpless and blind.

FAMILY CYPSELIDÆ (APODIDÆ).

Characters same as those of Order *Cypseli*.

Key to subfamilies and genera of family CYPSELIDÆ (APODIDÆ).

Outer and middle toe with only three phalanges, tarsus thickly feathered,
tail without spines *Cypselinæ* (*Apodinæ*)
(Genus *Apus*)

Outer and middle toe with more than three phalanges, tarsus bare,
tail with spines, formed by shafts of rectrices being elongated beyond
end of webs *Chaturinæ*
(Genus *Chætura*)

Genus APUS Scop.

APUS Scopoli, *Introd. Hist. Nat.*, p. 483 (1777—Type by tautonymy : *Hirundo apus* L.)*

Appearance generally like that of a Swallow, but structure widely different (*see descr. of Order*). Skin very thick, feathers hard and smooth. Tarsus short and thickly feathered, all four toes bare and directed forwards. Tail more or less forked or emarginated. Mouth very wide, very deeply cleft. No rictal bristles. Nest in holes in rocks, buildings, or trees. Many species, six in Palæarctic region, of which only one breeds in British Isles, one other a rare straggler.

Key to species of genus APUS.

- Larger, wings over 200 mm., underside white *A. melba*, p. 2
 Smaller, wings under 200 mm., underside black *A. apus*, p. 4

APUS MELBA

211. *Apus melba melba* (L.)—THE ALPINE SWIFT.

HIRUNDO MELBA Linnæus, *Syst. Nat.*, ed. x, i, p. 192 (1758—Gibraltar).
Cypselus melba (Linnæus), Yarrell, II, p. 372; Saunders, p. 263.

DESCRIPTION.—*Adult male and female.*

Winter and summer.—Whole upper-parts mouse-brown (varying somewhat individually in shade of colour), each feather lightly tipped greyish-white (more noticeable in fresh plumage and disappearing by abrasion); patch of feathers in front of eye and narrow line over eye tipped blackish; sides of chin and throat, ear-coverts, sides of neck and band across upper-breast mouse-brown, feathers tipped white; chin, centre of throat, lower-breast and belly white, feathers with very fine brown-black shafts; flanks, under tail-coverts, under wing-coverts and axillaries mouse-brown with rather prominent white tips;

The Alpine Swift (*Apus m. melba*).

* The name *Apus* is rejected by many writers, being considered as pre-occupied by *Apos* of the same author, in the same little book, p. 404, for a genus of Crustaceans. As Scopoli must have known the small number of genera in his book, which is written in Latin, excluding the possibility of an error of transcription, we must suppose that he purposely made the two different names, so as to distinguish them, and must adopt the oldest name also in this case. If *Apus* is rejected, the next name *Micropus* Meyer and Wolf 1810 must be used.—E.H.

tail-feathers dark brown slightly glossed greenish; outer webs and tips of wing-feathers and primary-coverts still darker and when freshly grown with more distinct greenish gloss and with very narrow whitish edges to tips and inner webs; wing-coverts as rest of upper-parts. This plumage is acquired by complete moult. From Mar. to Nov. adults are in every stage of moult but the wing- and tail-feathers do not appear to begin to moult until May or exceptionally in April and the moult is usually finished by October. There appears to be no moult from Dec. to Feb. but specimens taken in these months are scarce. It would thus seem that there is really only one moult, which is a gradual one extending throughout the summer.

Nestling.—(Not examined.)

Juvenile.—Like adult in fresh plumage and difficult to distinguish except by the rather more distinct white edgings to wing-feathers and coverts and these make it more easily distinguishable when compared with adults in worn plumage.

First winter.—Very difficult to distinguish from adult. The juvenile body-plumage is moulted Aug.-Oct. but apparently not wing- or tail-feathers or wing-coverts until summer when bird appears to have a complete moult as adult.

Measurements and structure.—♂ wing 220-228 mm., tail: central pair 55-64, outer pair 77-90, tarsus 16-18, bill from skull 15-16 (12 measured). ♀ wing 207-221. Primaries: 2nd usually longest, 1st occasionally equal or 1-2 mm. longer but usually 2-4 shorter, 3rd 10-15 shorter, 4th 27-32 shorter, 5th 50-58 shorter. Rest of structure as Swift.

Soft parts.—Bill brown-black; feet dark flesh-colour; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*A. m. africanus* (Abyssinia, East and South Africa) has broader breast-band. Large size and white breast and belly distinguish it from other British Swifts.

FIELD-CHARACTERS.—Frequents gorges or cliffs among mountains, as well as buildings and old walls in plains. Easily distinguished from common Swift by its large size and white belly. Flight appears to me less rapid than that of Swift, but this may be owing to larger size of bird. Note a loud persistent "chitter." (H.F.W.)

BREEDING-HABITS.—Nests in crevices, under eaves in buildings and also in holes of ruins, and in natural fissures in cliff-faces.

Nest.—Composed of materials picked up on the wing, agglutinated with saliva, such as bits of straw or grass, feathers, leaves, husks of buds and seeds of trees. *Eggs*.—Normally 2, but not infrequently 3, rarely 4, dull white. Average of 81 eggs, 31.1×19.2 mm.

Max.: 34.3×19.5 and 30.1×20.5 . Min.: 27.5×20.2 and 30.7×17.8 .

Breeding-season.—End of May and early June.

Incubation.—By hen only (Naumann): by both sexes (S. B. Wilson); 18-21 days. Single brooded.

FOOD.—Insects, mostly of fairly large size, taken on the wing; chiefly diptera, including Tabanidæ, Syrphidæ, Muscidæ and Culi-cidæ. As many as 220 have been taken from one bird, including 30 *Tabanus bovinus*. Also lepidoptera (*Vanessa cardui*, etc.), hymenoptera (Aculeata and Ichneumonidæ), coleoptera (Staphylinidæ, etc.), neuroptera (Odonata), and also aphides.

DISTRIBUTION.—*British Isles*.—*England*.—Rare vagrant. About thirty satisfactorily identified from April to Oct. in various parts, but chiefly in southern half, but seven Yorks. and one North-umberland. *Wales*.—One, Pembroke, Nov. 20, 1908. *Ireland*.—Four. *Scotland*.—One caught and afterwards released Ayr, Aug. 25, 1892, another believed seen same locality July 28, 1900, one seen Wigtown, July 30, 1915.

DISTRIBUTION.—*Abroad*.—North-west Africa, south Europe to Pyrenees, Alps and Crimea, islands in Mediterranean, Asia Minor to Caucasus, Persia to Turkestan, Himalayas and high mountains of Indian Peninsula, Ceylon. Accidental: northern France, Germany, Heligoland, Denmark and Canaries. Winter-quarters uncertain; observed in south Arabia and northern Sahara on migration. Replaced by allied races in mountains of tropical and south Africa.

APUS APUS

212. *Apus apus apus* (L.)—THE SWIFT.

HIRUNDO APUS Linnaeus, Syst. Nat., ed. x, i, p. 192 (1758—Europe. Restricted typical locality: Sweden).

Cypselus apus (Linnaeus), Yarrell, ii, p. 364; Saunders, p. 261.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Whole upper-parts black-brown glossed greenish, darker and more glossy on mantle than crown and rump which are rather browner; feathers of rump and fore-head usually with very narrow and inconspicuous grey tips (usually a few white-tufted filoplumes concealed on crown but sometimes a number showing on crown and also mantle and breast); chin and throat dull brownish-white, extent of white varies and feathers are usually more or less washed brown and have fine brown shaft-streaks; sides of throat brown, feathers tipped whitish; rest of under-parts black-brown with slight greenish gloss, feathers of belly and flanks usually, and those of breast occasionally, with very narrow whitish tips; under tail-coverts, axillaries and under wing-coverts browner and with more prominent whitish tips; tail-feathers dark brown glossed greenish; primaries and primary-coverts same but outer webs glossed darker greenish, secondaries and greater wing-coverts browner, lesser, median and outer greater wing-coverts darker with more purplish-green gloss. This plumage is acquired by moult. The body-feathers often commence to moult in Europe

in August and occasionally even in July, but I have not seen a bird taken in Europe which was moulting its wing- or tail-feathers. Only a few winter specimens are available for examination and in these body, wings and tail have been moulting in Nov., Dec. and Feb., so that it is difficult to decide whether there is one moult or two. There is no difference in winter and summer plumage. Remains of sheath are to be found on outer primaries occasionally as late as March. It is possible that body-feathers moult twice (autumn and spring) but apparently wing- and tail-feathers moult only once very gradually from Nov. to Feb. Late in summer plumage becomes less glossy and browner by wear.

Nestling.—Down absent. Inside mouth flesh, small pale brown spot at tip of tongue; externally flanges at base dull white, along edge of bill brown becoming dark brown at tip.

Juvenile.—Upper-parts as adults but browner and with less gloss, feathers of fore-head with wider whitish tips giving it a hoary appearance, feathers of crown with narrow whitish tips and those

Primaries of juvenile Swift (*Apus a. apus*) showing white edgings. Note also attenuated tip of 1st primary.

of mantle, rump and upper tail-coverts with whitish tips slightly more prominent than in adult; chin extending to gape, throat and lores white (white purer and more extensive than in adult); rest of under-parts as adult but whitish tips to feathers more prominent; under wing-coverts with much broader white edgings; tail- and wing-feathers paler than in adults and with narrow whitish margins at their tips; all wing-coverts paler than in adults and with narrow whitish tips and edgings, especially prominent along edge of metacarpus.

First winter.—No specimens available for examination. After moult (which appears to be a complete one) in winter, bird appears to become exactly like adult.

Measurements and structure.—♂ wing 167-177 (one 182) mm., tail: central pair 40-48, outer pair 72-81, tarsus 10-12, bill from skull 10-11.5 (12 measured). ♀ wing 164-179. Primaries: 2nd usually longest, 1st occasionally equal, very rarely 1-2 mm. longer and usually 1-5 shorter, 3rd 7-10 shorter, 4th 21-27 shorter, 5th 40-47 shorter; primaries very narrow and incurved towards their tips, webs not emarginated but tip of 1st much attenuated and

tips of rest pointed. Secondaries very short, outer ones shorter than and inner about as long as 10th primary, tips wedge-shaped except innermost which are rounded. Tail much forked, ten feathers, tips pointed. Bill very flat and broad at base, tip of upper mandible strong and curved. Gape very wide, mouth opening nearly as far back as posterior edge of eye. Nostrils prominent and oblong. No rictal or nasal bristles. Tarsus short and very strong and feathered anteriorly, but bare behind. Toes short and strong, hind-toe (1st digit) very short and directed inwards and forwards; claws strong and sharp (*see* fig. C, vol. 1, p. 5).

Soft parts.—Bill and feet black; iris deep brown.

CHARACTERS AND ALLIED FORMS.—*A. a. pekinensis* (Persia, northern Asia) is very similar but upper-parts are rather browner and fore-head and fore-part of crown especially are paler brown; *A. a. marwitzi* (Caucasus, Asia Minor) is brown like last but fore-head darker. *Apus murinus* and subspecies have more white on throat and are browner on upper-parts. Scimitar-like wings, almost uniform blackish colour except for white chin distinguish Swift from other British birds.

FIELD-CHARACTERS.—Sooty-brown plumage, long, narrow, sickle-shaped wings and short body at once distinguish Swift from Swallow, even at a distance. Pre-eminently aerial; flight, accomplished by a few rapid wing-beats alternating with long glides on motionless, outstretched wings, extremely rapid and dashing. At times courses singly or in scattered bands low over pastures or sheets of water, at others hawks for food high overhead. Often ranges far from its nesting-places in houses and sea-cliffs, and may be seen about the summits of our highest mountains. Its power of flight is seen to greatest advantage on fine summer evenings, when the birds dash in a screaming band through a village street, or career round the church-tower, to mount still higher as the light fades, until they are no longer visible, although their scream, a harsh long-drawn “swee-ree” may still be heard.

BREEDING-HABITS.—Nests in crevices under eaves of houses, often in colonies, in holes of thatch; occasionally in natural cavities in face of cliffs or in old nests of House-Martin. *Nest*.—Composed of bits of straw or grass, seeds of trees, bud cases, feathers, etc., picked up floating in the air and agglutinated with saliva. Eggs also at times laid on top of old Sparrows’ nests in holes. *Eggs*.—Usually 2-3, but occasionally 4 met with, dull white. Average size of 100 eggs, 24.9×16.2 mm. Max.: 28×17.6 . Min.: 22×16 and 23.5×14.3 . *Breeding-season*.—Last days May and early June. *Incubation*.—Apparently by hen only; at least 18 days (Steele-Elliott). Single brooded.

FOOD.—Insects taken on the wing, including diptera (*Chironomidæ* etc.), coleoptera (*Philonthus*, *Quedius*, *Aphodius*, *Xantholinus*, *Coccinella*, *Cryptophagus*, *Hippodamia*, *Meligethes*, *Notiophilus*, *Sitones*, *Staphylinidæ*, etc.), hymenoptera (*Apis*, etc., especially drones of *A. mellifica*), lepidoptera (*Triphæna*). Also aphides and cicadæ.

DISTRIBUTION.—*British Isles*.—Summer-resident. Generally distributed except in north-west Scotland, where does not breed; I. Hebrides, where rarely breeds; O. Hebrides, Orkneys and Shetlands, where does not breed but is fairly regular migrant. These last must be passage-migrants.

MIGRATIONS.—*British Isles*.—Early arrivals of summer-residents begin fourth week April (early dates Mar. 21, 1892, Suffolk, Mar. 27, 1897, Somerset, April 12, 1905, Hants., April 14, 1912); main arrival begins last three days April and merges into passage-migration that takes place probably throughout country and by west and east coastal routes, Great Britain and east coast Ireland, and lasts until first week June and even later. Summer-residents begin to move south mid-July and emigration from south coast begins first week Aug. Passage-migrants begin to arrive east coast end July mainly Forth to Thames; numbers apparently quite small north of Forth. Some evidence also of passage by west coast route. Combined movement continues to end of Aug., with frequent stragglers first half Sept. and occasional ones to first week Oct. (late dates Cumberland, Oct. 9, 1909, Norfolk, Oct. 10, 1909, Glasgow, Oct. 13, 1918, Devon, Oct. 16, 1911, Butt of Lewis (O.H.), Oct. 30, 1913, Middlesex, Oct. 31, 1912, Essex, Nov. 6, 1912, Salop, Nov. 2 to 9, 1912, Linlithgow, Nov. 13, 1917, Clackmannan, Nov. 14, 1914).

DISTRIBUTION.—*Abroad*.—Europe generally from about lat. 70° in Scandinavia and Archangel in north Russia southwards, in winter as far as south Africa and Madagascar. Casual Spitsbergen and Iceland, Færoes and Kolguev. Replaced by doubtful forms in south Europe and north-west Africa, and by more distinct ones in various parts of west, north, and middle Asia.

Genus CHÆTURA Steph.

CHÆTURA Stephens, Shaw's Gen. Zool, XIII, pt. II, p. 76 (1826, not later than March—Type by subsequent designation, of Baird 1858, *C. pelagica*).

Easily distinguishable from *Apus* by tail, in which the shafts of the feathers are longer than the webs, and protrude like spines. Toes and tarsus bare, tail in the only species occurring in British Isles square, not in the least emarginated. Shafts of primaries very strong, wings very long. Three toes only directed forwards.

Many species in Asia, Africa and America, one only Palæarctic. Nest in form of small saucer, attached by saliva to rocks or trees, also (in American species) to buildings.

CHÆTURA CAUDACUTA

213. *Chætura caudacuta caudacuta* (Lath.).—THE NEEDLE-TAILED SWIFT.

HIRUNDO CAUDACUTA Latham, Ind. Orn., Suppl., p. lvii, (1801—Australia).

Acanthyllis caudacuta (Latham), Yarrell, II, p. 371 (footnote), III, p. ix ; Saunders, p. 265.

DESCRIPTION. — *Adult male and female.* Winter and summer.

— Fore-head creamy-white ; crown and nape dark brown glossed metallic-green (base of feathers of nape whitish) ; upper part of mantle, scapulars, back and rump dark brown ; centre of mantle pale brown ; upper tail-coverts metallic-green ; immediately in front of eye small black patch ; ear-coverts dark brown some feathers tipped whitish ; whole chin and throat white ; breast and belly dark brown, feathers on sides of belly with white, or partially white, bases ; lower part of flanks white and brown with some glossy-green ; vent and under tail-coverts white ; axillaries and under wing-coverts dark brown glossed green ; tail-feathers metallic-green with dark brown bases ; wing-feathers : outer webs, part of inner webs and tips metallic-green, inner portions of inner webs brown, two innermost secondaries with inner webs white ; primary-coverts, greater, median and lesser wing-coverts metallic-green, innermost greater and median coverts with their inner webs white. In worn plumage the metallic colour becomes dark purple and when much worn blackish with scarcely any gloss. There appear to be two full moults, one taking place from Aug. to Nov. and another from Jan.-May. There is no difference in summer and winter plumage.

Nestling.—(Not examined.)

Juvenile.—Much like adults but centre of fore-head brown, feathers lightly tipped brownish-white and narrow patch on sides of fore-head brownish-white ; crown and nape less glossed with green ; under tail-coverts conspicuously tipped dark brown.

Tail of the Needle-tailed Swift
(*Chætura c. caudacuta*).

First winter.—Like adults but usually with some black-tipped under tail-coverts. The juvenile body-feathers are moulted from Aug.-Nov., but not apparently all of them and not wing- or tail-feathers nor wing-coverts. *Summer*.—A complete moult takes place from Jan.-May as in adult and the bird then becomes indistinguishable from adult.

Measurements and structure.—♂ wing 203-216 mm., tail including "spine" 49-54, tarsus 16.5-18, bill from skull 13-15 (12 measured). ♀ wing 195-212. Primaries: 1st longest, 2nd 1-4 mm. shorter, 3rd 11-15 shorter, 4th 25-32 shorter, 5th 42-50 shorter, 6th 60-70 shorter; primaries very narrow and incurved towards their tips, webs not emarginated but tip of 1st much attenuated and tips of rest pointed. Outer secondaries very short and tips somewhat squared off, inner secondaries longer and tips rounded. Tail very short, almost square, ten feathers, very stiff and with shaft projecting 4-6 mm. beyond web in a stiff needle-like (or spine-like) point. Under tail-coverts very long. Bill, gape and nostrils like Swift. Tarsus bare. Toes and claws fairly long and latter very strong and sharp. Hind-toe (1st digit) short and directed backwards.

Soft parts.—Bill black; legs and feet flesh-colour with a purplish tinge; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*Ch. c. nudipes* (Himalayas, Mts. Assam) has no white on fore-head and is more glossy on crown and nape. *Ch. cochinchinensis* (Malacca, Sumatra, Cochin China) has pale brown chin and throat. White throat and under tail-coverts, dark brown breast and belly, metallic-coloured wings and tail and short needle-pointed tail-feathers are distinctive characters.

BREEDING-HABITS.—Breeds in crevices of cliffs, and according to Przevalsky, also in hollow trees. *Nest*.—Like that of other Swifts, composed of materials picked up in air, and according to some writers a gelatinous substance, secreted by bird. *Eggs*.—2 or 3, white and dull in surface. Average size of 27 eggs, 29.9×18.8 mm. Max.: 32.2×20 . Min.: 27.5×19.3 and 31.2×17.5 . *Breeding-season*.—First half of June in Siberia. No details of incubation.

FOOD.—Insects taken on the wing. Few details obtainable, but a British killed specimen contained remains of hymenoptera (*Vespa*), lepidoptera (*Leucania*) and small coleoptera (Corbin).

DISTRIBUTION.—*England*.—Two. One Great Horkesley (Essex) July 8, 1846 (E. Newman, *Zool.*, 1846, p. 1492). One (said to have been with another) Ringwood (Hants.) July 26 or 27, 1879 (A. Newton, *Proc. Zool. Soc.*, 1880, p. 1; G. B. Corbin, *Zool.*, 1880, p. 81).

DISTRIBUTION.—*Abroad*.—East Siberia, Mongolia, Manchuria, Sachalin, and Japan, in winter in Australia and Tasmania. Replaced by *C. caudacuta nudipes* in the Himalayas and Assam Hills.

ORDER CAPRIMULGI.

Consists of the Nightjars or Goatsuckers. No families but two subfamilies distinguished, only one, the *Caprimulginae* in Old World, the other, *Nyctibiinae*, being neotropical.

Palate ægithognathous (not schizognathous), rarely desmognathous; cervical vertebrae 13 or 14; basi-pterygoid processes and oil-gland present; sternum on hind-margin with large notch on each side, without spinæ or with very small spina interna; middle toe much the longest, its claw pectinated (except in *Nyctibiinae*), hind-toe comparatively short with 2 phalanges, outer with 4 phalanges only (except in *Nyctibiinae* which have five). Eye very large, mouth very deeply cleft. Long rictal bristles. Primaries ten, rectrices ten; skin very thin, feathers very soft and easily coming off, with very small aftershaft. Young helpless, covered with long sparse down. Eggs two, spotted, on ground without nest. Nocturnal, insectivorous. Many tropical species, but only six Palæarctic, two in Europe.

FAMILY CAPRIMULGIDÆ.

Characters same as those of Order *Caprimulgi*.

Genus CAPRIMULGUS L.

CAPRIMULGUS Linnæus, Syst. Nat., ed. x, i, p. 193 (1758—Type by tautonymy: "*caprimulgus*," i.e. *Caprimulgus europæus*).

Strong and long rictal bristles. Wings long and pointed, 2nd and 3rd primaries longest, 1st as a rule considerably shorter. Tail more or less rounded. Tarsus more or less feathered. Sexes in some cases similar, mostly different. Young more or less like females. Palæarctic species migrants. Skin very thin and tender. Eggs without nest on ground, clutch 2, spotted. Over 50 species, nearly whole world, but absent from Arctic and Antarctic Regions and many islands, including New Zealand.

Key to species of genus CAPRIMULGUS.

1 {	Inner webs of primaries indented with white	<i>C. ægyptius</i> , p. 15
1 {	Inner webs of primaries with single white spots	2
2 {	Wide golden rufous nuchal band	<i>C. ruficollis</i> , p. 17
2 {	No golden rufous nuchal band	<i>C. europæus</i> , p. 11

CAPRIMULGUS EUROPÆUS

214. *Caprimulgus europæus europæus* L.—THE NIGHTJAR.

CAPRIMULGUS EUROPÆUS Linnæus, Syst. Nat., ed. x, i, p. 193 (1758—“Europe and America,” the latter a mistake. Restricted typical locality : Sweden).

Caprimulgus europæus Linnæus, Yarrell, II, p. 377 ; Saunders, p. 267.

DESCRIPTION.—*Adult male.*

Winter.—Fore-head and whole crown grey with a silvery tone, very thickly and very finely freckled with wavy bars of brown and each feather with a pronounced black shaft-stripe becoming very broad down centre of crown where they are usually margined with rufous (feathers of back of crown somewhat

The Nightjar (*Caprimulgus e. europæus*).

elongated and pointed); some feathers on nape with cream-coloured shaft stripes (forming very indistinct and much broken collar); mantle and back as crown but rather darker and duller and with less silvery tone and black stripes not so prominent as in centre of crown; inner scapulars as centre of crown with silvery tone more pronounced, most of the feathers with broad diagonal bands of cream to dark cream and rufous and black with varying amount of freckling and barring; rump and upper tail-coverts as mantle but with black shaft-stripe broken and feathers with broken transverse bars of black; lores and narrow line over eye cream to rufous freckled black; ear-coverts, cheeks, chin and upper-throat rufous narrowly barred black; narrow and somewhat broken moustachial stripe cream; patch of cream or whitish on lower throat, usually divided centrally by some feathers like upper-throat; below this patch a band of feathers extending to sides of neck under ear-coverts creamy-buff to whitish irregularly marked and barred brown and black; upper-breast grey-brown vermiculated and barred brown-black and many feathers with buff or cream tips; lower-breast, flanks, belly, under wing-coverts and axillaries buff barred dark brown; under tail-coverts same but with fewer bars; tail: central pair grey much vermiculated and with broad wavy bars of brown-black, often not very well defined, next two pairs darker and browner and with much wider bars, two outer pairs with still more black and with only broken bars of brown-buff and with tips (25-30 mm.) usually pure white but sometimes tinged buff and speckled black; primaries brown-black freckled grey at tips, outer webs with broken, spot-like

bars of rufous-buff, inner webs of three outer primaries with large white spot on distal half varying in size and sometimes extending on to outer web on 2nd and 3rd but smaller and rounder and not reaching shaft on 1st, basal portions of inner webs of primaries with somewhat interrupted comb-like markings or bars of rufous-buff; secondaries as inner primaries but with comb-like rufous-buff barring usually better defined, innermost secondaries grey-brown freckled black and with black shaft-stripes; primary-coverts as outer webs of primaries; outer greater coverts same but inner ones more freckled with grey, and innermost grey-brown freckled black with black shaft-stripe as innermost secondaries and usually with a more or less distinct cream or buff spot at tip of outer web; median coverts much as inner greater coverts, but with distinct and large buff or cream spots; lesser coverts black barred rufous and feathers at point of wing with cream tips. This plumage is acquired by moult in Aug.-Sept., and although inner secondaries sometimes moult in Aug., it is possible that all wing- and tail-feathers do not moult in autumn. *Summer*.—A complete moult takes place in Dec.-Feb., but new plumage is as winter. Abrasion and fading makes spots on wing-coverts, throat-spot and tips of breast feathers whiter, while elongated feathers of centre of back of crown become spear-shaped by reason of outer edges at tip wearing away leaving black central stripe.

Adult female. Winter and summer.—As male but two outer pairs of tail-feathers without white tips, tips (only 5-10 mm.) of these two feathers being buff to greyish-buff, usually much vermiculated with brown-black; three outer primaries like rest of primaries and without white spots, though often there is (especially on two outer feathers) a small buff or rufous-buff spot (usually considerably vermiculated with black) in corresponding position to white spot in male. Moults as in male.

Nestling.—Down pale buff basally, reddish-brown on distal portions, long but rather sparse though almost covering bird.

Juvenile. Male and female.—As adult female and difficult to distinguish except by looser structure of feathers, lower breast and belly usually greyer and less buff, patch on throat buffer and less well defined.

First winter. Male and female.—Like adult female. The juvenile body-feathers are moulted but not always completely in Sept.-Oct., but not wing- or tail-feathers nor wing-coverts. *Summer*.—A complete moult takes place Jan.-Feb. after which male cannot be distinguished from adult male.

Measurements and structure.—♂ wing 184-198 mm., tail 129-138, tarsus 17-19, bill from feathers 8-10 (12 British measured). ♀ wing 183-206. Primaries: 2nd longest, 1st and 3rd 3-9 mm. shorter, 4th 25-31 shorter, 5th 42-50 shorter, 6th 57-65 shorter; outer webs of 2nd and 3rd emarginated and slightly serrated along edge of emarginated portion. Secondaries outermost feather

about equal to innermost primary rest graduated becoming longer inwards, tips rounded. Tail rounded, ten feathers, tips rounded. Bill very weak, flat and broad at base (triangular), tip of upper mandible curved and projecting beyond lower. Gape very wide, mouth opening nearly as far back as posterior edge of eye. Nostrils small and semi-tubular being surrounded with a raised operculum. Along edge of upper mandible a line of long and very stiff bristles directed forwards and outwards, smaller and softer bristles at angle of lower mandible and round nostrils (see fig. B, vol. 1, p. 5). Tarsus short and about three-fourths of it feathered anteriorly. Hind-toe directed inwards, other three toes connected by membrane to second joint, middle one long with claw curved outwards and having on its edge a row of flattened serrated projections like teeth of a comb (see fig. 3, vol. 1, p. 5); these pectinations are less developed in nestling and juvenile. Eyes and external aperture to ear very large.

Soft parts.—Bill blackish-brown; feet brownish-flesh; iris deep umber.

CHARACTERS AND ALLIED FORMS.—*C. e. meridionalis* (south Europe, Asia Minor and north-west Africa) is very much like typical form but rather paler and smaller; *C. e. sarudnyi* (Altai, Tarbagatai) is much as typical in colour, intermediate in size and has larger white spots on primaries, those on outer 2nd and 3rd extending across outer webs as they do in *C. e. unwini* (Persia, Turkestan, N.W. India) which, however, is smaller and paler than other forms; *C. e. plumipes* (east Turkestan) is much like last but has a more rufous-isabelline tinge. Large bristled gape, pectinated middle claw, grey vermiculated and black striped upper-parts distinguish Nightjar, while dark coloration and want of rufous collar distinguish this species from the other two British species.

FIELD-CHARACTERS.—Haunts woodland glades, commons and wastes, particularly where ling, gorse or bracken afford cover. Of crepuscular and nocturnal habits, is quiescent in daytime and likely to be overlooked, for its coloration is protective in a high degree, whether bird is lying prone along branch of tree, on rocks or bare soil. Becomes active at nightfall, pursuing its insect prey with silent, twisting flight, accomplished by deliberate wing-beats and glides on motionless wings, a long-tailed, long-winged bird. In flight male shows white spots on wings and tail. Love-song a sustained and reverberating "chur-r-r-r," uttered when stationary in some exposed situation, such as bough of tree, bare rock, fence-rail, top of a telegraph-post, or roof-tree of low building, and audible from a considerable distance. Call-note, uttered in flight, "co-ic"; alarm-notes, "quick" and "chuck." A loud clap is often produced by bird in flight smiting its wings together above its back.

BREEDING-HABITS.—Haunts commons, bracken-covered hillsides, open glades in woods, etc. No nest, eggs laid on ground in scrape, often sheltered by bits of dead wood. *Eggs*.—2 normally, but exceptionally 3 and even 4 on record. Much elongated and elliptical in shape; ground greyish-white to creamy, spotted and marbled or blotched irregularly with yellowish-brown and sometimes dark sepia markings as well as clouded and blotched with leaden-grey. Sometimes dark markings are obsolete, or irregular brown streaks and hair-lines prominent. Average of 100 eggs, 31.5×22.3 mm. Max: 36.5×21 and 34×24 . Min.: 27×20.4 and 30.4×20 . *Breeding-season*.—From about mid-May onward, but most eggs laid end of May and early June. Also eggs in July and first half August. *Incubation*.—By both sexes; period 15 days from laying (Evans), 16-18 days (Heinroth), 18 days (Gurney, Walton). Undoubtedly sometimes double brooded.

FOOD.—Insects taken on the wing, especially in twilight: principally coleoptera (*Melolontha*, *Geotrupes*, *Aphodius*, *Phyllopertha*, *Rhizotrogus* and *Elater*); lepidoptera (*Sphinx*, *Hepialus*, many species Noctuæ, and Geometræ); diptera (*Tipula*, etc.). Naumann states that neuroptera are also taken (Odonata, Phryganeidæ, etc.) and Hartert that orthoptera are picked up.

DISTRIBUTION.—*British Isles*.—Summer-resident. Generally distributed in suitable localities, except Orkneys and Shetlands, where only a vagrant, and O. Hebrides, where only occurred three times (Ghlaiss, Aug. 14, 1897, N. Uist, June 2, 1907, July 18, 1916).

MIGRATIONS.—*British Isles*.—Early arrivals of summer-residents begin fourth week April (early dates Apr. 4, 1869, Yorks. Apr. 6, 1912, Derby, Apr. 15, 1908, Surrey, Apr. 16, 1909); main arrival first week May, lasting to end May or first week June. Very little evidence of passage-migration. Nesting-haunts begin to be deserted about mid-Aug. and emigration from south coast commences at end of month and lasts to third or fourth week Sept. (late dates Morecambe Bay Lt.-v. (Lancs.), Oct. 7, 1910, I. of May (Forth), Oct. 9, 1913, Wigtown, Oct. 10, 1914, Suffolk, Oct. 27, 1910, Devon, Nov. 10 to 13, 1911). A few records suggest that east and west coastal routes are used Aug.-Sept., but it is not clear whether travellers are passage-migrants. Irish summer-residents apparently arrive and depart by south-east coast.

DISTRIBUTION.—*Abroad*.—Europe from about lat. 63° north southwards, in winter in Africa south to Cape Colony. Casual Madeira and Salvages; also Færoes. Replaced in Spain, Corsica and Sardinia, parts of Italy, south-east Europe north to Hungary, Crimea, and south-east Russia, Asia Minor, north-west Africa, and various parts of Asia by other races.

CAPRIMULGUS ÆGYPTIUS

215. *Caprimulgus ægyptius ægyptius* Licht.* — THE EGYPTIAN NIGHTJAR.

CAPRIMULGUS ÆGYPTIUS Lichtenstein, Verz. Doubl., p. 59 (1823—
Typical locality: Egypt).

Caprimulgus ægyptius (Licht.), Yarrell, III, p. ix; Saunders, p. 270.

DESCRIPTION.—*Adult male and female. Winter and summer.*

—Whole upper-parts greyish sand-colour, each feather very finely freckled and marked with irregular wavy bars of black, varying number of feathers at back of crown with black tips and varying number on nape with sandy tips; mantle more buff not so grey and feathers less freckled and barring browner; scapulars

The Egyptian Nightjar
(*Caprimulgus æ. ægyptius*).

with wavy black bars more prominent and wider apart and most feathers with a penultimate thick black band (giving a general appearance of irregular black spots) and usually with some portion of tips of feathers uniform sand-colour without freckling; upper tail-coverts like scapulars but without thick penultimate bands though on longer feathers wavy bars are sometimes very broad; lores cream barred black; cheeks, sides of throat, ear-coverts and upper-breast much as upper-parts; a white patch (varying in size) on lower-throat which is usually almost divided centrally by feathers of sandy-buff, tipped black and with a few narrow irregular black bars; under white patch and extending round sides of neck below ear-coverts a narrow line of sandy-buff feathers similarly barred; breast same but tips of feathers vermiculated; flanks and lower-breast sandy-buff, feathers with narrow black-brown wavy bars rather widely spaced; centre of belly and under tail-coverts paler and without bars except the longest coverts which are buffer and have a few black bars but often on outer webs only; under wing-coverts pale sandy-buff barred brown; axillaries same but whiter; tail: two central pairs as long upper tail-coverts, next pair tinged rufous and usually less freckled and with black-brown wavy bars more prominent, two outer pairs with stronger rufous tinge, considerably less freckled and with black-brown bars considerably broader and tips of feathers creamy-buff very lightly freckled

* It is more likely that the true *C. ægyptius ægyptius* has occurred in Europe than the Saharan form *C. æ. saharæ*, but it would be desirable to compare the specimen in Mr. Whitaker's collection.

brown; primaries brown-black with tips greyish-sandy freckled brown-black, outer webs with broad bars of somewhat rufous-buff freckled brown-black, inner webs same at tip but with basal three-fourths white deeply and irregularly indented with broad teeth-like markings of brown-black; secondaries sandy-buff, inner webs whitish, more or less vermiculated brown and barred across with wavy brown, innermost secondaries as upper-parts greyish-sandy much vermiculated and with wavy narrow bars of black; wing-coverts much as upper-parts but with tips of feathers almost uniform sandy-buff giving spot-like appearance. This plumage is acquired by complete moult April-Aug.

Nestling.—(Not examined.)

Juvenile.—Like adults and difficult to distinguish except by rather looser structure of feathers.

First winter.—Like adults. The juvenile plumage is completely (including wings and tail) moulted June-Oct.

Measurements and structure.—♂ wing 184-211 mm., tail 115-129, tarsus 21-23, bill from feathers 8-9 (9 measured). ♀ wing 190-208 (one 225). Primaries: 2nd longest, 1st 2-9 mm. shorter, 3rd 1-7 shorter, 4th 20-30 shorter, 5th 40-48 shorter, 6th 56-66 shorter; outer webs of 2nd and 3rd emarginated, and very slightly serrated along edge of emarginated portion. Rest of structure as in *C. e. europæus* but tarsus feathered for only one-third to half its length.

Soft parts.—Bill dark slate, flesh at base; legs and feet grey; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*C. æ. saharæ* (Algeria to Libyan desert) is of a warmer sand-colour, not so grey. Sandy-grey upper-parts without thick black stripes and absence of white spots on primaries and outer tail-feathers in male, distinguish species from other British Goatsuckers.

BREEDING-HABITS.—No nest is made and the eggs are laid in a mere scrape in the desert sand. *Eggs*.—2, paler in colouring than European Nightjar, pale yellowish-grey, marbled and blotched with pale olivaceous and leaden-grey. Average of 7, 32.1×21.7 mm. Max.: 34×21 and 33×22 . Min.: 30×22 and 32×21 . *Breeding-season*.—Eggs taken in Algeria from March 27 to June 17. No details of incubation.

FOOD.—Probably chiefly coleoptera and orthoptera, but no definite records.

DISTRIBUTION.—*England*.—One Rainworth, near Mansfield (Notts.) June 23, 1883 (J. Whitaker, *Zool.*, 1883, p. 374).

DISTRIBUTION.—*Abroad*.—Ranges from Turkestan, Afghanistan, Baluchistan, Mesopotamia, and east Persia to Egypt, and is partly

migratory. Casual in Malta, Sicily and Heligoland. A less greyish, more reddish-isabelline form inhabits the Sahara, south Algeria, south Tunisia, Libyan Desert to Egypt on west side of Nile.

CAPRIMULGUS RUFICOLLIS

216. *Caprimulgus ruficollis desertorum* Erl.* — THE ALGERIAN RED-NECKED NIGHTJAR.

CAPRIMULGUS RUFICOLLIS DESERTORUM Erlanger, Journ. f. Orn., 1899, p. 521, pl. xi (Tunisia).

Caprimulgus ruficollis Temminck, Yarrell, II, p. 386, III, p. ix; Saunders, p. 269.

DESCRIPTION.—*Adult male.*

Summer.—General character of upper-parts much like *C. e. europæus* but much paler and with broad rufous-buff collar. Sides of fore-head, crown and nape silver-grey, very finely freckled with black, feathers of centre of fore-head, crown and nape with broad velvety-black shaft-stripes margined with rufous; broad nuchal collar extending to sides of throat

The Algerian Red-necked Nightjar
(*Caprimulgus r. desertorum*).

golden-buff and rufous with small black markings; mantle duller grey than sides of crown and with narrow black-brown shaft-stripes; back and rump same but more tinged buff and feathers with more or less well-defined black-brown cross-bars; upper tail-coverts same but with irregular blackish markings in centres of feathers and not definitely cross-barred; scapulars silver-grey freckled as crown with broad velvety-black shaft-stripes somewhat irregular and in many feathers broadly margined (chiefly on outer webs) with uniform buff to rufous-buff; lores and narrow line over eye rufous; ear-coverts same but lower feathers partially white forming continuation of short and narrow white moustachial stripe; chin rufous-buff, feathers tipped black; across throat patch of white, more or less clearly divided centrally by rufous feathers with black tips; lower-throat and upper-breast rufous-buff, tips of feathers greyish and finely freckled black-brown;

* I have carefully examined the specimen from Killingworth; it is rather faded, but, taking this into full consideration, there seems no doubt that it belongs to the desert form, and not to the darker *C. ruficollis ruficollis* from Spain and north Morocco, which one would have expected.—E.H.

rest of breast, flanks and belly darkish buff to rufous-buff with narrow but widely separated bars of dark brown, centre of belly and under tail-coverts same but without bars, but latter sometimes with a few broken bars ; axillaries rufous-buff ; under wing-coverts same but with rather broad brown bars ; tail : central pair grey fringed buff, freckled brown-black and with ill-defined wavy brown-black bars, next pair darker and more tinged rufous and with broader and better defined black bars, next pair still darker with broad black bars and with small white or whitish tip, two outer pairs same but with more rufous on outer webs and with long white tips (35-45 mm.) ; primaries dark brown mottled grey at tips, 1st to 3rd with rufous bars (usually an edging in 1st primary) on basal half of outer webs and rufous fringe on inner webs, on distal half a large white spot, confined to inner web on 1st primary but often extending as a buff patch on to outer webs of 2nd and 3rd, occasionally smaller white spot on inner web of 4th, rest of primaries with rufous bars across both webs ; secondaries more rufous with black bars and with grey mottling at tips, inner secondaries like scapulars ; primary-coverts barred rufous and black ; greater coverts same but with broader black central streaks, freckled edgings and ill-defined bars, and with buff to rufous-buff spot-like tips to outer webs and inner feathers freckled grey ; median coverts same but more freckled grey ; lesser coverts upper series rufous-buff with a few brown bars and lower series with black centres and bases and rufous and grey, finely freckled tips and edges. No moulting examples and none taken in winter have been available for examination. N.B.—One Sept. adult, one March and one April specimen of *C. r. ruficollis* were just completing a complete moult, the outer primaries being in sheath, so it is probable that this species has a double moult.

Adult female.—Like adult male but white spots on primaries and tips of outer tail-feathers smaller and more or less tinged with rufous-buff, spots on primaries sometimes rufous-buff and not white and tip of 3rd pair of tail-feathers without white.

Nestling.—(Not examined.)

Juvenile.—(Not examined, but juvenile of *C. r. ruficollis* is much like adult female but duller on upper-parts and with smaller white spots on primaries and less white on tips of outer tail-feathers.)

Measurements and structure.—♂ wing 195-204 mm., tail 152-172, tarsus 20-24, bill from feathers 10-12 (7 measured). ♀ wing 187-202. Primaries : 2nd longest, 3rd sometimes equal but usually 1-4 mm. shorter, 1st 5-9 shorter, 4th 18-32 shorter, 5th 44-50 shorter, 6th 58-65 shorter ; outer webs of 2nd and 3rd emarginated (4th less distinctly), and slightly serrated along edge of emarginated portions. Rest of structure as in *C. e. europæus*.

Soft parts.—Bill black-brown, flesh towards base ; legs and feet grey-brown ; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*C. r. ruficollis* (south Spain and Portugal, Marocco) is considerably darker grey and less rufous-buff on upper-parts, tail and wings darker and under-parts darker with bars more distinct. Rufous nuchal collar, pale colour, larger white patch on chin and comparatively long 3rd primaries distinguish species.

FIELD-CHARACTERS.—Inhabits forest-clad hillsides, but often more open country than Common Nightjar, with scanty vegetation and bushes. Whirring sound same as Common Nightjar, habits similar. (E.H.)

BREEDING-HABITS.—Haunts hillsides with patches of scrub here and there. No nest, but eggs laid in scrape on ground, sometimes sheltered by bush. *Eggs*.—2, very similar to European Nightjar, but slightly larger on average. Colour greyish-white marbled, blotched and sometimes with fine streaks of yellowish-brown and leaden-grey. Elongated in shape. Average of 50 eggs of Spanish form, 32×23 mm. Max.: 34×24.1 and 32.3×24.5 . Min.: 28.5×23 and 29.2×21.3 . *Breeding-season*.—Erlanger took eggs on June 9 and 16, but Spanish race breeds from May 8 onward.

FOOD.—Little definitely recorded except that Tristram found it feeding on young locusts, apparently picking them up from the ground. Beetles, grasshoppers and moths (E.H.).

DISTRIBUTION.—*England*.—One Killingworth, near Newcastle (Northumberland), Oct. 5, 1856 (Hancock, *Ibis*, 1862, p. 39).

DISTRIBUTION.—*Abroad*.—Tunisia and Algeria, but not breeding south of Atlas mountains, migratory, passing through Sahara where, however, it does not nest. Winter quarters not yet known. Replaced by darker form in south Spain, Portugal, and Marocco south to south-western Atlas.

ORDER MEROPES.

Palate desmognathous; cervical vertebræ 15; basi-ptyergoid processes absent. Ambiens muscle absent. Sternum with long spina communis and on each side two deep indentations. Feet syndactylous, 3rd toe connected with 4th to the beginning of last joint, 2nd and 3rd on basal joint only. Primaries 11, first very short. Tarsus very short. Rectrices 12. Very short, hardly perceptible rictal bristles. Oil-gland naked. Bill long and slightly curved. Palæarctic species migratory. Eggs unspotted white in long tunnels made by the birds themselves, either in banks or in the ground. Young blind and helpless. Skin thin, but tough. Food flying insects. Many tropical species, but absent from New World, only three in Palæarctic region.

FAMILY MEROPIDÆ.

Only family of the Order, same characters. Several genera but only one in Palearctic fauna.

Genus MEROPS L.

MEROPS Linnæus, Syst. Nat., ed. x, i, p. 117 (1758—Type by tautonymy : "*merops*," i.e. *Merops apiaster*, also by subsequent designation of Gray 1840).

Upper bill without groove. Nostrils rounded, basal, not quite covered by feathers. First primary very short. Tail slightly rounded, middle pair of tail-feathers much elongated and tapering. Nearly twenty species.

MEROPS APIASTER

217. *Merops apiaster* L.—THE BEE-EATER.

MEROPS APIASTER Linnæus, Syst. Nat., ed. x, i, p. 117 (1758—"Habitat in Europa australi, Oriente").

Merops apiaster Linnæus, Yarrell, II, p. 435 ; Saunders, p. 283.

DESCRIPTION.—*Adult*

male. Summer.—

Fore-head white often with a few yellow feathers ; a line of green feathers on fore-part of crown ; rest of crown and nape dark rich chestnut ; upper mantle paler shading into golden chestnut with greenish tinge on lower mantle and back ; scapulars paler more yellowish and

The Bee-Eater (*Merops apiaster*).

outer feathers sometimes slightly marked with blue ; rump as back some feathers tipped greenish-blue ; upper tail-coverts dark green tipped and edged blue ; lores, line under eye and ear-coverts black ; line over eye blue edged green and a similar but short and narrow line along lower part of gape ; chin and throat bright yellow, below which is a narrow band of black ; rest of under-parts metallic-blue or green ; tail dark metallic-green with blue edges, tips, edges of inner webs and underside of feathers pale brown, tips of elongated central pair blackish ; primaries tipped blackish, outer webs and portion of inner webs metallic-blue on distal half and metallic-green or bluish-green on proximal half, inner edges of inner webs brown ; secondaries chestnut with long black tips and some bluish-green between.

chestnut and black on outer webs, innermost feathers metallic blue and green; primary-coverts metallic blue or green; greater and median coverts chestnut but innermost greater metallic blue and green; lesser coverts outer half metallic-green, inner half chestnut. This plumage is acquired by complete moult from Nov.-Feb. *Winter*.—A moult of the body-feathers only takes place in Aug.-Sept., after which crown becomes more or less tinged green; mantle, scapulars, back and rump green, feathers tipped blue; black throat-band replaced by narrower line of green-tipped feathers with very little black; rest of under-parts as summer. N.B.—This adult winter plumage is retained only two or three months and seems to have been hitherto confused with the juvenile plumage, but birds with worn elongated central tail-feathers and chestnut secondaries and wing-coverts and therefore certainly adults, moult into this juvenile-like body-plumage in Aug.-Sept.

Adult female. Summer.—Like adult summer male but with slight mixture of green on lower mantle and scapulars and more on rump, often more green on fore-part of crown, less chestnut and more green on secondaries and wing-coverts. Moult as male. *Winter*.—Moult as male after which body-plumage becomes like winter male but mantle and scapulars greener, feathers usually having no blue tips.

Nestling.—(Not examined.)

Juvenile. Male and female.—Upper-parts much like adult male winter but with less chestnut, most of crown usually washed green and whole of rest of upper-parts being blue to green, scapulars often blue-grey and sometimes buffish-green; chin and throat paler yellow than in adult; throat-band as in adult winter with scarcely any black; tail as adult but duller and usually more bluish and less green, central pair of feathers only slightly elongated and not so pointed; primaries as adult but tips browner and outer webs duller; secondaries with browner tips than in adult and outer webs green or heavily washed green with only a tinge of chestnut, innermost feathers duller than in adult; all wing-coverts dull green.

First summer.—Like the adults. The juvenile plumage is moulted completely (including wings and tail) from Nov. to Feb. N.B.—There is no first-winter plumage, the juvenile plumage being replaced by summer plumage.

Measurements and structure.—♂ wing 144-156 mm., tail: middle pair 108-120, rest 87-96, tarsus 12-14, bill from skull 37-44 (12 measured). ♀ wing 138-148. Primaries: 1st very narrow and pointed about three-fourths primary-coverts, 2nd longest, 3rd 2-8 mm. shorter, 4th 15-20 shorter, 5th 25-30 shorter, 6th 35-40 shorter, outer webs not emarginated. Secondaries: outer feathers rather shorter than 11th primary, tips notched as inner primaries, inner feathers longer with tips sharply rounded. Tail: 12 feathers, central pair elongated, tips tapering to a point, rest of tail square,

tips fairly square and notched (*see* fig., vol. 1, p. 5). Bill compressed, slightly decurved and tapering to a very fine point. Short bristle-like feathers at gape almost covering nostrils. Hind-toe short, other three long and slender joined together up to about half length of inner and two-thirds length of outer, forming a flat sole.

Soft parts.—Bill black; legs and feet dark purplish-brown; iris crimson (juvenile red-brown).

CHARACTERS.—No subspecies. Easily distinguished from all other British birds by its elongated tail-feathers, chestnut upper-parts, yellow throat and blue under-parts.

FIELD-CHARACTERS.—In fine weather generally on the wing in small parties, rising and falling with easy, graceful flight, like that of Swallow; in dull weather often sits on wires or trees, where its upright carriage, pointed tail and long bill at once distinguish it. On the wing colour not conspicuous except in favourable lights, but bird recognizable at once by frequently uttered and rather monotonous liquid disyllabic note, "turrük, turrük." At close quarters golden-bronze of upper-surface and emerald-green breast are distinctive. (F.C.R.J.)

BREEDING-HABITS.—Breeds usually in colonies, sometimes in the perpendicular banks of streams. At other times in almost flat ground or in cuttings by roadsides. A circular tunnel is bored horizontally into a bank or sloping downwards if on flat ground, from 3 or 4 to 8 or 9 ft. ending in a circular chamber. No nest is made, but castings accumulate round eggs or young. *Eggs*.—5-6, sometimes 7 and 8, while 9 and 10 have been recorded; pure white, glossy and somewhat globular in shape. Average of 100 eggs, 25.6×21.8 mm. Max.: 28×22 and 26×23.6 . Min.: 24×20.1 . *Breeding-season*.—From about mid-May onward in south Europe. No details of incubation, except that eggs are incubated as laid.

FOOD.—Insects taken on the wing while hawking in small parties. Chiefly hymenoptera (*Bombus*, *Apis*, *Vespa*, etc.) and coleoptera. Also in smaller numbers diptera, lepidoptera and according to Naumann orthoptera, odonata, phryganeidæ and cicadæ.

DISTRIBUTION.—*British Isles*.—Vagrant. *England*.—Over forty obtained and many others seen, chiefly south of Derby, but seven in Yorks. *Scotland*.—About ten seen or obtained on mainland, and two Shetlands. Pair recorded as attempting to nest near Edinburgh, June 1920. *Ireland*.—Over twenty seen or obtained. Generally appears in spring, but also in autumn; often two or three together, and flocks of six or seven have been reported.

DISTRIBUTION.—*Abroad*.—South Europe and Mediterranean islands, Africa north of Sahara, north to Camargue in south France, Danube in Hungary, and south Russia, eastwards to Transcaspiæ, Turkestan

and west Siberia, Asia Minor, Syria, Persia, Afghanistan, and Kashmir. On passage Canaries and Madeira; casual Azores. During migration and in winter in tropical Africa south to Cape Colony (where also said to nest), and north-west India. Often strays north of its regular range and has nested at least three times in Germany, once found in Lapland, several times in central and even north Russia, and in Scandinavia and Denmark, Heligoland, Germany, Belgium, Holland, north France, and Luxemburg.

[NOTE.—The BLUE-TAILED BEE-EATER, *Merops philippinus* L., recorded from near Seaton Carew in 1862, cannot be admitted (Yarrell, II, p. 442; Saunders, p. 284).]

ORDER UPUPÆ.

Palate desmognathous; cervical vertebræ 14; basi-ptyergoid processes and vomer absent. Ambiens muscle absent. Sternum each side with one indentation. Oil-gland tufted. Bill long, slender, slightly curved. 10 primaries, 10 rectrices. Tarsus short, both in front and behind with scutes, like Larks. Third toe connected with fourth at basal joint, second quite free. Skin thin and soft. Eggs in holes. Old World only, Europe, Africa, Asia.

FAMILY UPUPIDÆ.

Only this one family, which is separable into two subfamilies: *Upupinæ* with rounded, open nostrils and tail shorter than wing, crest and no metallic gloss, and *Irrisorinæ*, restricted to tropical Africa, with elongated nostril, partly with operculum, long graduated tail and metallic colours.

Genus UPUPA L.

UPUPA Linnæus, Syst. Nat., ed. x, i, p. 117 (1758—Type by tautonymy: "*Upupa*" = *Upupa epops*).

Characters same as in subfamily *Upupinæ* of which it is the only genus. One species with about 6 or 7 subspecies, Europe, Africa and Asia.

UPUPA EPOPS

218. *Upupa epops* L.—THE HOOPOE.

UPUPA EPOPS Linnæus, Syst. Nat., ed. x, i, p. 117 (1758—Europe. Restricted typical locality: Sweden).

Upupa epops Linnæus, Yarrell, II, p. 419; Saunders, p. 285.

DESCRIPTION.—*Adult male. Winter and summer.*—Fore-head and hind-neck pale pinkish-brown; feathers of crown much elongated forming a large crest, with long black tips, those of fore-part shorter

and paler in colour, those of hind-part longer, deeper chestnut-brown and with a white subterminal band varying in extent; mantle pinkish-brown or greyish-brown varying in shade; scapulars and back banded with cream and black; rump white; upper tail-coverts black, upper feathers with white bases and narrow white tips; lores and ear-coverts pale pinkish-brown; chin, throat and breast more vinous-pink and feathers of chin with whitish edgings; flanks and sides of belly whitish with rather wide dark brown streaks; centre of belly and under tail-coverts white; axillaries very pale pink; under wing-coverts white with pink tinge and lower series with black tips; tail glossy-black with a broad white band across middle, white on outer webs of outermost pair of feathers being more or less extended; wing-feathers glossy-black, primaries with a single broad white band across both webs of 2nd to 8th, similar band or spot on inner webs only of 1st, 9th and 10th and sometimes 8th, secondaries banded with white throughout their length but outermost two or three feathers with bands broken or absent on outer webs of their distal halves, innermost feathers browner with longitudinal cream streaks; primary-coverts glossy-black; greater and median coverts glossy-black banded white with more or less tinge of cream; lesser coverts: lower ones black tipped creamy-white, upper ones pinkish-brown. This plumage is acquired by complete moult July-Nov.

Adult female.—Like male but throat and breast usually browner and less vinous-pink, feathers of chin and throat usually with longer white tips and sometimes with blackish bases, but these distinctions are variable and some females cannot be distinguished from males by coloration.

Nestling.—Down, white and fairly long. Distribution, inner supra-orbital, occipital, spinal, humeral, ulnar, ventral, femoral and crural. (Description from half feathered skins.)

Juvenile.—Like adult female and difficult to distinguish but usually without any of the vinous-pink tinge on breast and sides of neck.

First winter.—Like adult. The juvenile plumage is completely moulted (including wings and tail) Aug.-Oct.

Measurements and structure.—♂ wing 140-153 mm., tail 98-109, tarsus 22-24, bill from skull 53-63 (12 measured). ♀ wing 136-148, bill 50-58. Primaries: 1st about half 2nd, 4th and 5th longest, 2nd 15-28 mm. shorter, 3rd and 6th 1-5 shorter; 3rd to 6th emarginated outer webs. Secondaries between 7th and 10th primaries, tips fairly square. Tail square, ten feathers, tips rounded. Bill much compressed, decurved, very fine towards point (*see fig.*, vol. 1, p. 4). Nostrils bare. No rictal or nasal bristles.

Soft parts.—Bill blackish, base and lower mandible greyish; legs and feet slate-grey; iris brown.

CHARACTERS AND ALLIED FORMS.—*U. e. saturata* (east Siberia, Mongolia) is slightly darker on mantle; *U. e. major* (Egypt) has a

longer bill thicker at base; *U. e. somalensis* (north-east Africa) is pinker on mantle and breast and has no white on crest-feathers; *U. e. africana* (south Africa) is deep pink, has no white on primaries and more on secondaries; *U. e. marginata* (Madagascar) has narrow white band on tail; *U. e. indica* (southern India and China) is much like *somalensis* but paler on under-parts and greyer on mantle; *U. e. ceylonensis* (Ceylon) is much like last but smaller. Black and white wings and tail, long curved bill and long crest distinguish the species.

FIELD-CHARACTERS.—When flying, wings barred with black and weak fluttering flight with rounded wings are sufficient to distinguish this species. Note, “Oo-poo-poo, Oo-poo-pco,” is quite unlike that of any Passerine bird. When at rest long curving crest is depressed, but still noticeable, and when raised black tipped orange-tawny crest, disproportionately large, is quite unmistakable. (F.C.R.J.)

BREEDING-HABITS.—Nesting-sites variable; frequently in hole of tree (especially willows and olives), but also in loose stone-walls, heaps of stones, crevices in buildings, and even in drains and nesting-boxes. *Nest*.—Sometimes a few bits of straw, feathers, etc., and frequently excrement of some kind is added, so that site becomes very offensive as fæces are not removed. *Eggs*.—5 to 7 as a rule, occasionally 8 to 10, and 12 once recorded, dull greenish-blue to whitish-grey or yellowish-olive, but often nest stained more or less. Average of 100 eggs, 25.9×17.8 mm. Max.: 29.3×19 and 28.3×19.2 . Min.: 23.1×17.3 and 25.7×16.6 . *Breeding-season*.—End April to early May in south Europe; May and June in middle Europe. *Incubation*.—By hen only. Probably single brooded.

FOOD.—Chiefly insects and their larvæ: coleoptera (*Scarabæus*, *Bembidium*, *Aphodius*, etc., and their larvæ: larvæ of *Melolontha*); orthoptera (larval stages of locusts and grasshoppers, also *Forficula*); lepidoptera (larvæ of *Noctuæ*, *Zygæna*, etc.); also diptera and hymenoptera (ants). Spiders, centipedes (including very large tropical species), woodlice and earthworms also recorded.

DISTRIBUTION.—*England and Wales*.—Passage-migrant, regular in spring (beginning April to end May) but less frequent in autumn (early Aug. to mid-Nov.) on south and south-east coasts England. North of Thames on east coast frequent, but less regular; elsewhere a vagrant, rare in north Wales, midlands and north-west England. Has nested from time to time in all south coastal counties (perhaps most frequently Hants.) as well as Surrey, Wilts. and Bucks. As vagrant has occurred in all other months of year, even in winter in north. *Scotland*.—Vagrant. Has occurred in most parts, including I. and O. Hebrides, Orkneys, Fair Isle, and Shetlands.

Ireland.—Almost annual passage-migrant in spring and autumn on south coast, but has never nested. Vagrant elsewhere.

DISTRIBUTION.—*Abroad*.—Europe, more frequent in south. Eastwards to west Siberia and west Turkestan, breeding apparently also in north-west India. In winter in Africa as far as Gambia, Haussaland, Abyssinia and Galla countries, and south India. Casual Færøes, Iceland, Spitsbergen, also Azores and Madeira. Replaced by other forms in east Siberia and Mongolia to Tibet, Egypt, tropical and south Africa, Madagascar, India, Ceylon, south China, and Hainan.

ORDER CORACIÆ.

Palate desmognathous ; cervical vertebræ 14 ; basi-pterygoid processes rudimentary or absent ; vomer very narrow. Ambiens muscle absent. Sternum each side with two indentations, with spina externa but without interna. Oil-gland naked. Bill short and strong ; tip strongly curved down. 10 primaries, 12 rectrices. Tarsus in front with large scutes. Eggs unspotted white in hollows (of trees or otherwise). Old World only. Two families or sub-families, but only one, *Coraciinæ* (*Coraciidæ*) in Palæarctic region, the other (*Leptosomatidæ* or *Leptosomatinae*) restricted to Madagascar and Comoro Islands.

FAMILY CORACIIDÆ.

Characters same as those of Order *Coraciæ*.

Genus CORACIAS L.

CORACIAS Linnæus, Syst. Nat., ed. x, i, p. 107 (1758—Type by subsequent designation, of Gray 1855 : *C. garrulus*).

Bill hard, much narrower at base than long and with a few short, curved rictal bristles. Tail more than half length of wing, central and lateral pair generally (in some tropical species very much) elongated. Fifteen species of which, however, one only is European, in Europe, Africa and Asia south to Celebes.

CORACIAS GARRULUS

219. *Coracias garrulus garrulus* L.—THE ROLLER.

CORACIAS GARRULUS Linnæus, Syst. Nat., ed. x, i, p. 107 (1758—Europe. Restricted typical locality : Sweden).

Coracias garrulus Linnæus, Yarrell, II, p. 428 ; Saunders, p. 281.

DESCRIPTION.—*Adult male and female. Summer.*—Fore-head with basal part of feathers showing dull brownish-white ; rest of crown and nape pale greenish-blue ; mantle and scapulars bright chestnut-brown ; back and rump deep purplish-blue ; upper tail-coverts more greenish ; lores and round eyes blackish-brown, bases of

feathers brownish-white; chin brownish-white; throat, ear-coverts and sides of neck bright greenish-blue with paler shaft-streaks; rest of under-parts pale greenish-blue; under wing-coverts and axillaries a shade brighter; tail: central pair brown washed green, rest with shafts and proximal three-quarters (half on outer feathers) of inner webs black-brown, proximal portions of outer webs deep blue and green, tips pale greenish-blue becoming whitish on inner edge of inner webs, outermost pair with black attenuated tips (underside of brown proximal portions of inner webs deep purplish-blue); primaries brownish-black, 1st primary with outer web deep greenish- or purplish-blue, 2nd and 3rd with bases of outer webs same, rest of primaries with bases of outer webs pale

The Roller (*Coracias g. garrulus*). Four outer tail-feathers of juvenile (left) and adult (right).

blue followed by a narrow deep purplish-blue band; secondaries as inner primaries but with rather more purplish-blue above the pale blue bases, innermost feathers dark brown washed green, outer webs and tips of two innermost chestnut-brown and central portion of outer web of next same (underside of secondaries and primaries dark purplish-blue on inner webs); primary-coverts pale blue with deep purplish-blue tips; greater and median coverts pale greenish-blue, innermost greater as innermost secondaries; lesser coverts deep purplish-blue. This plumage is acquired by complete moult in Jan.-Mar. (occasionally April). *Winter*.—A complete moult takes place between July and Nov., but as some examples are still acquiring winter body-feathers as late as Dec. and their wings and tails are in moult it is difficult to say whether wings and tail always moult twice though they are to be found in different stages of moult in different individuals from July to March. Winter like

summer but crown and nape dull brownish-green ; mantle and scapulars duller brown not so chestnut ; throat and upper-breast duller with a mixture of greenish-brown especially on breast ; some median and greater coverts tipped brownish.

Nestling.—(Not examined.)

Juvenile.—Much like winter adult but crown and nape still duller and more brownish-green ; back and rump paler and duller ; throat, breast, ear-coverts and sides of neck brownish tinged green, feathers with whitish shaft-streaks ; tail duller, central feathers browner and rest with brownish tips, outermost pair short and without black attenuated tip ; wing-feathers with very narrow pale brown tips ; primary-coverts without deep purplish-blue tips ; greater and median coverts duller ; lesser coverts not so purplish.

First winter.—Like adult winter except for tail- and wing-feathers and primary-coverts which are as juvenile. The juvenile body-feathers and wing-coverts are moulted Nov.-Dec. but not primaries, secondaries, tail and primary-coverts. *Summer*.—A complete moult (including wings and tail) takes place Jan.-April after which bird is like adult except that primary-coverts have no purplish-blue tips and feathers of back and rump are frequently tipped green.

Measurements and structure.—♂ wing 193-205 mm., tail 112-128, outermost feather 110-130, tarsus 23-24, bill from skull 36-41 (12 measured). ♀ wing 183-205. Primaries : 2nd longest, 1st 4-8 mm. shorter, 3rd 1-5 shorter (rarely equals 2nd), 4th 10-13 shorter, 5th 22-27 shorter ; 2nd to 5th emarginated outer webs. Secondaries : outer feathers rather shorter than 10th primary, inner feathers about equal to 6th primary, tips rounded. Tail rounded except for outermost pair which are usually as long as and sometimes slightly longer than central, 12 feathers, tips rounded except for outermost pair which have inner web sharply attenuated for 10-15 mm. at tip. In juvenile outermost pair are about 20 mm. shorter than rest and their tips are rounded as in other feathers. Bill strong, compressed, slightly hooked at tip (*see fig.*, vol. 1, p. 5). Nostrils slit-like and bare, but close to fore-head feathers. Some strong rictal bristles.

Soft parts.—Bill brownish-black ; legs and feet yellowish ; iris pale brown.

CHARACTERS AND ALLIED FORMS.—*C. g. semenowi* (Persia, Kashmir, Turkestan) is paler, and averages slightly larger. *C. benghalensis* (India) has more brilliant deep and pale blue wings and tail, mauve throat and breast and other differences. Coloration easily distinguishes Roller from other British birds.

FIELD-CHARACTERS.—At a distance is somewhat Corvine in appearance, but very striking contrasts of azure-blue head, tail and underparts, brown back and blue and black wings are soon apparent.

Extraordinary tumbling flight from which it derives its name, and loud harsh cry, "Rack-kack, kacker," etc., at once attract attention. (F.C.R.J.)

BREEDING-HABITS.—In middle Europe generally in well-wooded districts, but in south Europe wherever suitable sites are available. *Nest*.—Sometimes in holes of trees; also in ruined buildings, old town walls, natural holes in steep mud-banks or rocks. Exceptionally recorded from old nests of Magpie and Wood-Pigeon. Usually no nesting material but a scanty bed of grass, roots, feathers or hair sometimes recorded. *Eggs*.—4 to 6, pure white with some gloss, average (208), 35.4×28.4 mm. (Goebel). Max.: 40×30 and 39.5×31.5 . Min.: 32×26 and 32.5×25.5 . *Breeding-season*.—About mid-May in Mediterranean area; late May and early June in Scandinavia. *Incubation*.—Apparently by both sexes; period said to be 17 days (Barr), 18-20 days. Single brooded.

FOOD.—Largely insects taken on ground, especially coleoptera (*Geotrupes*, *Scarabæus*, *Carabus*, *Melolontha*, *Harpalus*, *Elater*, etc.) and orthoptera (locusts, grasshoppers, earwigs and mole-cricket). Also diptera, hymenoptera (ants), and scorpions, centipedes (up to 6 inches long), small lizards, exceptionally small birds and frogs, while in autumn fruit (figs, grapes, etc.) also taken.

DISTRIBUTION.—*British Isles*.—Vagrant. Over one hundred have occurred in most parts, chiefly autumn, but fairly often spring. Most often in south and east England (24 Norfolk), rarely in north Wales and north-west England and Scotland (but examples recorded as far as Caithness, Orkneys, and St. Kilda). Ten obtained in Ireland.

DISTRIBUTION.—*Abroad*.—Europe from 61° north in Scandinavia and latitude of St. Petersburg to Mediterranean and north-west Africa, eastwards to west Siberia. Replaced by allied form in Transcaspia, north Persia, etc. In winter in tropical and south Africa to Cape Colony, also in India. Single specimens observed in north Norway, on Færoes and Canaries.

[NOTE.—The recorded occurrences of two ABYSSINIAN ROLLERS, *Coracias abyssinicus* Bodd., near Glasgow about 1857 (Yarrell, II, p. 434; Saunders, p. 282), and of an INDIAN ROLLER, *Coracias benghalensis* L., said to have been shot near Louth (Lincs.), Oct. 1883, cannot be admitted.]

ORDER HALCYONES.

Palate desmognathous; cervical vertebrae 15; basi-pterygoid processes absent; vomer absent; sternum with two indentations at each side, long spina externa, no interna. Ambiens muscle absent. Oil-gland tufted. Feathers hard and close. No after-shafts. The featherless tracts covered with down. Primaries 11, first small. Rectrices 10, sometimes 12. Feet with three toes in front and one behind, but 3rd and 4th for their greater part

united, 2nd and 3rd at basal joint. Tarsus short. Head large, often out of proportion. Bill long, straight and pointed, about as long as tail or longer. Nests in long tunnels, eggs rounded, glossy white. Young naked. All parts of world, but chiefly tropical, only one European species.

FAMILY ALCEDINIDÆ.

Characters of Order *Halcyones*. Some authors admit several families, but their limits are unsatisfactory. Numerous genera, only one Europe.

Genus ALCEDO L.

ALCEDO Linnæus, Syst. Nat., ed. x, i, p. 115 (1758—Type by subsequent designation of Swainson 1820: *Alcedo atthis ispida*).

Bill laterally compressed, tail short, not longer than bill and covered about two-thirds by the decomposed upper tail-coverts. About a dozen species all of great beauty in colour in Europe, Africa, and Asia, only one, with number of subspecies Palæarctic.

ALCEDO ATTHIS*

220. *Alcedo atthis ispida* L.—THE KINGFISHER.

ALCEDO ISPIDA Linnæus, Syst. Nat., ed. x, i, p. 115 (1758—"Habitat in Europa, Asia." Restricted typical locality: Europe).

Alcedo ispida Linnæus, Yarrell, II, p. 443; Saunders, p. 279.

Alcedo ispida ispida L., Hand-List, p. 99 (1912).

DESCRIPTION.—*Adult male. Winter.*—Fore-head, crown and nape dark greenish-blue, each feather with a bright blue subterminal band; centre of mantle, back, rump and upper tail-coverts brilliant glossy blue or greenish-blue; sides of mantle and scapulars dark green or greenish-blue with a few brighter marks at tips of scapulars†; lores: upper portion orange-chestnut, lower black; ear-coverts orange-chestnut with a narrow patch of white tinged buff and sometimes tipped chestnut behind ear-coverts; broad moustachial stripe extending to base of sides of neck bright blue or greenish-blue, anterior portion with narrow blackish bars; chin and throat white more or less tinged buff; on each side of breast a patch of greenish-blue; rest of under-parts orange-chestnut rather

* The first name of the Kingfisher is not *A. ispida* L., *t.c.*, p. 115, but *Gracula Atthis* L., *t.c.*, p. 109, ex Hasselquist, described from Egypt. Therefore the closely allied form inhabiting north Africa must be called *Alcedo atthis atthis*, while the European one becomes *A. atthis ispida* L.—E.H.

† If bird is held up between light and eye whole upper-parts appear deep blue and not greenish.

paler in centre of belly and under wing-coverts; tail-feathers greenish-blue, shafts and edges of inner webs dark brown; wing-feathers black-brown, edges of inner webs paler brown and outer webs (except of 2nd primary) greenish-blue; primary-coverts with outer webs greener not so blue; greater and median coverts dark greenish-blue with small bright blue spots at tips; lesser coverts greener.

The Kingfisher (*Alcedo a. ispida*).

This plumage is acquired by complete moult Aug.-Nov. *Summer*.—A moult confined to the body-plumage takes place Jan.-March. New plumage as winter.

Adult female.—As male, but usually not quite so brilliant.

Nestling.—Down absent. Mouth inside flesh, no tongue-spots, externally flanges dull bluish-flesh, bill lead-colour, tip whitish.

Juvenile.—Like adult but upper-parts duller and more greenish especially bands on feathers of crown; moustachial stripe much duller; under-parts especially centre of belly, slightly paler than in adults and feathers of breast tipped grey often with a slight greenish tinge but occasionally grey tips are wanting and such birds are very difficult to distinguish from rather dull adult females. Before juvenile plumage is moulted grey tips of breast-feathers become worn and almost white.

First winter.—Like adult. The juvenile body-plumage is moulted Aug.-Dec., but not tail- or wing-feathers, nor any wing-coverts.

Measurements and structure.—♂ wing 72-78 mm., tail 33-38, tarsus 9-11.5, bill from skull 40-47 (12 measured). ♀ wing 74-79. Primaries: 1st minute about three-fourths primary-coverts, 3rd and 4th longest, 2nd and 5th 1-3 mm. shorter, 6th 3-6 shorter. Secondaries: outer ones about equal to 11th primary, tips fairly square, inner ones about equal 6th primary, tips rounded. Tail fairly square, very slightly rounded, 12 feathers, tips slightly rounded. Under tail-coverts nearly reaching tip of tail. Inner toe very short and two outer ones joined for about half their length forming a flat sole. Bill much compressed and tapering to a sharp point. Nostrils slit-like, being almost closed by operculum. No rictal or nasal bristles. Feathers of back of crown and nape and especially of mantle, rump and upper tail-coverts long and rather narrow, and rami of distal portions not connected by radii.

Soft parts.—Bill black, base of under mandible reddish in ♂ and sometimes in ♀; legs and feet coral-red; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*A. a. atthis* (north Africa, Syria) has a slightly finer bill; *A. a. pallasii* (west Siberia, Persia) is smaller and *A. a. bengalensis* (east Siberia, Japan, China, India) is still smaller. Brilliant blue upper-parts and chestnut under-parts, short tail and long bill distinguish Kingfisher from other British birds.

FIELD-CHARACTERS.—Unique among our native birds in brilliance of its coloration. Upper-parts dazzling cobalt-blue or emerald-green according to incidence of light; under-parts, chiefly noticeable when bird is stationary, warm reddish-buff; feet sealing-wax red. Even at a distance and when colours are not evident, short shuttle-shaped form and direct and rapid flight close to surface of water are unmistakable. Habitat restricted perforce by nature of its food, but, given water, bird is found in diverse situations, streams, canals, lakes, fen-drains, and, particularly in winter, tidal estuaries, gutters on salt marshes, and rock-pools on coast. Prey usually captured by plunging obliquely from branch overhanging water, a tree-stump or lock-gate, but at times bird hovers over open water with body erect, at right angles to surface and ten to twelve feet above it, and plunges from this position. Call, a loud, clear “ch’kee” twice or thrice repeated; whilst, in spring, a whistling repetition of this note apparently functions as a love-song.

BREEDING-HABITS.—Haunts rivers and slow-flowing streams by preference. *Nesting-hole*.—Made generally in steep bank by side of stream, but also at times in sand-pit or bank at considerable distance from water, and occasionally among roots of trees or in hole of wall. Tunnel generally about a yard in length, ending in circular chamber, where eggs are laid without any nest-material, although fish-bones are deposited afterwards. *Eggs*.—Normally 7, less commonly 6, rarely 8, while 9 and even 10 are said to have occurred, pure white, very glossy and spherical in shape. Average of 100 eggs, 22.6×18.7 mm. Max.: 24.2×19 and 21.3×19.7 . Min.: 21×19 and 23×16.7 . *Breeding-season*.—Usually towards end April, exceptionally as early as March. Although usually single brooded, in some cases a second brood is undoubtedly reared. *Incubation*.—Period uncertain. *Fledging-period*.—24 days (A. Taylor).

FOOD.—Chiefly small fish, minnow, miller’s thumb (*Cottus gobio*), sticklebacks, gudgeon (*Gobio fluviatilis*), roach, pike, stone loach, fry of various species, etc. Occasionally mollusca, tadpoles, worms, fresh-water shrimp, large water-beetles, larvæ of dragon-flies and diptera, and *Notonecta glauca* recorded, also frog and newt (once each). At sea coast shrimps, prawns and small rock-fish taken.

DISTRIBUTION.—*England and Wales.*—Resident. Generally distributed on slow-flowing streams, often moving to coasts in autumn and severe weather. Occasional appearance at Lights in autumn and spring may indicate passage-movements. *Scotland.*—Resident. Generally distributed in south, but becoming irregular and rare north of Grampians. Not noted Caithness or Shetlands, and only once Orkneys and O. Hebrides (Barra, July 25, 1892). *Ireland.*—Resident but scarce in all counties.

DISTRIBUTION.—*Abroad.*—Europe generally, from south Scandinavia to Mediterranean, casual Madeira, replaced by closely-allied forms in north Africa and Asia.

[NOTE.—The two AMERICAN BELTED KINGFISHERS, *Ceryle alcyon* (L.), said to have been obtained in Meath and Wicklow in autumn 1845 (Yarrell, II, p. 452; Saunders, p. 280 (in text)) cannot be admitted, as the records were undoubtedly due to a fraud. Another stated to have been obtained in Cornwall in November 1908 was not identified or recorded until ten years afterwards and does not afford a sufficiently certain record to admit the species (*Brit. B.*, XII, pp. 160, 216). The bird inhabits North America and has occurred in Holland, Iceland and on the Azores.]

ORDER PICI.

Palate schizognathous; cervical vertebræ 14; basi-pterygoid processes absent; vomer split and reduced; sternum with long forked spina externa, no interna, with two pairs of rather deep indentations. Ambiens muscle absent. Neck with exceedingly powerful muscles. Bill hard, straight, strong, powerful, like chisel. Nostrils near base, rounded. Tarsus short with one row of scutes in front. Feet very strong either four toes, in some cases 3, two in front, two (or one) behind. Rectrices actually 12, but two outer (one each side) quite short, soft and above the second. Tail cuneate. Oil-gland tufted. Bare tracts wide. Tongue extraordinarily long, worm-like and capable of being protruded very far, owing to its long "horns" which are, as a rule, curved round skull and originate near base of bill, tip hard and barbed. Young hatched blind and helpless, without down. Nests in holes of trees, nearly always excavated by birds themselves. Eggs white and glossy, oval or even pyriform. Over 400 species in nearly all parts of world where trees abound, but absent from Australian and Papuan sub-regions and many oceanic islands, as South Sea.

FAMILY PICIDÆ.

Only one family can satisfactorily be recognized, and only two subfamilies, *Picinae* and *Jynginae* are well divided.

SUBFAMILY PICINÆ.

Tail-feathers pointed, stiff and strong-shafted, used as prop when climbing trunks of trees, nostrils covered by stiff antrorse feathers. Numerous genera, but of the 50 recognized in *Catalogue of Birds* and Sharpe's *Handlist* many useless, being based on colour only. Only two genera British.

Key to genera of subfamily PICINÆ.

- Colour more or less green *Picus*, p. 34
 Colour black and white with some red, no green . . . *Dryobates*, p. 37

Genus PICUS L.

PICUS Linnæus, Syst. Nat., ed. x, i, p. 112 (1758—Type by subsequent designation of Swainson 1820 and Kaup 1829: *Picus viridis*). Synonym: *Gecin*us Boie.

Green Woodpeckers differ from Spotted and Black Woodpeckers by thicker, not remarkably thin, neck. Four toes. Outer front toe as long as or longer than outer hind-toe. Colour generally green. Many forms in Europe and Asia, only one British.

PICUS VIRIDIS

221. *Picus viridis virescens* (Brehm)*. — THE GREEN WOODPECKER.

GECEINUS VIRESCENS Brehm, Handb. Naturg. Vog. Deutschl., p. 199 (1831—In winter in Germany).

(*Picus brehmi* Kleinschmidt, Orn. Germanica, 3rd ed., p. 5 (1919—New name for "*frondium*," which is preoccupied, as is *pinetorum*) need therefore not be used.)

Picus viridis pluvius Hartert, Brit. B., v, p. 125, Hand-List, p. 100 (1912). *Gecin*us *viridis* (Linnæus), Yarrell, II, p. 457; Saunders, p. 273.

DESCRIPTION.—*Adult male. Winter.*—Fore-head, crown and extending down centre of nape crimson mottled grey, feathers being grey with narrow and somewhat pointed crimson tips; sides of nape greyish-green; mantle, scapulars and back green, feathers on back of neck frequently, and on mantle and scapulars occasionally with more golden-green tips; rump bright greenish-yellow with

* British examples do not quite reach the extreme size of some middle European specimens, but the proportion of these larger individuals is so small that I do not consider a separation into two races justified. The measurements are as follows:

♂ British ...	wing 157-165 mm.	bill 42-48	30 measured.	
Continental ..	158-168	43-50	18	"
♀ British ...	159-165 (1-168)	42-48	22	"
Continental ..	159-169	43-48	22	"

H.F.W.

green showing here and there, only tips and fringes of feathers being yellow; upper tail-coverts same but with more green showing; lores, line over eye, patch below eye extending to anterior portion of ear-coverts and behind eye black; rest of ear-coverts and upper portion of sides of neck greenish-grey; moustachial stripe crimson surrounded with black; chin and throat greenish-grey; rest of under-parts pale greyish-green; lower flanks and under tail-coverts barred greenish-brown; axillaries and under wing-coverts pale greenish-yellow barred dark brown; tail-feathers dark brown with inconspicuous pale bars and greenish fringes especially on central pair, outermost pair with greenish tips; primaries dark brown, emarginated portions of outer webs and inner edge of inner webs with whitish tooth-like marks, outer webs of inner primaries and unemarginated portions of outer feathers with these markings obscured by bronze-green fringes; secondaries same but outer webs bronze-green with only faint indications on outer feathers of tooth-like pale marks; primary-coverts as unemarginated portions of primaries; rest of wing-coverts bronze-green. This plumage is acquired by complete moult July-Nov. *Summer*.—A moult confined to body-feathers, and probably involving only some of them as there is no appearance of heavy moult, takes place Jan.-March. Plumage as winter. Abrasion frequently makes mantle dull and brown. (Under-parts sometimes become much discoloured by contact with trees.)

Adult female.—Upper-parts as male; moustachial stripe black with no crimson; feathers of posterior portion of black patch over eye often with greyish-green tips; under-parts as male but feathers of lower-breast and belly with more or less distinct green or greenish-brown crescentic bars. N.B.—In some examples these bars are quite distinct and in others almost obsolete. In some adult males there is an indication of these bars.

Nestling.—Down absent. Has a pad, roughened by papillæ, at back of tarsal joint ("heel-pad"). Prominent, hard, rounded knob on each side of lower mandible near its base (J. H. Gurney, *Zool.*, 1901, p. 128).

Juvenile. Male.—Crown as adult but crimson tips duller and smaller showing more grey; mantle and scapulars greyish-green with whitish spots or bars; feathers of rump and upper tail-coverts with paler greenish-yellow tips and basal

Juvenile male Green Woodpecker (*Picus v. virescens*).

portions distinctly barred whitish ; feathers of lores, round eyes, ear-coverts and sides of neck greyish-white with black edgings ; moustachial stripe shorter than in adult, feathers of anterior portion black with greyish-white tips and those of posterior portion with small crimson tips ; chin and throat greyish-white, feathers with narrow black fringes ; rest of under-parts greyish-white tinged pale green and barred brown-black ; tail as adult but pale bars rather more distinct ; primaries with outer webs greyer and tooth-like marks more prominent, secondaries paler green and with obsolete pale bars on outer webs ; wing-coverts with pale spots or bars as mantle. *Female*.—As male but with feathers of moustachial stripe all with greyish-white tips and no crimson.

First winter.—As adults. The juvenile plumage is completely (including wings and tail) moulted Aug.-Nov.

Measurements and structure.—♂ wing 157-165 mm., tail 100-104, tarsus 26-32, bill from skull 42-48 (30 British measured). ♀ wing 159-168, bill 42-48. Primaries : 1st 1-8 mm. longer than longest primary-covert, in juvenile 15-20 longer, 4th and 5th longest but not always quite equal, 2nd 26-33 shorter, 3rd 4-6 shorter, 6th 2-6 shorter ; 3rd to 7th emarginated outer webs. Secondaries between 10th and 8th primaries, tips rounded. Tail graduated, 12 feathers, 4 inner pairs very stiff and strong but elastic, tips sharply pointed and slightly bifurcated, penultimate pair softer and tip more rounded, outermost pair very small hidden by tail-coverts, soft and tip rounded. Toes : 1st and 4th directed backwards, 2nd and 3rd forwards, 1st toe very short, 2nd longer and joined at base to 3rd which is much longer and about equal to 4th ; claws large, much curved and very strong (*see fig.*, vol. 1, p. 4). Bill very strong, straight and pointed, culmen ridged and compressed. Nostrils covered by bristle-like feathers.

Soft parts.—Bill greyish-black, base of lower mandible yellowish-olive ; legs and feet greyish-olive ; iris white.

CHARACTERS AND ALLIED FORMS.—*P. v. viridis* (Scandinavia, Prussia, Russia) has longer wing and bill ; *P. v. pronus* (Italy) has rather finer bill ; *P. v. innominatus* (south and west Persia) is considerably paler ; *P. v. sharpei* (southern Spain and Portugal) has darkish grey over and under eye and ear-coverts and unbarred under tail-coverts ; other forms (*P. v. karelini*, north Persia, *P. v. saundersi*, Caucasus, *P. v. dofleini*, Macedonia, Greece, *P. v. romanica*, Rumania) have been separated on slight differences of size and colour. Green colour and large size distinguish it from other British Woodpeckers.

FIELD-CHARACTERS.—Loud, laughing cries, “pleu, pleu, pleu” and “ha, ha, ha,” are unmistakable, as is coloration, dark green with yellow rump and crimson crown. Haunts woodlands and open country if well timbered. Is less arboreal than other Wood-

peckers, and obtains some of its food from anthills and elsewhere on ground, where it progresses by hops. Ascends tree-trunks by jerky leaps. Flight, in which short tail and heavy bill are conspicuous, rapid and noticeably undulating.

BREEDING-HABITS.—Usually haunts well-wooded districts, but in search of ants may be met with some distance from trees. *Nesting-hole.*—Bored in trunk of tree at varying heights, turning downward and widest at bottom. Average breadth of entrance $2\frac{3}{8}$ inch. Occasionally an old hole is used again, but nearly always a new one is made annually, as may be seen from chips below entrance. *Eggs.*—Usually 5 to 7, occasionally 8, pure white and glossy, but sometimes stained with yellow and rich brown by wet acting on wood. Average of 100 eggs, 32.1×23.2 mm. Max.: 35.3×23.3 and 35×25 . Min.: 27.7×20.1 . *Breeding-season.*—From end April onward unless dispossessed by Starlings, as is often the case, when most eggs laid late May. *Incubation.*—By both sexes, said to last 16-18 days but confirmation required. Single brooded.

FOOD.—Chiefly ants of various species and larvæ; also larvæ of wood-boring beetles and occasionally orthoptera (*Forficula*) and larvæ of lepidoptera (*Sesia culiciformis*, etc.). In one case 50-60 millipedes were found in one stomach (T. E. Gunn), and in another case worms. Vegetable matter is also eaten; oats, acorns, berries of *Pyracanthus* and apples are also recorded.

DISTRIBUTION.—*England and Wales.*—Resident. Fairly generally distributed but local, rare Lancs., extreme west and north-west Yorks., and Durham, breeds extreme south Northumberland, bred Westmorland 1918, but otherwise only occasional visitor Westmorland, Cumberland and Northumberland. Has bred Isle of Wight since 1910 and now well established there. *Scotland.*—Rare vagrant, but bred Loch Lomond 1912. Three Dumfries., one Clyde area, one Roxburgh, one "Forth," several "Tay," and one Orkneys, but most records not entirely satisfactory. *Ireland.*—Rare vagrant. Three recorded as obtained, one in 1847 and one in 1854, but no specimens exist.

DISTRIBUTION.—*Abroad.*—Central Europe, west to Holland, Belgium and France, in Germany east to Pomerania (or west Prussia), west to France, south to Alps (Switzerland), Austria, Hungary, Bosnia and Herzegovina. Replaced by larger form in Scandinavia north to about 63° N., north Russia, and east Prussia, and by others in Spain, Italy, Rumania, Balkan Peninsula, Caucasus, Asia Minor, and various parts of Persia.

Genus DRYOBATES Boie.

DRYOBATES Boie, Isis, 1826, II, p. 977 (Monotype: *Picus pubescens* L.).

This genus comprises all the Spotted four-toed Woodpeckers of Europe. Neck is much thinner than in Green Woodpeckers.

Tarsus feathered on uppermost portion only. Outer hind-toe longer than outer front toe. Colours black and white, with red here and there. (" *Dendrocopus* " or " *Picus* " of many authors. See note in *Hand-List Brit. B.*, p. 100.) Many species in Europe, America and Asia, only two in British Isles.

Key to species of genus DRYOBATES.

- Larger, wing over 100 mm. *D. major*, p. 38
 Smaller, wing under 100 mm. *D. minor*, p. 42

DRYOBATES MAJOR

222. *Dryobates major major* (L.)—THE NORTHERN GREAT SPOTTED WOODPECKER.

PICUS MAJOR Linnaeus, *Syst. Nat.*, ed. x, i, p. 114 (1758—Europe. Restricted typical locality : Sweden).

Dendrocopus major (Linnaeus), Yarrell, II, p. 470 (part) ; Saunders, p. 275 (part).

Bills of; A. The British Great Spotted Woodpecker (*Dryobates m. anglicus*); B. The Northern Great Spotted Woodpecker (*D. m. major*), showing extreme differences.

DESCRIPTION.—*Adult male and female.*—Like *D. m. anglicus* but scapulars and ear-coverts purer white, under-parts paler not so brown, outer tail-feathers usually more widely barred black. Molt as in *D. m. anglicus*, but autumn moult often not complete until Nov.

Measurements and structure.—♂ wing 135-146 mm., tail 86-95, tarsus 23-26, bill from skull 28-33, width at nostrils 10-12 (14 measured). ♀ wing 141-147, bill 28-33. Primaries : 1st usually 1-5 mm. shorter than longest primary-covert, sometimes 1-5 longer (one 9 longer) in adults, in juveniles 4-12 longer, 4th longest, 5th as long or 1-2 shorter, 2nd 20-25 shorter, 3rd 3-5 shorter, 6th 2-9 shorter ; 3rd to 6th emarginated outer webs. Rest of structure as Green Woodpecker, but 4th toe rather larger than 3rd. Bill is considerably stouter than in *D. m. anglicus*, not so striking in measurement but obvious to the eye.

CHARACTERS AND ALLIED FORMS.—*D. m. pinetorum* (central and west Europe to Pyrenees and Asia Minor) is slightly paler on under-parts and has slightly wider bill than *D. m. anglicus* and longer wing; *D. m. harterti* (Sardinia) is darker brown on under-parts and brighter crimson on vent and outer tail-feathers more strongly barred than *D. m. anglicus*; *D. m. parroti* (Corsica) is similar but with longer bill; *D. m. hispanus* (Spain and Portugal) is similar but with smaller white spots on wing-feathers and sometimes a little crimson in centre of breast-band; *D. m. mauritanus* (Marocco) is like last but paler on under-parts and has more crimson in centre of breast-band; *D. m. numidus* (Algeria, Tunisia) is like last but breast-band joined across and feathers black with crimson tips; *D. m. canariensis* (Tenerife) has dark under-parts but white flanks; *D. m. poelzami* (Caspian) is much like *D. m. anglicus* but with chocolate-brown under-parts and is smaller; *D. m. brevirostris* (Siberia) is much like *D. m. major* but with whiter under-parts; *D. m. tscherskii* (east Siberia, Manchuria) is like last but has larger white spots on secondaries; *D. m. kamtschaticus* (Kamtschatka) has less black on outer tail-feathers and more white on primaries; *D. m. japonicus* (Japan) is more like *D. m. pinetorum* but with larger white spots on secondaries. Black upper-parts with white scapular patches, crimson vent and under tail-coverts and larger size distinguish *D. major* from *D. minor*, while these characters with unstreaked under-parts and black dividing white of ear-coverts and neck-patch separate it from *D. medius*, *D. leucotus*, *D. syriacus* and *D. cabanisi*.

BREEDING-HABITS.—Similar to those of British race; haunts the great coniferous forests of northern Europe. *Eggs*.—5-6, sometimes 7, like those of British form, but slightly larger. Average of 17, 26.9×20.7 . Max.: 29.3×20.8 and 28.4×21.1 . Min.: 25.3×19.7 . *Breeding-season*.—Rather late; eggs seldom earlier than end of May or early June. Single brooded.

FOOD.—Small beetles (*Chrysomela sanguinolenta*), worms and grubs from dung and even berries of rowan are recorded as food of stragglers to Shetlands. Normal food larvæ of wood-boring coleoptera, hymenoptera, etc.

DISTRIBUTION.—*British Isles*.—Winter-visitor. Apparently fairly regular in small numbers Sept. to Nov. east coast Great Britain from Norfolk northwards, often visiting Shetlands and Orkneys, and occasionally west side Scotland and even O. Hebrides, also sometimes occurs inland in England (e.g. Northants, 1889), and south of Norfolk. In Ireland about forty occurrences in all probability of this form. Periodically occurs in considerable numbers, as in 1861, 1868, 1886, 1889, 1898, 1901, 1903, 1909. Very few specimens have yet been critically examined, but evidence for a above statement is strongly presumptive. Examples have been determined as follows:—Inverness, Mar., 1872; co. Down winter 1886-7;

Northants, Dec., 1889; Perth, Oct., 1891; Forfar, Nov., 1892; Lines., Oct., 1898; Sussex, Nov., 1903; Northumberland, Nov., 1904; Berwick, March, 1906; Yorks. and Forth, Sept., 1909; Fair Isle, several Sept.-Oct., 1909; East Ross, Oct., 1909; Aberdeen, Dec., 1909; Sussex, Nov., 1910.

DISTRIBUTION.—*Abroad.*—North Europe, from tree-limit as far south as East Prussia, north and middle Russia and Siberia. Accidental Færoes. In winter somewhat vagrant, thus appearing sometimes out of its range. Replaced by allied forms in central, west, and south Europe, Canaries, north-west Africa, and many parts of Asia.

223. *Dryobates major anglicus* (Hart.)—THE BRITISH GREAT SPOTTED WOODPECKER.

DENDROCOPUS MAJOR ANGLICUS Hartert, Nov. Zool., 1900, p. 528 (England); *id.*, Brit. B., i, p. 221.

Dendrocopus major (Linnæus), Yarrell, II, p. 470 (part); Saunders, p. 275 (part).

DESCRIPTION.—*Adult male.* *Winter.*—Bristle-like feathers covering nostrils black; fore-head buff to buffish-white; crown, back of neck, mantle, back, rump and upper tail-coverts glossy jet-black, feathers with grey bases; across nape a band of crimson, feathers having crimson tips; scapulars white, often tinged brownish; lores, narrow line over eye, broader line under eye, behind eye and ear-coverts and a patch on each side of hind-neck white, often tinged brownish; broad black line from base of lower mandibles down sides of throat and curving inwards on sides of upper-breast and joining black of upper-parts above and below white patch on sides of hind-neck (occasionally some crimson-tipped feathers at ends of band on breast and sometimes a touch or two of crimson between ends of band); centre of belly, lower part of flanks and under tail-coverts crimson; rest of under-parts pale brown to brownish-white; axillaries and under wing-coverts white and latter covering outer primaries marked blackish-brown; tail: two central pairs black (2nd pair sometimes with a spot of pale brown near tip), 3rd pair with brownish-white tip crossed by a black band, next two pairs (outer pairs) with basal half black and distal half dull white with two black bands varying but proximal one usually not crossing outer web, outermost (dwarf) pair black; primaries and secondaries black with white spot-like bars on outer webs and rounder tooth-like white marks on inner portions of inner webs, 1st primary with no white on outer web, 2nd with white on outer web only at base, spots on inner webs varying but usually only on basal halves of 2nd to 5th primaries; all wing-coverts black but inner feathers

Outermost dwarf tail-feather of British Great Spotted Woodpecker (*D. m. anglicus*).

of greater and median coverts white forming with white scapulars a large white patch on each side. This plumage is acquired by complete moult Aug.-Oct. *Summer*.—A moult confined to body-feathers, and probably involving only some of the body-feathers, takes place Jan.-April. Plumage as winter.

Adult female.—Like adult male but without crimson band on nape.

Nestling.—Down absent.

Juvenile. Male and female.—Like adult female but whole crown crimson, feathers being tipped crimson; black line from base of mandibles narrower and mixed with white and its continuation on sides of breast broken, feathers being only partially black; underparts generally paler than adults; crimson of vent much duller and feathers of belly tinged yellow and with scarcely any crimson; flanks often with a few blackish shaft-streaks; outer tail-feathers with rather more white and 2nd pair from centre often with a little white at tip; wing-feathers except inner secondaries tipped white; inner greater and median coverts with some black spots or bars and scapulars usually with a few black marks or blackish shaft-streaks.

First winter. Male and female.—Like adults. The juvenile plumage is completely (including wings and tail) moulted Aug.-Oct.

Measurements and structure.—♂ wing 126-135 mm., tail 78-86, tarsus 21-24, bill from skull 29-33, width at nostrils 8-10 (15 measured). ♀ wing 127-136. Primaries as *D. m. major* and rest of structure as Green Woodpecker, but 4th toe rather larger than 3rd. Bill distinctly finer than in *D. m. major*.

Soft parts.—Bill lead-grey, paler at base; legs and feet greenish-grey; iris crimson (adult) brown (juvenile).

FIELD-CHARACTERS.—Identified by boldly pied plumage, black and white with vivid crimson under tail-coverts, and, except in adult female, crimson patch on head. On wing resembles Starling in size and shape, but even at distance when colours cannot be made out its dipping flight is characteristic. More strictly arboreal than Green Woodpecker; affects woods and groves, particularly where there is old timber, and, to a less extent, isolated trees in fields and hedgerows. Cry a loud, sharp "tcheck, tcheck," repeated so quickly when nest is threatened as to become a scream. Hunger-cry of young in nest a continuous "itty, itty, tititty, itty." A loud, grinding rattle, which apparently functions as a song, is made in spring by extremely rapid and vibrating blows of bill on trunk or branch of a tree.

BREEDING-HABITS.—More of a forest bird than Green Woodpecker. Breeds generally at a good height, cutting a hole into tree trunk, which descends perpendicularly into a rounded chamber. Average breadth of entrance $1\frac{3}{4}$ -2 inches. *Eggs*.—Normally 5-6, sometimes 7, rarely 8; white and with some gloss. Average of 100 British eggs, 26.4×19.5 . Max.: 29×19.6 and 27×21.9 . Min.: 21×17.3

and 27.5×17.2 . *Breeding-season*.—Probably normally about May 20 in south England and a week or two later in north, but many pairs are dispossessed by Starlings and cannot breed till early June. *Incubation*.—Details of period lacking. Single brooded.

Food.—Mainly larvæ of wood-boring insects : coleoptera (*Rhagium*, etc. ; also *Hippodamia mutabilis*) ; lepidoptera (*Zeuzera æsculi*, *Cossus ligniperda*, etc.), and probably also hymenoptera. Spiders also freely taken ; and quite exceptionally, young birds, probably Blue Tits. Beech-mast, hazel-nuts and pips of crab apples taken in autumn.

DISTRIBUTION.—Confined to British Isles. *England and Wales*.—Resident. Fairly distributed in wooded parts, but scarce Lancs. and rare Westmorland and Cumberland, and very scarce north of Durham. *Scotland*.—Became extinct about middle of nineteenth century, but since 1887, when bred in Berwick., has gradually increased in south Scotland and is now fairly well spread, but very scarce, though increasing, in south-eastern half as well as Dumfries., and has nested since 1907 as far north as Dunkeld (Perth.) on western side of Perthshire in 1917 and Loch Lomond 1912, and even once in Aberdeen (1903). Several seen in summer 1919 and 1920 Loch Fyne district.*

DRYOBATES MINOR

224. *Dryobates minor comminutus* (Hart.)—THE BRITISH LESSER SPOTTED WOODPECKER.

DENDROCOPUS MINOR COMMINUTUS Hartert, Brit. B., I, p. 221 (1907—England. Type : Wingrave in Bucks.).

Dendrocopus minor (Linnæus), Yarrell, II, p. 477 ; Saunders, p. 277.

DESCRIPTION.—*Adult male*. *Winter*.—Fore-head brownish-white, feathers tipped brown to dark brown ; crown crimson mottled whitish, basal portion of feathers being dull white and tips crimson, narrow and somewhat pointed ; nape and upper part of mantle black ; scapulars, lower mantle and back white barred black, each feather being white with penultimate black bar ; rump and upper tail-coverts black ; lores brownish-white ; stripe over eye black ; stripe from behind eye, along upper part of ear-coverts and extending to wide patch at base of sides of neck white ; ear-coverts brown ; moustachial stripe extending to wide patch below ear-coverts to shoulders black ; chin brownish-white ; throat and rest of under-parts brown, sides of breast and flanks finely streaked black (sides of upper-breast more widely streaked) ; lower flanks

* Many winter occurrences of stray birds in north England and north and west Scotland are no doubt referable to the northern form, as are probably the examples recorded from Ireland.

and under tail-coverts with black penultimate bars or spots; axillaries white tinged brown often with some blackish spots; under wing-coverts white, a few with blackish tips and a patch of black at base of 1st primary; tail: two central pairs black, 3rd pair black with brownish-white tip and edging to distal half of outer web, next two pairs with black bases (more extended on inner webs) and distal portions brownish-white with two black bars near tips, the upper bar being confined to inner web on 4th pair and often broken on 5th pair, outermost (dwarf) pair white barred black; primaries brown-black with white spot-like bars on outer webs (on 2nd only at base) and tooth-like white marks on inner portions of inner webs, secondaries same but innermost three secondaries barred right across with white; primary-coverts brownish-black; greater coverts black with white spots on edges of both webs, inner feathers barred white; median coverts with broad white bars and narrow black tips; lesser coverts black. This plumage is acquired by complete moult July-Nov. *Summer*.—A moult confined to body-feathers, and probably involving only some of them, takes place Jan.-Feb. Plumage as in winter.

Showing differences in pattern of upper-parts of Great Spotted Woodpecker (left) and Lesser Spotted Woodpecker (right), and outermost dwarf tail-feather of British Lesser Spotted Woodpecker.

Adult female.—Like male but crown brownish-white or pale brown, feathers often with small and inconspicuous crimson tips and occasionally with black tips; black of nape extending more forward towards crown than in male.

Nestling.—(Not examined.)

Juvenile. Male and female.—Like adult male but crimson of crown rather duller, sides of breast and flanks inclined to be rather more streaked and the streaks more often short and spot-like than in adult.

First winter. Male and female.—Like adults. The juvenile plumage is completely (including wings and tail) moulted Aug.-Oct.

Measurements and structure.—♂ wing 85-88 mm., tail 49-53, tarsus 13-15, bill from skull 16-17 (12 measured). ♀ wing 85-89 (one 91). Primaries: 1st 1-3 mm. longer and occasionally 1-2 shorter than longest primary-covert in adult but rather longer (5-7 mm.) in juvenile, 4th and 5th longest but not always quite equal, 2nd 13-19 shorter (equal to 8th or between 7th and 8th), 3rd 1-3 shorter but occasionally equal to 4th and 5th, 6th 1-2 shorter; 3rd to 6th slightly emarginated outer webs. Secondaries between 9th and 10th primaries, tips rounded. Rest of structure as Green Woodpecker, but 4th toe rather larger than 3rd.

Soft parts.—Bill greyish-black; legs and feet dark greenish-grey; iris red-brown.

CHARACTERS AND ALLIED FORMS.—*D. m. minor* (Scandinavia, Russia) is larger, has whiter under-parts and more conspicuous streaks on sides of breast and wider black bars on outer tail-feathers; *D. m. hortorum* (middle Europe) has breast-streaks and wider black bars on tail-feathers as in *D. m. minor* but is intermediate both in size and colour of under-parts between that form and *D. m. comminutus*; *D. m. buturlini* (Italy, south France), has wider breast and flank streaks and more closely barred outer tail-feathers; *D. m. ledouci* (north-west Africa) is very close to last but black is more intense; *D. m. danfordi* (Asia Minor) is much like last but with a black line circling ear-coverts; *D. m. colchicus* (Caucasus) has black line round ear-coverts broken and breast-streaks narrower; *D. m. quadrifasciatus* (Lenkoran) is said to have very brown under-parts without black streaks and median coverts without or with much restricted white at tips; *D. m. morgani* (south-west Persia) has long bill, black line encircling ear-coverts which are whitish and broad bars on outer tail-feathers; *D. m. kamtschatkensis* (Siberia) is larger, has whiter under-parts than *D. m. minor*, fewer and paler flank-streaks and more white on back and wing-coverts; *D. m. immaculatus* (Kamtschatka, Anadyr) is like last, but pure white on under-parts, scarcely streaked and still whiter on back; *D. m. minutillus* (Ussuri, Yezo, Sachalin) is much like *D. m. minor* but has finer bill and usually less pronounced barring on back. Small size, crimson top of crown in male and whitish in female and barred scapulars and back, black streaks on flanks and absence of crimson on under tail-coverts distinguish it from *D. major*.

FIELD-CHARACTERS.—In general form and habits resembles Greater Spotted Woodpecker, but is smaller—approximately size of Chaffinch, plumage is barred rather than pied, and crimson patches are less vivid. Flight slow and hesitating. Would often escape notice, as it affects upper branches of trees more than trunk and limbs, but for its spring rattle—very similar to, but not so loud as Greater Spotted's—and its notes, “kick-kick” and, in spring, a loud “pee-pee-pee,” like call of Wryneck.

BREEDING-HABITS.—Generally found where there is plenty of old timber, especially in river valleys. Breeds at varying heights from a few feet to 60 or 70 ft. from ground, but only boring the nest-hole in very soft and decayed wood. No nest, eggs laid in a circular chamber cut out by bird and approached by an entrance passage. *Eggs.*—Usually 4 to 6, occasionally 7, while 8 and 9 are said to have been found; white and glossy, with delicate, rather transparent shells. Average of 51 British eggs, 18.5×14.2 . Max.: 21×14.5 and 19.2×15.6 . Min.: 17×14 and 19.7×13.3 mm. *Breeding-season.*—Earlier than *D. major*; generally about 2nd week May, but young have been found on May 9 and fresh eggs up to end May and mid-June. *Incubation.*—Apparently by hen alone; details of period lacking. Single brooded.

FOOD.—Chiefly larvæ of wood-boring insects; coleoptera (*Scolytidae*, *Hylesinus fraxini* and *Rhagium*) and lepidoptera (*Zeuzera æsculi*, etc.). Also hymenoptera (ants), larvæ of diptera, and spiders.

DISTRIBUTION.—*England and Wales.*—Resident. Local but common in some places in south England and midlands, becoming extremely local Yorks., very rare Lancs., and only vagrant northwards, though has nested once Cumberland. In eastern Wales fairly distributed, but in west practically unknown, though nested Merioneth 1908. *Scotland.*—One recorded Dumfries. 1865, and two others said obtained Solway district, said to have bred Renfrew 1904 and other reported occurrences elsewhere extremely doubtful. *Ireland.*—Six or seven recorded, but none since a very doubtful record in 1857; no specimen can be traced, and R. J. Ussher placed species in square brackets (*List of Irish Birds*, 1908).

DISTRIBUTION.—*Abroad.*—The Lesser Spotted Woodpecker of Holland appears to be the same as that of Great Britain. In other parts of Europe, north-west Africa, and north Asia, replaced by allied races.

[NOTE.—Numerous supposed occurrences of the BLACK WOODPECKER, *Dryocopus m. martius* (L.), have been recorded (Yarrell, II, p. 482; Saunders, p. 278), but none is sufficiently authenticated to admit of its inclusion. Caged birds are known to have been turned out on one occasion at least. Its distribution abroad is: Europe from Archangel in north Russia and Scandinavia to Cantabrian mountains, Alps and Balkan Peninsula, Caucasus and Siberia to Kamtschatka and Sachalin in the east, and Ussuriland in the south. Replaced by allied form in Kham (south-west Tibet).]

[NOTE.—Examples of the AMERICAN HAIRY WOODPECKER, *Dryobates villosus* (L.) or subspecies, are said to have been obtained in Yorks. (Yarrell, II, p. 485; Saunders, p. 276). An example of the AMERICAN DOWNY WOODPECKER, *Dryobates pubescens* (L.), or one of its forms, is said to have been killed in Dorset in 1836 (Yarrell, II, p. 485; Saunders, p. 278), and others have been recorded, but all these, as well as a specimen of the AMERICAN GOLDEN-WINGED WOODPECKER, *Colaptes auratus* (L.) or one of its subspecies (Yarrell, II, p. 486; Saunders, p. 278) said to have been shot in Wilts. in 1836, were no doubt due to importation. Donovan's statement in 1809 that an example of the THREE-TOED WOODPECKER, *Picoides tridactylus* (L.) or subspecies, had been shot in Scotland, is unsubstantiated (Yarrell, II, p. 486; Saunders, p. 278).]

SUBFAMILY JYNGINÆ.

Plumage much softer than in most *Picinæ*. Tail soft, and only slightly rounded, rectrices not pointed, nostrils open. Only one genus.

Genus JYNX L.

JYNX Linnaeus, Syst. Nat., ed. x, i, p. 112 (1758—Monotype: *Jynx torquilla*).

Characters of subfamily. Coloration different from that of all true Woodpeckers, upper side reminding one of that of certain Goatsuckers or Owls, brown and grey of various shades, buff with fine black markings. The reduced small outermost tail-feather not above but below next tail-feather, as usual. One species in several subspecies in Palæarctic region, some rather different species in Africa.

JYNX TORQUILLA

225. *Jynx torquilla torquilla* L.—THE WRYNECK.

JYNX TORQUILLA Linnaeus, Syst. Nat., ed. x, i, p. 112 (1758—Europe. Restricted typical locality: Sweden).

Jynx torquilla Linnaeus, Yarrell, II, p. 487; Saunders, p. 271.

DESCRIPTION. — *Adult male and female.* *Winter.*—General colour of upper-parts vermiculated grey and brown with rufous-brown and blackish bars and broad blackish streaks; fore-head, crown, sides of nape and sides of mantle variegated grey and brown barred rufous-brown and brown-black and with pale grey bands or patches usually divided centrally by black-brown on crown and

The Wryneck (*Jynx t. torquilla*).

thus somewhat spot-like, feathers of sides of mantle with narrow dark brown mesial streaks; centre of nape, back of neck, mantle and back with broad brown-black streaks margined rufous-brown with brown-black vermiculations and feathers edged grey with brown vermiculations; scapulars rufous vermiculated black-brown and with irregular brown-black centres with rufous or greyish semi-circular spots at tips of outer webs; rump and upper tail-coverts grey vermiculated and irregularly banded brown and with more or less well-defined narrow brown-black mesial streaks; centre portion of ear-coverts forming a streak rufous narrowly barred black;

rest of ear-coverts, lores and under eye buff, sometimes uniform, sometimes barred brown-black; apex of chin and along edges of lower mandible white narrowly barred brown-black, rest of chin and throat buff (varying in shade) barred same; rest of underparts creamy-white, with brown arrow-head shaped markings which are reduced to dots or entirely absent on centre of lower breast and belly, sides of breast variegated with rufous and brown vermiculations; flanks usually buff and often with some vermiculations and with some narrow brown-black bars as well as arrow-head markings; under tail-coverts buff with narrow dark brown bars and some brown vermiculations and usually with tips whiter; axillaries and under wing-coverts buff to cream narrowly

Primaries of adult Wryneck (upper) and juvenile (lower), showing much larger 1st primary in juvenile. N.B.—The wing-feathers in the juvenile specimen figured are not quite fully grown.

barred dark brown; tail grey vermiculated dark brown with ill-defined bands of grey-brown and widely spaced irregular bars of brown-black; primaries brown, outer webs barred rufous-buff and inner edges of inner webs with pale buff tooth-like marks somewhat vermiculated with brown, secondaries same but bars on outer webs vermiculated brown and tooth-like marks on inner webs larger, more rufous and more vermiculated, innermost secondaries vermiculated rufous-brown with brown-black central streaks and ill-defined rufous-buff bands; primary-coverts as primaries but buff bars somewhat vermiculated brown; rest of wing-coverts rufous-brown vermiculated dark-brown with pale grey or buff spots outlined with arrow-head shaped marks of brown-black. This plumage is acquired by complete moult in Aug.-Sept. *Summer*.—Another complete moult takes place Dec.-Mar. New plumage as winter.

Nestling.—Down absent. Mouth inside flesh, no spots, externally flanges pale flesh. Has a pad, roughened by papillæ, at back of tarsal joint ("heel-pad").

Juvenile.—As adults but grey of crown, sides of mantle and rump usually rather paler and bars on under-parts browner, less dark and not so prominent. At once distinguished from adult by its large 1st primary.

First winter.—Like adults. The juvenile plumage is completely moulted (including wings and tail) Aug.-Sept.

Measurements and structure.—♂ wing 83-91 mm., tail 61-71, tarsus 19-20, bill from skull 14.5-17 (12 measured). ♀ wing 83-91. Primaries: 1st minute about half primary-coverts in adults but in juvenile very much longer and broader and about half as long as longest primary, 3rd longest, 2nd sometimes as long but usually 1-3 mm. shorter, 4th 1-2 shorter but occasionally as long, 5th 4-6 shorter, 6th 7-10 shorter; outer webs of 3rd and 4th primaries emarginated. Secondaries shorter than 10th primary, but inner ones as long as 7th primary and innermost considerably shorter, tips rounded. Tail rounded, outermost pair dwarfed and hidden by under tail-coverts, penultimate pair 10 mm. and next pair 5 mm. shorter than rest, 12 feathers, soft and broad, tips rounded. Bill straight, rather slender, broadish at base tapering to sharp point, under mandible sloping upwards beyond the angle. Nostrils slit-like in upper part of nasal groove, lower part being covered by membrane. A few very short rictal bristles and at base of nostrils. Feet slender, 1st and 4th toes directed backwards, 2nd and 3rd forwards, 1st and 2nd much shorter and more slender than 3rd and 4th.

Soft parts.—Bill, legs and feet pale brownish horn-colour; iris hazel.

CHARACTERS AND ALLIED FORMS.—*J. t. tschusii* (Italy, Dalmatia, Sardinia) is smaller, darker on upper-parts and much more heavily barred on under-parts; *J. t. mauretanica* (Algeria) is similar to last but still smaller and darker; *J. t. japonica* (east Siberia, north China, Japan) has more buff under-parts and is slightly smaller than typical form. Blended greys and browns and dark streaks of upper-parts and black-barred buff throat distinguish Wryneck from other British birds.

FIELD-CHARACTERS. — Mottled and vermiculated grey-brown plumage, which suggests coloration of Nightjar, as well as its skulking and unobtrusive habits would often cause Wryneck to be overlooked on tree-trunks and boughs in its woodland haunts, were it not for its loud and frequent cry, a rapid whistling "quee, quee, quee," similar to call of Lesser Spotted Woodpecker. Alarm-note is a short "tuck," repeated quickly several times under stress of excitement. Although mainly arboreal, obtains much of its insect food on ground, where it progresses with elevated

tail, by a series of short jumps. Flight slow and hesitating. A close sitter, it resents inspection at nest by a snake-like hissing and curious contortions of head and neck.

BREEDING-HABITS.—A local species and less common than formerly. Nesting-sites variable; sometimes in natural hole of tree, often in orchard, occasionally in hole in bank or old Sand-Martin's burrow, in nesting-box or hole in sleeper fixed upright as fencing material. *Nest.*—None. Eggs laid on floor of hole. *Eggs.*—Usually about 8, but range from 6 to 10 or 12, twice 14 in number. If eggs are removed as laid the bird has been known to go on laying till 40 or more have been produced; white, rather dull and opaque as compared with Lesser Spotted Woodpecker's. Average of 100 eggs, 20.4×15.3 . Max.: 22.5×15.5 and 21.5×16.5 . Min.: 17.5×14.5 and 19×14 . *Breeding-season.*—From last week May onward. *Incubation.*—By both sexes (Oswip Lee). Period: variously given, but not less than two weeks and probably longer. *Fledging-period.*—About three weeks, but last hatched young may remain in nest some days after rest of brood has flown. Single brooded.

FOOD.—Chiefly ants of various species: *Myrmica rubra*, *Formica nigra*, *fusca*, etc.) and their pupæ. Coleoptera, lepidoptera and their larvæ, as well as spiders are also taken from trees. Woodlice are also said to be eaten, and according to Naumann elderberries, though rarely.

DISTRIBUTION.—*England and Wales.*—Summer-resident. Chiefly south-east England, scarce south-west, rare Wales (especially in north), very scarce Cheshire, north Staffs., and Derby., very local Yorks. and Durham, rare vagrant Northumberland, as now in Lancs., Westmorland and Cumberland, where formerly bred. *Scotland.*—Very scarce passage-migrant on east side and most often noted in northern isles. Very rare vagrant to south-west, has not occurred from Argyll. northwards or in Inner and only once (St. Kilda, Sept. 6, 1910) in Outer Hebrides. *Ireland.*—Seven. One in May, six in autumn at or near coast.

MIGRATIONS.—*Great Britain.*—Early arrivals of summer-residents begin fourth week March (early dates Berks. Feb. 28, 1919, Surrey Mar. 12, 1911, Bucks. Mar. 13, 1911, Hants. Mar. 14, 1910, Essex Mar. 16, 1906); main arrival begins first week April and lasts to mid-May. Passage-migration probable by east coast route (Channel to northern isles) second week May to early June, but numbers probably small and evidence of movement not conclusive at present. Summer-residents probably begin to move south early Aug. and emigration from south coast begins end of month. Passage-migration east coast (northern isles to Channel), small numbers in north but larger ones Humber southwards, begins

end Aug. A few records suggest a small passage-movement west coast (south of Solway) same time. Combined movements continue to third week Sept. (late dates Staffs. Sept. 28, 1909, Kirkcudbright third week Nov. 1916).

DISTRIBUTION.—*Abroad*.—Europe and temperate north Asia, passing through the Sahara and Egypt, and wintering in tropical Africa and India. Casual Færoes. Replaced by closely-allied forms in the far east, Sardinia, Algeria and Tunisia.

ORDER CUCULI.

Comprises Cuckoos and Plantain-Eaters (*Musophagidæ*). Palate desmognathous; cervical vertebræ 14. No basi-pterygoid processes. Vomer very small or absent. Foot with outer toe reversible. Oil-gland bare. Skin very thin and tender. Primaries 10, secondaries 9 or 10, in *Scythrops* (Australia) 13. Rectrices 10, in *Crotophaga* (America) 8. Young naked, without down. Separable into some well-defined subfamilies: *Cuculinæ*, in Old and New, *Phænicophainæ* and *Centropodinæ* in Old World only, *Crotophaginæ* New World only. Only *Cuculinæ* in Europe.

FAMILY CUCULIDÆ.

Characters as given above for *Cuculi* (excluding *Musophagidæ*).

Key to genera of family CUCULIDÆ.

1 {	Head crested	<i>Clamator</i> , p. 56
	Head not crested	2
2 {	Nostrils round, underside barred	<i>Cuculus</i> , p. 50
	Nostrils oval, underside not barred	<i>Coccyzus</i> , p. 59

Genus CUCULUS L.

CUCULUS Linnaeus, Syst. Nat., ed. x, i, p. 110 (1758—Type by tautonymy: "*Cuculus*" = *Cuculus canorus*).

No crest. Nostrils round. Rump-feathers elongated, stiff and more copious than in other genera of the family, forming a thick bolster, upper tail-coverts very long and somewhat pointed, reaching to about middle of tail. Third primary longest. Tarsus feathered for about two-thirds or three-fourths. Numerous species in all countries, but absent from America. Only one species in Europe.

CUCULUS CANORUS

226. *Cuculus canorus canorus* L.—THE CUCKOO.

CUCULUS CANORUS Linnæus, Syst. Nat., ed. x, i, p. 110 (1758—Europe. Restricted typical locality : Sweden).

Cuculus canorus Linnæus, Yarrell, II, p. 387 ; Saunders, p. 287.

DESCRIPTION.—*Adult male. Winter and summer.*—Whole upper-parts slate-grey, rump and upper tail-coverts of a purer colour than rest, upper tail-coverts narrow and elongated and with indistinct greyish tips ; chin, throat, ear-coverts and upper-breast ashy-grey ; breast, belly and flanks white each feather with brownish-black bars about 1.5 to 2.5 wide and 4-5 mm. apart ; under tail-coverts pale creamy-buff, shorter ones with a few spots or bars or almost without markings, longer ones usually whiter and more regularly barred ; axillaries as flanks but more closely barred ; smaller under wing-coverts more faintly barred and longer ones usually greyer irregularly barred dark grey ; tail bluish-black, greyer at base, feathers tipped white and with white spots varying in size and number on each side of shaft and on edges of inner webs, white spots on outermost pair of feathers and at bases of rest larger and forming irregular bars ; primaries : outer webs dark brownish-grey, inner webs browner with white tooth-like bars on proximal three-quarters and white patch at base of inner feathers (1st primary usually has also some white marks at base of outer web), secondaries same with white bases but without tooth-like white bars ; primary-coverts dark slate-grey ; rest of wing-coverts like mantle but a shade browner. A complete moult takes place in winter-quarters from Nov.-Mar. Adults in April and May in Europe are sometimes moulting body-feathers and I think these are finishing their winter-moult. In June and July a heavier and more regular moult of the body-feathers takes place in adults and sometimes lesser and median wing-coverts are involved, and I think this must represent a second partial moult in which the wing- and tail-feathers do not participate.

Adult female. Winter and summer.—Upper-parts like adult male but with slightly more brownish tinge, and edges of lower and upper tail-coverts often barred, or partially barred, white ; grey of throat tinged buffish-brown and usually not extending so far down ; feathers of lower throat and sides of neck grey, more or less tipped or barred with buff-brown ; feathers of upper-breast buff-brown barred with dark brown, forming an ill-defined and variable breast-band ; rest of under-parts and tail as adult male ; wings and wing-coverts as adult male but slightly browner. Moult as adult male.

Adult female. "Hepatic" variety. Winter and summer.—A constantly recurring but scarce rufous variety confined to females (one examined sexed male but not on reliable authority) has been

considered by many to be a stage of plumage connected with age but moulting specimens prove that such birds are rufous throughout life. Whole upper-parts rich chestnut each feather broadly barred black-brown, feathers of rump and upper tail-coverts with bars broken and spot-like or absent, upper tail-coverts usually tipped greyish-white; ear-coverts and sides of neck paler chestnut with whitish bases to the feathers; chin, throat and breast more or less tinged rufous-buff, each feather barred black-brown; rest of under-parts as normal female but usually tinged buff; tail-feathers broadly and unevenly barred black and chestnut with a very broad black penultimate bar and white tips and spots as in normal female; primaries and secondaries black-brown with broken tooth-like bars on both webs chestnut except on outer edges and at bases of inner webs where they are white; primary-coverts black-brown with chestnut spots at tips and on outer webs; rest of wing-coverts as upper-parts.

Nestling.—No down. Skin rather dark on head, paler on back. Mouth inside orange, externally flanges yellow (J. H. Owen).

Juvenile. Male and female.—Upper-parts of two distinct, but rather variable, types, one grey-brown to dark brownish-slate not distinctly barred, the other barred rufous-brown. *First type*: forehead and crown dark brown to dark brownish-slate, feathers narrowly edged greyish- to buffish-white often with a few white feathers in centre of crown and with buffish spots or bars in middle portion of feathers, back of neck same but with pale buff or whitish bars more prominent; patch of white on nape; mantle and scapulars as crown but centre of mantle often greyer; back, rump and upper tail-coverts purer grey, distinctly tipped white and lower and longer upper tail-coverts browner and barred white, or rufous and white; chin, throat, ear-coverts and sides of neck dull white very heavily barred brown-black; breast and belly as adults but usually tinged buff; under tail-coverts in some with scarcely any bars or spots, in others with bars as breast; tail: sometimes much as adults but with larger white spots, but usually with narrow and irregular chestnut-brown bars in addition to white spots; primaries and secondaries black-brown tipped white, with tooth-like bars on both webs but not reaching shaft, chestnut-brown on outer and distal portion of inner webs and white on rest of inner

Juvenile Cuckoo (*Cuculus c. canorus*).

webs, sometimes reduced to small spots on outer webs of primaries ; primary-coverts black-brown tipped white, sometimes with chestnut-brown spots on outer webs ; wing-coverts dark brown tipped white and with chestnut-brown spots or bars varying in prominence and not reaching shafts of feathers and usually absent from lesser coverts. *Second type* : upper-parts somewhat like hepatic variety of adult female but feathers with whitish fringes and chestnut much less prominent and less brilliant, more rufous-brown or chestnut-brown and usually paler ; crown with chestnut-brown bars often scarcely showing, frequently white feathers in centre of crown ; patch of white feathers on nape ; rump and upper tail-coverts tipped whitish and barred grey, grey-brown or dark brown and usually with a slatish tinge or wash ; under-parts as in other type of juvenile but usually with more buff tinge and chin and throat often not so heavily barred ; tail and wing-feathers much as in hepatic female but chestnut not so rich and wing-feathers tipped whitish ; wing-coverts as mantle.

Juvenile. "Hepatic" female.—More chestnut on upper-parts than second type described above and rump and upper tail-coverts usually with few dark bars. Like adult hepatic female but with white nape-spot, crown more dark brown and nape barred paler brown, less chestnut, most feathers of upper-parts with whitish tips, rump more or less barred not so uniform, chin and throat more thickly barred and not so rufous-buff.

First summer. Male.—Like adult male but with varying number of juvenile barred secondaries and often greater coverts retained unmoulted. *Female.*—Some barred juvenile secondaries and greater coverts retained as in male, often barring on other coverts and spots of rufous-brown on outer webs of primaries ; crown and nape often barred rufous-brown and sometimes some barring on mantle and scapulars ; grey of throat restricted, barred, rufous-tinged feathers extending almost to chin. The juvenile plumage is completely moulted (except that some secondaries and greater coverts appear always to be retained) from Nov.-Mar. in winter-quarters. A partial moult of body-feathers takes place in Europe Aug.-Oct., but this seems to be part of the winter moult though it certainly often ceases and then recommences.

Measurements and structure.—♂ wing 216-228 mm., tail 165-180, tarsus 18-24, bill from skull 24-28 (16 British measured). ♀ wing 200-223. Primaries : 3rd longest, 1st 60-75 mm. shorter between 6th and 8th, 2nd and 4th 10-15 shorter, 5th 24-32 shorter, 6th 40-52 shorter ; outer webs not definitely emarginated but those of first three primaries tapering off at tips. Tail rounded, outermost pair very short, 35-45 mm. shorter than central, penultimate pair 10-20 shorter, 10 feathers, tips rounded. Bill rather slender, broad at base, compressed at tip, upper mandible slightly curved and overlapping a little at tip. Nostrils bare, elliptical with prominent margin. No rictal or nasal bristles. Tarsus short and

feathered half-way down, toes slender, 2nd and 3rd (longest) directed forwards and 1st (very short) and 4th backwards (*see* fig. A, vol. 1, p. 5).

Soft parts.—Bill : upper mandible dark horn, lower greenish, paler at base ; legs and feet yellow ; iris orange-yellow (hazel in juvenile) ; eyelids yellow ; inside mouth reddish-orange, gape yellow.

CHARACTERS AND ALLIED FORMS.—*C. c. kleinschmidtii* (Corsica) stated to be darker on upper-parts is doubtful ; *C. c. minor* (Spain, north-west Africa) is smaller ; *C. c. telephonus* (west Siberia to Japan and Himalayas) has barring on under-parts finer and less black ; *C. c. bakeri* (Khasia Mts., India) has darker upper-parts and broad-banded under-parts. *C. optatus* (Siberia, north Japan, China, India) has barring of under-parts broad and black and under tail- and wing-coverts rusty-cream. *C. intermedius* (Japan, China, Himalayas) is very small. *C. micropterus* (south and middle China, India) is dark grey-brown on upper-parts. Long white-tipped tail, uniform slate-grey upper-parts of adult and barred under-parts together with structure of bill and feet distinguish Cuckoos from other British birds.

FIELD-CHARACTERS.—Blue-grey colour, barred under-parts and long tail of adult suggest a Sparrow-Hawk, but wings are shorter, tail-feathers tipped white, and flight slow and laboured. Haunts very varied, e.g. woodlands, cultivated districts and sand-dunes, whilst grouse-moors and open hill-country are much affected. Call of male, “cuck-oo,” and, as season advances, “cuck-cuck-oo,” is sometimes preceded by hoarse “kwow-wow-wow.” Female has a loud water-bubbling cry. Young, which is clove-brown in colour with white spot on nape, shows resentment when in nest by a low hiss, and, if handled, emits a shrill whistling scream. The hunger-cry, a querulous and incessant “chiz, chiz, chiz” used only after nest is vacated, is uttered regardless of warning alarm-notes of foster-parents.

BREEDING-HABITS.—Parasitic on other species, placing a single egg in a nest and generally removing one of the fosterer's at same time. In rare cases where two or three Cuckoo's eggs are found in one nest, they are produce of different hens. Estimates of number of eggs laid vary from 5-8 (Saunders) to about 17-22 laid on alternate days (Rey). Each hen confines herself to a limited locality, and shows a preference for some particular fosterer. In case of Reed-Warbler maximum number of eggs from one female in one season appears to be about 11 or 12, but under exceptionally favourable circumstances E. Chance records 16 and even 21 from one hen in nests of Meadow-Pipit. Rey's series of 16 and 17 from nests of Red-backed Shrike in Germany are undoubtedly also genuine. Capek suggests two clutches of 5-7 and about 4-5 eggs with an interval between them. *Eggs*.—Variable, but less so in

British Isles than on Continent; shell always thick and heavy, shape frequently blunt, texture also characteristic but colour and markings vary widely, some being reddish, others bluish, greenish, grey-brown more or less speckled, spotted or blotched with darker shades. Small black spots are also nearly always present. Rey's average for 626 eggs is 22.4×16.5 mm. Max.: 25.5×17.8 and 25×18.1 . Min.: 20×15.5 and 20.7×14.7 . *Breeding-season*.—Generally latter part of May and June, exceptionally early in May or late in April, and early July. *Incubation*.—Period 12-13 days. The young Cuckoo ejects its companions from the nest, in which it remains alone for about 20 days.

FOOD.—Chiefly injurious insects; caterpillars of many species, especially hairy ones refused by most birds. Among those identified are *Pieris*, *Zeuzera*, *Spilosoma*, *Abraxas*, *Lasiocampa*, *Cosmotriche*. Also larvæ of phytophagous hymenoptera (*Nematus*, *Tenthredo*, etc.); larvæ of diptera (*Tipula*, *Syrphus*, etc.); small coleoptera and odonata (dragon-flies); while worms and eggs are also occasionally taken and in a few cases birds' eggs have been found in stomachs. Young are reared on diet which varies according to fosterer, including larvæ of lepidoptera, coleoptera, diptera, orthoptera, etc., worms, small snails and even vegetable food.

DISTRIBUTION.—*British Isles*.—Summer-resident. Generally distributed, but scarce migrant in Shetlands, though occurs annually in small numbers and exceptionally in larger numbers at Fair Isle on spring migration.

MIGRATIONS.—*British Isles*.—Early arrivals of summer-residents begin last three days March (early dates Mar. 10, 1884, Mar. 24, Devon 1910, Mar. 26, Gloucester 1907, Yorks. 1910, Devon 1912, Mar. 27, Sussex 1909); main arrival second week April, probably accompanied by certain number of passage-migrants though in most years numbers appear to be quite small; there are indications of a west coast route (Channel to Hebrides and northern isles) being used by these, but very little of an east coast route. Movement continues throughout May and in northern isles to second week June. Adults begin to leave early in July and stragglers are recorded up to last week Aug. Juveniles leave during Aug. and first half Sept. with stragglers up to end Sept. Passage-movements east and west coasts (Forth and Solway southwards) mid-July to mid-Sept. (Late dates Staffs. Oct. 3, 1912, Suffolk Oct. 12, 1909, co. Down Nov. 26, 1900, Wilts. Dec. 1, 1916, Cheshire Dec. 26, 1897 or 8).

DISTRIBUTION.—*Abroad*.—Europe from within the Arctic Circle to Pyrenees, Italy and south-east Europe, and a great part of Asia. In winter in Africa south of Sahara and parts of south Asia. Casual or on passage Canary Islands, Madeira and Færoes. Replaced by allied forms in parts of Asia, and in Iberian Peninsula and north-west Africa.

Genus CLAMATOR Kaup.

CLAMATOR Kaup, Skizz. Entwick. Gesch. & Naturl. Syst., p. 53* (1829—Monotype: *C. glandarius*).

Differs from *Cuculus* in its crested head and longitudinal, slit-like nostrils. Third and fourth primary longest. Lays eggs in nests of other birds like *Cuculus*. Eight species in Africa and India, only one in Europe. (*Coccystes* of many authors.)

CLAMATOR GLANDARIUS

227. *Clamator glandarius* (L.)—THE GREAT SPOTTED CUCKOO.

CUCULUS GLANDARIUS Linnæus, Syst. Nat., ed. x, i, p. 111 (1758—North Africa and South Europe).

Coccystes glandarius (Linnæus), Yarrell, II, p. 408; Saunders, p. 289.

DESCRIPTION.—*Adult male and female.*

Winter and summer.—

Fore-head and crown blue-grey, feathers with blackish shafts and often edged and tipped dark brownish-grey with small, inconspicuous creamy spot at extreme tip, feathers narrow and elongated forming conspicuous crest; centre of nape blackish-brown; mantle and scapulars rather

paler brown, a few feathers of mantle slightly fringed whitish, scapulars with conspicuous white spots at tip; back and rump greyer-brown, narrowly tipped greyish-white; upper tail-coverts same but with longer white tips and outer feathers with outer webs white; lores, over and below eyes, ear-coverts extending to nape grey to blackish-grey; chin and throat reaching upper-breast and extending to sides of nape buffish-cream varying somewhat in intensity, most feathers with dark grey shafts; rest of under-parts white tinged cream, flanks lightly washed greyish; axillaries and under wing-coverts buffish-cream, longer coverts pale grey to white; tail: central pair dark brown with slight metallic-green tinge and small white tip, rest darker

Great Spotted Cuckoo (*Clamator glandarius*).

* The page is numbered " 35, " but this is clearly a misprint for 53.—E.H.

with more bluish tinge and with long white tips ; wing-feathers brown, outer webs and tips darker with slight metallic-green tinge, inner webs margined whitish, tips white, broader on secondaries than primaries ; all wing-coverts dark brown with conspicuous, large, somewhat rounded white tips giving a spotted appearance. This plumage is acquired by complete moult Dec.-Mar. (occasionally Nov. and April). Abrasion causes crown to become paler grey and dark edges and tips of feathers wear off, rest of upper-parts become paler brown and white tips become reduced, metallic tinge in tail- and wing-feathers is lost, chin and throat become paler.

Nestling.—(Not examined.)

Juvenile.—Fore-head and crown black with a minute buff dot at tip of most feathers, which are not so narrow and elongated as in adult ; brown of upper-parts and wing-coverts darker, spots at tips of feathers smaller and creamy not white ; back and rump darker without greyish-white tips ; chin and throat deeper buffish-cream and feathers without dark grey shafts ; under tail-coverts more creamy ; tail as adult but with considerably less white at tips ; primaries chestnut except for their distal quarters which are dark brown with white tips as in adult, 1st primary with considerably more brown than rest and 2nd with mixture of brown on outer web ; secondaries as in adult but often with some chestnut down centre of inner feathers ; primary-coverts as adult.

First summer.—From Jan. to Mar. a moult takes place which varies in extent individually especially in wing-feathers, wing-coverts and tail-feathers of which some almost invariably remain unmoulted. This plumage sometimes resembles that of juvenile but tips of wing-coverts and scapulars are usually rather whiter, though not so long and white as in adult, but sometimes plumage is much like adult but crown darker not so grey and more or less chestnut in primaries, usually mixture of chestnut and brown.

Measurements and structure.—♂ wing 191-222 mm., tail 180-218, tarsus 31-35, bill from skull 28-31 (12 measured). ♀ wing 182-206. Primaries : 1st about half second, 3rd and 4th longest, 2nd and 5th 15-20 mm. shorter ; outer webs of primaries not emarginated. Secondaries : outer ones shorter than 10th primary, inner ones about equal, tips rounded. Tail much graduated : central pair longest, next occasionally equal, usually 2-5 mm. shorter, next 5-15 shorter, penultimate 25-40 shorter, outer pair 75-95 shorter, ten feathers, narrow, tips sloped off. Bill fairly strong, culmen curved, tip projecting beyond lower mandible. Nostrils small, slit-like, bare of feathers. No rictal or nasal bristles. Toes, long and weak. Tarsal joint feathered.

Soft parts.—Bill blackish grey-brown, base of lower mandible paler ; legs and feet brownish-grey ; iris dark brown, orbital ring reddish-orange.

CHARACTERS.—No subspecies recognized. Spotted wing-coverts, creamy throat, crest, very long, graduated, white-tipped tail are distinctive characters.

FIELD-CHARACTERS.—Loud call-note, harsh chatter and very long white-edged tail at once attract attention in flight or at rest. At close quarters bluish-grey crown and crest are readily distinguished and with whitish under-surface render it impossible to confuse with any other species. Young birds look almost black above, yellowish below, but adults have mantle, wings and most of tail brown, spotted with white. Has various notes: spring call, wailing “kee-oowa” or “kee-oo.” (S. S. Allen). (F.C.R.J.)

BREEDING-HABITS.—Parasitic on various species of Corvidæ; in Spain and Portugal rarely in nests of *Corvus c. hispanus*, occasionally *Cyanopica c. cooki*, and commonly *Pica p. melanotos*; in north-west Africa, *Pica p. mauritanica*; in Egypt, *Corvus cornix*; in Cyprus, *Pica pica*; in Palestine, *Corvus c. syriacus*; in Somaliland, *Corvus affinis*; and in south Africa in nests of several other species (*Corvus capensis*, *Amydrus morio*, etc.). Several hens may lay in a single nest, or one hen may lay several eggs in one nest and each time a fosterer's egg is generally removed, though this is not always the case. Eggs.—Not unlike Magpies, but elliptical in shape, with blunt ends, and smooth surface; ground pale greenish-blue, rather thickly dotted with spots of light liver-brown or reddish-brown. Average of 78 eggs, 32.1×24 mm. Max.: 35.4×25.1 and 33.6×26.3 . Min.: 28.4×22 and 31×21.5 . Breeding-season.—Last ten days of April and early May is usual time in Spain, but eggs have been taken early in April and up to June. Young are hatched before Magpie's eggs laid about same time, but make no attempt to eject foster-brothers and are reared together.

FOOD.—Chiefly orthoptera (locusts, grasshoppers, etc.) and larvæ of lepidoptera (including several species of large hairy caterpillars). Also coleoptera, hymenoptera (ants) and eggs of insects.

DISTRIBUTION.—*British Isles*.—Four. One Omev Isle (Galway) about March 1842. One seen Skellig Rock (Kerry) April 30, 1897. One near Bellingham (Northumberland) Aug. 5, 1870. One Yarmouth (Norfolk) Oct. 18, 1896 (Saunders, p. 289).

DISTRIBUTION.—*Abroad*.—During breeding-season in north Africa and south-west Europe, rare in Greece, east to Asia Minor, Cyprus, Syria and Persia, casual in Bulgaria and Dalmatia, also in Italy, three times observed in Germany, casual Canaries. Wintering in tropical and south Africa. Breeds also in tropical and south Africa.

Genus COCCYZUS Vieill.

Coccyzus Vieillot, *Analyse nouv. orn.*, p. 28 (1816—Monotype: "Coucou de la Caroline Buffon," i.e. *Cuculus americanus* L.).

No crest. Nostrils longitudinal. Bill more compressed than in *Cuculus* and *Clamator*. Tarsus entirely bare. Third and fourth primaries longest. Rump-feathers much less copious than in *Cuculus*. Underside not barred, uniform whitish or buffy. Sexes alike. Seven species with several subspecies. North and South America, including West Indies and Galapagos Islands.

Key to species of genus COCCYZUS.

Inner webs of primaries rufous, outer rectrices blackish with wide white tips . . . *C. americanus*, p. 59

Inner webs of primaries brown, edged with buff, outer rectrices brownish-grey, narrowly tipped with dull white *C. erythrophthalmus*, p. 61

COCCYZUS AMERICANUS

228. *Coccyzus americanus americanus* (L.) — THE AMERICAN YELLOW-BILLED CUCKOO.

CUCULUS AMERICANUS Linnæus, *Syst. Nat.*, ed. x, i, p. 111 (1758—Carolina).

Coccyzus americanus (Linnæus), Yarrell, II, p. 414; Saunders, p. 290 (in text).

DESCRIPTION.—*Adult male and female. Winter.*—Whole upper-parts brown with a slight bronzy gloss; fore-head, lores and line over eye washed grey; ear-coverts dark brown; whole under-parts extending to cheeks and lower part of ear-coverts white, chin tinged buffish, throat and breast tinged ashy-grey, axillaries and under wing-coverts creamy-buff; tail: central pair as upper-parts but with rather more gloss, next pair same but darker especially on distal half and with small whitish tips, three outer pairs brown-black with long white tips and narrow white edging to inner and outer webs (white tips are longest on outermost pair which also has more white on outer webs); wing-feathers: distal portions and most of outer webs brown as upper-parts, central portions, extending more or less on to outer webs of primaries, chestnut becoming buff on inner edge of inner webs especially basally and often creamy-white at base of secondaries, first primary often without chestnut and inner secondaries without chestnut or with only a tinge in centre of feathers; primary-coverts brown marked rufous on middle portions of inner and outer webs; rest of wing-coverts as upper-parts but with varying amount of rufous tinge on outer feathers. This plumage is acquired by complete moult

July-Sept. *Summer*.—A complete moult takes place Jan.-Mar. occasionally April. Plumage as winter.

Nestling.—(Not examined.)

Juvenile.—Like adults but usually rather browner on forehead and upper-parts and with more rusty tinge on wing-coverts, primary-coverts and outer webs of primaries; tail-feathers not so black and white tips not so sharply defined.

First winter.—Like adults except for primary-coverts, primaries and tail which are apparently not moulted. The juvenile body-feathers and wing-coverts are moulted Aug.-Sept., but material available is insufficient to show exact extent of moult.

Measurements and structure.—♂ wing 138-156 mm., tail 136-158, tarsus 22-27, bill from skull 28-30 (12 measured). ♀ wing 137-150. Primaries: 3rd longest, 4th rarely equal, usually 1-5 mm. shorter, 1st 50-58 shorter, 2nd 12-17 shorter, 5th 10-18 shorter; outer webs not definitely emarginated but narrowing slightly on distal halves. Tail graduated, two central pairs about equal and longest, 3rd pair 2-8 mm. shorter, 4th pair 17-30 shorter, outermost pair 40-62 shorter, 10 feathers, tips rounded. Bill rather slender, broad at base, compressed at tip, curved and somewhat arched, upper mandible overlapping at tip. Nostrils bare, oblong without a prominent margin. No rictal or nasal bristles. Tarsus feathered a little below the joint, toes slender, 2nd and 3rd (longest) directed forwards and 1st (very short) and 4th backwards.

Soft parts.—Bill above and tip of lower mandible blackish horn-colour, rest of lower mandible and basal half of cutting edge of upper mandible yellow; legs and feet dusky slate-grey; iris dark brown; eyelids lemon-yellow; bare skin round eye greyish in adult, pale yellow in young (Ridgway).

CHARACTERS AND ALLIED FORMS.—*C. a. occidentalis* (western N. America) is very slightly larger and has a slightly stouter bill. Easily distinguished from common Cuckoo by its smaller size and uniform coloration.

BREEDING-HABITS.—Not parasitic but builds very slight nest of twigs, lined with grass, blossoms, moss, etc., among branches of trees. *Eggs*.—Normally 3-4, sometimes only 2, or 5 to 7, greenish-blue in colour, with characteristic cloudy marks and decidedly paler than those of Black-billed Cuckoo. Average of 66 eggs, 30.2×22.9 mm. Max.: 33.5×25.4 . Min.: 27.9×21.3 (Bendire). *Breeding-season*.—Rather late, more often early in July than in June, but in southern States occasionally late in April. Single brooded in north, but sometimes double brooded in south. *Incubation*.—About 14 days, chiefly by hen (Bendire).

FOOD.—Mainly larvæ of lepidoptera. Beal records from 21 stomach examinations, 355 caterpillars, 18 coleoptera, 23 orthoptera (grasshoppers), 31 hymenoptera (saw-flies), 14 hemiptera, 6 diptera.

Also 12 arachnida. Bendire also records in addition to larvæ, grasshoppers, beetles, cicadas, small snails and different kinds of fruit, and Davison winged ants. Perhaps occasionally also eggs. Widmann adds *Ephemeræ* in spring and elderberries in autumn.

DISTRIBUTION.—*British Isles*.—Rare vagrant. About twelve as follows :—*England and Wales*.—Pembroke, autumn, 1832. Cornwall about 1835. Cardigan, Oct. 29, 1870. Lundy Is. (Devon), Oct., 1874. Dorset, Oct. 5, 1895. Isle of Wight, Oct., 1896. Anglesey, Nov. 10, 1899. Somerset, Oct. 6, 1901. Hants. Oct. 30, 1901. *Scotland*.—Colonsay Isle (Argyll.), Nov. 6, 1904. *Ireland*.—Cork, autumn, 1825. Dublin, autumn, 1832 (*cf.* Yarrell. Saunders, and *Brit. B.*, I, p. 284, IV, p. 126).

DISTRIBUTION.—*Abroad*.—South-eastern parts of North America, migrates through West Indies and Central America, and winters in South America. Rare straggler to Greenland, Europe (Italy, Belgium, ? France). Replaced by closely allied subspecies in western U.S. and British Columbia and in South America.

COCYZUS ERYTHROPTALMUS

229. *Coccyzus erythrophthalmus* (Wilson)—THE AMERICAN BLACK-BILLED CUCKOO.

CUCULUS ERYTHROPTALMA Wilson, Amer. Orn., IV, 1811, 16, pl. 28, fig. 2 (1811—Typical locality probably near Philadelphia).

Coccyzus erythrophthalmus Yarrell, II, p. 415 (footnote); Saunders, p. 290 (in text).

Outer tail-feather of the American Yellow-billed Cuckoo (*Coccyzus a. americanus*).

Outer tail-feather of the American Black-billed Cuckoo (*C. erythrophthalmus*).

DESCRIPTION.—*Adult male and female. Winter*.—Upper-parts as *C. a. americanus* but with rather more bronzy gloss; ear-coverts as upper-parts and not so dark as in *C. a. americanus*; under-parts as in *C. a. americanus* but often with more buff tinge on throat and under tail-coverts; tail-feathers, all as upper-parts, central pair with very narrow whitish tips, rest with broader white tips (much narrower than in *C. a. americanus* and remainder of feather brown

not black) and narrow subterminal dark brown bands; wing-feathers as upper-parts but distal portions of inner webs duller brown and middle portions towards shafts more or less tinged rufous (not chestnut as in *C. a. americanus*) becoming creamy-buff on inner portions of inner webs. Moults probably as *C. a. americanus* but only four (Aug-Oct.) have been examined in moult and these were moulting on body only. *Summer*.—A number of May examples were moulting slightly on body and tail and there is perhaps a complete moult rather later in the year than in *C. a. americanus* but material available is insufficient to make sure of this.

Nestling.—One commencing to grow feathers appears to have no down.

Juvenile.—As adult but feathers of upper-parts including all wing-coverts with narrow greyish-white tips, rump considerably browner and feathers with whitish tips; under-parts with tips and edges of feathers of a silky texture and appearance; edges of wing-feathers with strong rusty tinge; tail-feathers with small and inconspicuous buffish-white tips without or with only very ill-defined dark subterminal bands.

First winter.—Browner on crown than adult, wing-coverts and wing-feathers with outer webs strongly tinged with rust-colour, tips of tail-feathers as in juvenile. The body-feathers and wing-coverts and apparently also primary-coverts and all wing- and tail-feathers are moulted Sept.-Oct., but material available is insufficient to make quite certain of extent of moult.

Measurements and structure.—♂ wing 135-143 mm. (one 132), tail 146-160, tarsus 23-25, bill from skull 26-29 (12 measured). ♀ wing 137-150. Primaries: 3rd longest, 4th rarely equal, usually 1-5 mm. shorter, 1st 48-55 shorter, 2nd 16-19 shorter, 5th 7-15 shorter; outer webs not definitely emarginated but narrowing slightly on distal halves. Tail graduated, two central pairs longest, 3rd pair 5-15 mm. shorter, 4th pair 20-25 shorter, outermost pair 55-62 shorter, 10 feathers, tips rounded. Rest of structure as *C. a. americanus*.

Soft parts.—Bill: upper mandible pale greyish-blue, tip dusky, under mandible black; legs and feet pale bluish-grey; iris dark brown; eyelids and bare skin round eye red in adult, yellow in young (Ridgway).

CHARACTERS.—No subspecies. Brown tail-feathers with short white tips, want of chestnut in wings and dark under mandible distinguish it from *C. a. americanus*.

BREEDING-HABITS.—Not parasitic as a rule but shows a tendency to it. *Nest*.—Better built than that of Yellow-billed Cuckoo, of fine twigs, soft inner bark of cedar, roots, etc., lined soft material, and placed on horizontal bough of bush or tree, not higher than 6 ft. *Eggs*.—2 to 7, greenish-blue, dull and varying in shade in

different places, giving a marbled appearance. Average of 42 eggs, 27.2×20.5 mm. Max. : 29.9×22.8 . Min. : 22.3×18.5 (Bendire). *Breeding-season*.—From about mid-May but often in June and July. Stages of incubation vary considerably in one nest at same time in some cases. *Incubation*.—By both sexes (Bendire).

FOOD.—Almost entirely injurious insects, chiefly larvæ of lepidoptera according to Beal, Forbes and King, but coleoptera, orthoptera, hymenoptera, “stink-bugs,” harvestmen and spiders also recorded.

DISTRIBUTION.—*Ireland*.—One “Kilbead” ? Killead (Antrim), Sept. 25, 1871 (*Zool.*, 1872, pp. 2943, 3022 ; *Proc. Zool. Soc.*, 1872, p. 681 ; Yarrell, Saunders, and *Birds Ireland*, p. 401).

DISTRIBUTION.—*Abroad*.—Breeds in eastern half of temperate North America, from Prince Edward Island, south-east Alberta, south Manitoba, south Quebec, south to Arkansas, North Carolina, and mountains of Georgia. Winters in South America, casual Bermudas, and has occurred as a vagrant in Italy and the Azores.

ORDER STRIGES.

Formerly generally united with the “*Rapaces*” or *Accipitres*, by recent authors with the “*Coraciiformes*.” Both views are wrong, the Owls forming a sharply limited, distinct separate order, the position of which must be between the “*Coraciiformes*” (i.e. *Caprimulgi*, *Cypseli*, *Coraciæ*, *Pici*, etc.) and the *Accipitres*.

Skeleton with many similarities to that of *Accipitres*, same powerful feet and claws and function of legs, curved sharp bill, cere, in which nostrils are situated, and others. Plumage soft and long, flight noiseless, eyes large, as in *Caprimulgi*, but in both cases adaptation to nocturnal life, not structural relationship. Palate schizognathous. Skull very pneumatic. Basi-pterygoid processes and vomer well developed. Sternum each side with one or two incisions, without spina interna. Oil-gland bare. Feathers of face forming large disk round eye, bordered by a ruff of short stiff, recurved feathers originating from a deep fold of the skin round the cheek. This disk is most strikingly marked in *Tyto*, but visible in all species. Primaries 11, rectrices 12. Unlike the Hawks no underdown, at all events in British species. Head thick, large eyes directed forward, not very movable. Eye closed by upper lid. Ears large, with strongly developed folds of the skin, often asymmetric, i.e. right and left ear differently shaped. Many genera in all parts of world. Eggs white, unspotted.

FAMILY STRIGIDÆ.

The various “families” are not satisfactory, being connected by intermediate forms. Therefore only one family is accepted.

Key to genera of STRIGIDÆ.

1 {	Very large, wing over 330 mm.	2	
	Middle-sized or small, wing under 320 mm.	3	
2 {	Long ear-tufts, colour chiefly yellowish-brown and blackish		<i>Bubo</i> , p. 77
	Indistinct ear-tufts, colour snow-white with blackish-brown markings		<i>Nyctea</i> , p. 64
3 {	Wing over 200 mm.	4	
	Wing under 200 mm.	6	
4 {	Underside cross-barred		<i>Surnia</i> , p. 67
	Underside uniform white or buff, or scantily spotted		<i>Tyto</i> , p. 94
	Underside with heavy longitudinal markings	5	
5 {	Wings comparatively short, 2nd primary much shorter than 3rd, 4th and 5th usually longest, five outer primaries distinctly notched on inner webs		<i>Strix</i> , p. 90
	Wings comparatively long, 2nd and 3rd primary longest, first only distinctly notched on inner web		<i>Asio</i> , p. 80
6 {	Toes thickly clothed in pure white feathers		<i>Ægolius</i> , p. 70
	Toes with thin scanty feathers or bristles		<i>Athene</i> , p. 73
	Toes absolutely bare		<i>Otus</i> , p. 87

Genus NYCTEA Steph.

NYCTEA Stephens, Shaw's Gen. Zool., XIII, II, p. 62 (1826—Type by tautonymy *Strix nyctea* L.)

Structurally near *Bubo* and of nearly same size, but "ear-tufts" only indistinctly indicated or rudimentary. Feathers of facial disk very long and almost completely concealing the bill. Eyes small for an Owl, smaller than in *Bubo*. Toes thickly clothed in feathers which conceal greater part of claws. Colour pure white, more or less spotted and blotched with dusky. Only one species. Circumpolar.

NYCTEA NYCTEA***230. Nyctea nyctea (L.)—THE SNOWY OWL.**

STRIX NYCTEA Linnæus, Syst. Nat., ed. x, i, p. 93 (1758—"Habitat in Europa et America septentrionali." Restricted typical locality: Sweden). *Nyctea scandiaca* (Linnæus), Yarrell, I, p. 187; Saunders, p. 303.

DESCRIPTION (Plate 1).—*Adult male. Winter and summer.*—Pure white or slightly tinged creamy with a few brown spots and broken

* Linnæus's name *scandiaca* cannot be accepted, because he referred to an Owl with long ears, and thus could not have meant the Snowy Owl.—E.H.

bars here and there especially on scapulars, wing-coverts, secondaries and primaries ; these brown markings vary in number in individuals but are always few in adult males and are sometimes restricted to one or two small marks on primaries (there is no proof that birds get whiter after their 2nd winter) ; base of feathers mouse-brown ; facial disk incomplete, feathers over eye being normal and not radiating ; a few feathers on each side of crown somewhat elongated forming more or less ill-defined "horns." This plumage is acquired by complete moult June-Nov.

Adult female. Winter and summer.—Facial disk, chin, throat, vent, axillaries, under wing-coverts and legs uniform white, also sometimes centre of breast and belly, under tail-coverts and rump ; rest of plumage white with broad bars of brown, rather darker, broader and more prominent on upper-parts than on under-parts. Moult as in male. There is some variation in amount of barring and in much worn plumage in summer many of the bars disappear or become much paler by fading and wearing and bird has a considerably whiter appearance.

Nesting.—Down white, fairly short, soft and plentiful, covering whole body fairly well and tarsi and toes to base of claws, with a bare patch at back of tarsal joint.

Juvenile.—Feathers of body, and greater, median and lesser wing-coverts of very loose and downy structure especially on head and under-parts, where they are very much like down. When not fully grown this plumage has general appearance of down as distal portions of rami appear as though they were separate filaments. In this stage much white nestling down is still adhering to tips of rami. Upper-parts, greater, lesser and median wing-coverts and under-parts dark mouse-brown, feathers tipped and speckled greyish-white, those of scapulars and mantle not so loosely constructed as rest and faintly barred whitish ; facial disk and chin white, feathers tipped brown ; toes white ; wing-feathers, primary-coverts and tail-feathers of normal structure, white, barred brown like adult female but tips of innermost secondaries and primary-coverts considerably mottled brown.

First winter and summer. Male.—Very much like adult female but with a small patch of heavily barred feathers in centre of nape, tips of inner secondaries mottled brown and usually some brown mottling on greater coverts and primary-coverts, belly also usually more barred than in adult female. The juvenile body-plumage, greater, lesser and median coverts are moulted, the body-plumage commencing before the wing- and tail-feathers are fully grown but often not complete until Oct., the wing- and tail-feathers and primary-coverts are not moulted.

First winter and summer. Female.—Considerably more heavily and closely barred with dark brown both on upper- and under-parts than in first winter male, tips of inner secondaries, greater and primary-coverts more heavily mottled. Moult as in male.

Measurements and structure.—♂ wing 398–415 mm., tail 195–225, tarsus 55–65, bill from base of feathers 30–38 (18 measured). ♀ wing 425–460 mm. Primaries: 3rd longest, 2nd and 4th occasionally as long but usually 5–10 mm. shorter, 1st and 5th 35–50 shorter; 2nd to 4th emarginated on outer webs; outer edge of 1st primary and of emarginated portions of 2nd to 4th with very short serrations. Outer secondaries about as long as 10th primary, rest becoming longer and longest about equal to 7th primary, tips rounded. Tail slightly rounded, 12 feathers, tips rounded. Under tail-coverts nearly as long as tail. Tarsus and toes thickly covered with feathers (with long, thread-like rami), three toes directed forwards and one backwards, claws long, much compressed, very strong, curved and tapering to very sharp point. Bill short, very strong and much compressed, upper mandible strongly curved and projecting at tip which is sharply pointed, lower mandible broader and shorter with rounded tip. Nostrils covered by bristle-like feathers of disk.

Soft parts.—Bill and claws blackish horn-colour; iris golden.

CHARACTERS.—No subspecies. Large size and white coloration with or without brown bars easily distinguish it.

BREEDING-HABITS.—Makes no nest, but lays eggs in depression on hillock in tundra or high fjeld. During lemming years accompanies hordes of migrating rodents, breeding far south of its usual limits. *Eggs.*—From 4 to 9 or 10, white, and in some cases at any rate laid at considerable intervals, incubated eggs and half grown young having been found together. Average of 100 eggs, 57.3×45.1 . Max.: 63×46.5 and 60.3×48.4 Min.: 51.5×43.7 and 55×42 . *Breeding-season.*—Varies according to latitude from mid-April and May to June. *Incubation.*—By hen only, male keeping guard. Period about 32 days. Normally single brooded, but possibly some birds do not breed every year.

FOOD.—In British Isles feeds on rabbits, mice, birds (Duck, Little Grebe, Partridge and small birds, such as Buntings and Finches) and insects (beetles), as well as spiders (found in castings). In Arctic regions feeds on lemmings, Arctic hare and birds (Little Auk, Ducks, Ptarmigan, Gulls and small birds). It has even been known to attack a wounded Brent Goose and catches fish at times.

DISTRIBUTION.—*British Isles.*—Almost regular winter-visitor to Shetlands and frequent Orkneys and Hebrides, often on mainland of Scotland and in Ireland, where about forty recorded, chiefly in north and north-west, and most numerous Mayo. In England three taken in Northumberland, one and several seen Yorks., one Derby., ten Norfolk, one Suffolk, one seen Bucks., about five Devon, one Somerset, one Scilly Isles. Occurs from Sept. to April, one (Elgin) June 18, 1917, one (Mayo) July 21, 1906, one (Bucks.) July-Aug., 1912.

DISTRIBUTION.—*Abroad.*—Circumpolar, some birds migrating into the temperate zone in winter, in Europe occasionally as far south as France, Switzerland, Caspian and Black Seas, in Asia to Japan, once in north-west India, in America to California, Texas, N. Carolina and Bermudas.

Genus SURNIA Dum.

SURNIA Duméril, Zool. Anal., p. 34 (1806—Monotype "*Surnie*" = *S. ulula caparoch*, also by designation of Gray 1841 "*Strix ulula* L.")

Middle-sized, whitish and blackish Owls, without ear-tufts. Third primary longest, 4th only a little shorter. Primaries much longer than secondaries, first about equalling 6th. Tail long and graduated, outermost pair about 3-4 cm. shorter than middle. Feathering more compact than in most other Owls. Ears comparatively small, symmetrical, elliptical, without flap and transverse fold. Tarsus very short, toes thickly feathered. Habits diurnal. Only one species with a very distinct subspecies in America and two very closely allied ones in Asia.

SURNIA ULULA

231. *Surnia ulula ulula* (L.)—THE EUROPEAN HAWK-OWL.

STRIX ULULA Linnaeus, Syst. Nat., ed. x, i, p. 93 (1758—Europe. Restricted typical locality : Sweden).

Surnia funerea (Linnaeus), Yarrell, i, p. 183 (part); Saunders, p. 305 (part).

DESCRIPTION (Plate 1).—*Adult male and female.* *Winter.*—Whole crown black-brown thickly spotted with white, feathers being barred white and brown but with the white on distal portions restricted and rounded, forming spots; some feathers on each side of crown somewhat elongated and forming ill-defined "horns"; hind-neck, upper mantle and scapulars white, irregularly barred and spotted brown; rest of mantle uniform brown with varying amount of concealed white bars and spots; rump and upper tail-coverts barred white and brown; facial disk incomplete, feathers over eyes being normal and not radiating, feathers of loreal portion of disk white with black tips and those behind eye with longer brown-black tips, forming with a line of feathers behind eye and on side of neck a narrow semicircular black-brown band, which is followed by a shorter white patch at base of sides of neck, and a black-brown patch at sides of nape; sides of chin and throat white (feathers often with brown shaft-streaks), in centre of chin and throat a dark brown patch of varying size; upper-breast white with a few brown bars or spots and on each side a dark brown patch formed by dark brown or barred feathers which sometimes extend across breast

and form a narrow, somewhat ill-defined breast-band; rest of under-parts, including under tail-coverts, axillaries and under wing-coverts white with narrow bars of brown; tail brown with narrow, and sometimes very faint, bars of white or whitish, becoming on inner portions of inner webs wider, whiter and more tooth-like; primaries and secondaries dark brown with tooth-like white marks on edges of outer and inner webs, smaller and often spot-like on outer and larger and tooth-like on inner webs; primary-coverts as primaries; greater and median coverts mostly uniform brown with a few white spots varying but usually on outer webs of outer feathers; lesser coverts brown with narrow white fringe. This plumage is acquired by complete moult July-Sept. *Summer*.—Apparently no moult and little change by abrasion.

Nestling.—(Not examined.)

Juvenile.—Feathers of body, greater, median and lesser wing-coverts of loose structure especially on head, throat, under and upper tail-coverts but otherwise not quite so loose as in other Owls. Crown mouse-brown, feathers tipped greyish-white; nape mouse-brown, feathers with whitish centres; mantle mouse-brown; scapulars and wing-coverts white barred brown; upper tail-coverts same with narrower bars; facial disk greyish-white and black-brown round eye with outer ring of dark mouse-brown; breast, belly and sides greyish-white barred pale brown; under tail-coverts white; wing- and tail-feathers as adult.

First winter.—Not to be distinguished from adult except that wing- and tail-feathers are more worn and paler brown at tips. The juvenile body-plumage and wing-coverts are moulted July-Sept.

Measurements and structure.—♂ wing 225–236 mm., tail 170–186. tarsus 22–29, bill from base of feathers 21–25 (9 measured). ♀ wing 227–242. Primaries: 3rd longest, 4th sometimes as long, sometimes 1–6 mm. shorter, 2nd 7–10 shorter, 1st 38–47 shorter, 5th 15–27 shorter; 2nd and 3rd clearly and 4th less clearly emarginated outer webs; outer edge of 1st primary and of emarginated portions of 2nd to 4th with very short serrations. Outer secondary about equal to 10th primary, rest becoming longer and longest about equal to 7th primary, tips sharply rounded. Tail much rounded, outermost pair of feathers being 20–40 mm. shorter than central pair, 12 feathers, tips rounded. Under tail-coverts about half as long as tail. Tarsi and toes covered with feathers. Rest of structure as Snowy Owl.

Soft parts.—Bill yellowish; claws blackish-brown; iris bright yellow.

CHARACTERS AND ALLIED FORMS.—For differences of *S. u. caparoch* see under that form; *S. u. tianschanica* (Tianshan) is dark like *S. u. caparoch* on upper-parts but bars on under-parts are narrow as in *S. u. ulula*, though darker; *S. u. pallasi* (Siberia) has rather paler upper-parts than *S. u. ulula*. Spotted upper-parts, barred

under-parts and long, much rounded tail distinguish it from other British Owls.

FIELD-CHARACTERS.—As much diurnal as nocturnal. Short pointed wings and long tail give hawk-like appearance in flight. Characteristic habit of perching on exposed, elevated position such as a bare pole or top of dead fir tree. Takes small birds on the wing and attends on sportsmen to prey on wounded game birds up to size of Willow-Grouse. Bold and aggressive in defence of its nest. Note chattering and hawk-like. (N.F.T.)

BREEDING-HABITS.—Breeds chiefly in coniferous forest, on hollow tops of broken trees, or in old Woodpeckers' holes and it is said, also in old nests of Raptores. No nest except down and feathers from the incubating bird. *Eggs*.—3 or 4 to 9 and even 10, white and glossy. Average of 100 eggs, 40×31.8 . Max.: 44×33 and 42.3×34.4 . Min.: 36×31.5 and 40×29 . Often laid at considerable intervals. *Breeding-season*.—Usually in April; occasionally end of March or more often in early May. June clutches are probably second layings. *Incubation*.—Chiefly by hen, but Wheelwright shot both male and female from nest. Single brooded.

FOOD.—Chiefly small mammals: lemmings, field- and wood-mice, rats and hamsters; also small birds; seen to strike Siberian Jay and feeding on Willow-Grouse; insects have also been found in stomachs.

DISTRIBUTION.—*Great Britain*.—One Unst (Shetlands) winter 1860-1, probably this form. One Amesbury (Wilts.), prior to 1876. One Aberdeen., Nov., 1898 (Saunders, pp. 305, 756). One Northants., Oct. 19, 1903, not definitely assigned to either form (J. H. Gurney, *Zool.*, 1904, p. 214).

DISTRIBUTION.—*Abroad*.—Northern parts of Old World, casual Alaska, in winter vagrant and slightly more to south. Replaced by very distinct subspecies in North America (*S. ulula caparoch*) and by very closely allied ones in parts of Asia.

232. *Surnia ulula caparoch* (Müller)—THE AMERICAN HAWK-OWL.

STRIX CAPAROCH P. L. S. Müller, *Natursystem*, Suppl., p. 69 (1776—Ex Edwards "Europa" by mistake! Typical locality: Hudson Bay). *Surnia funerea* (Linnaeus), Yarrell, 1, p. 183 (part); Saunders, p. 305 (part).

DESCRIPTION.—*Adult male and female*.—Like *S. u. ulula* but upper-parts and wings and tail of a darker, more blackish brown and white markings consequently more accentuated; feathers of crown

with more dark brown and less white than in *S. u. ulula*; bars on under-parts considerably broader than in *S. u. ulula* and inclined to be more tawny on flanks and lower belly. This plumage is acquired by complete moult Aug.-Nov.

Nestling and juvenile.—(Not examined.)

Measurements and structure.—♂ wing 221–233 mm., tail 170–186, tarsus 23–28, bill from base of feathers 22–24 (11 measured). ♀ wing 225–237. Rest of structure as in *S. u. ulula*.

Soft parts.—As in *S. u. ulula*.

BREEDING-HABITS.—Breeds sometimes in old nests of other species, or in old Woodpecker holes, hollow tops of stumps, and cavities in tree; and it is said also in recesses in face of cliffs. No nest, but a few feathers may be found scattered about. *Eggs*.—4 to 9, white. Average of 49 eggs, 39.5×31.5 . Max.: 43×32 and 39.4×32.8 . Min.: 36.5×30 . *Breeding-season*.—Begins in April, but fresh eggs have been obtained as late as June. Single brooded. *Incubation*.—Chiefly by hen, which alone has incubation patch, male mounting guard near, but Grinnell records male brooding eggs and young. Eggs laid at intervals.

FOOD.—In summer chiefly mice, lemmings, ground squirrels and voles, but small passerine birds and insects (grasshoppers, etc.) also recorded; in winter subsists mainly on *Lagopus lagopus*.

DISTRIBUTION.—*Great Britain*.—Four. One off Cornwall, March, 1830. One Yatton (Somerset), Aug., 1847. One Maryhill (Lanark), Dec., 1863. One near Greenock (Renfrew), Nov., 1868 (Saunders, p. 305). A second near Greenock Dec., 1871, seems of doubtful authenticity.

DISTRIBUTION.—*Abroad*.—Northern North America, in winter in small numbers as far south as Washington, Nebraska, Indiana, Ohio, New York, Massachusetts, and Maine.

Genus ÆGOLIUS Kaup.

ÆGOLIUS Kaup, Skizz. Entwick. Gesch. & Syst., p. 34 (1829—Monotype *A. tengmalni*).

Small to medium-sized Owls with large heads without any ear-tufts or only minute indications of the latter. Eyes comparatively small. Very large and asymmetrical ears; even the skull not quite symmetric. Third and fourth primaries equal and longest, in some American species second to fourth. Two outermost primaries only emarginated (notched) on inner webs, and rather near to tip. Tail very slightly rounded. Tarsus and toes very thickly clothed in feathers. Two species in northern portions of Northern Hemisphere, each with several subspecies.

ÆGOLIUS FUNEREUS

233. *Ægolius funereus funereus* (L.)—TENGMALM'S OWL.

STRIX FUNEREA Linnæus, Syst. Nat., ed. x, i, p. 93 (1758—"Europa."

Restricted typical locality: Sweden. Ex Fauna Suecica p. 17, No. 51, 1746, where it had been described from a plate of Rudbeck of Upsala. The objection raised to *funerea* in footnote, Hand-List, p. 105, 1912, is not valid, according to Lönnberg's investigations. See Brit. B., ix, p. 5). *Strix Tengmalmi* Gmelin, Syst. Nat., i, i, p. 291 (1788—Sweden).

Nyctala tengmalmi (J. F. Gmelin), Yarrell, i, p. 154; Saunders, p. 299.

Ægolius tengmalmi tengmalmi (Gm.), Hand-List, p. 105 (1912).

Foot of: A. Tengmalm's Owl (*Ægolius f. funereus*); B. The Little Owl (*Athene n. mira*); C. The Scops-Owl (*Otus s. scops*).

DESCRIPTION (Plate 1).—*Adult male and female. Winter.*—Upper-parts much as Little Owl but of a more reddish chocolate-brown, white spots on fore-part of crown whiter and white markings on rest of crown larger and rounder and not in form of streaks, rest of white on upper-parts much as in Little Owl but without any buff tinge; facial disk complete, white with a blackish patch on loreal portion and feathers of rest tipped and edged dull chocolate-brown; under-parts much as Little Owl but white much purer and brown of a reddish-chocolate; band across throat chocolate-brown, feathers edged white; tarsus and toes white with chocolate-brown marks, toes thickly covered with feathers and sometimes without chocolate brown marks; axillaries and under wing-coverts white with chocolate-brown markings rather more numerous than in Little Owl and chocolate-brown tips of feathers covering primaries not so long; tail reddish chocolate-brown as upper-parts with white spots on both webs, spots varying somewhat in size but usually narrow, and on inner webs of all except central feathers larger and more tooth-like; primaries and secondaries chocolate-brown with white spots on outer webs and much larger white tooth-like marks on edges of inner webs (white considerably more restricted than in Little Owl); primary-coverts chocolate-brown with white spots (concealed) on inner webs; greater and median coverts same

but with large white spots on outer webs and smaller ones or none on inner webs; lesser coverts same with white spots only on some of the outer feathers. This plumage is acquired by complete moult beginning sometimes in June and sometimes not complete until November but very few birds in moult have been available for examination. *Summer*.—Apparently no moult, and plumage very little altered by abrasion.

Nestling.—Down buffish-white on upper-parts and white on under-parts. Short, soft, covering bird sparsely.

Juvenile.—Feathers loosely constructed but not quite so downy as in many other juvenile Owls, especially on upper-parts, while greater wing-coverts are of almost normal structure. Whole upper-parts of a more reddish chocolate-brown than in adult, with only a few small white streaks on fore-part of crown, rest of crown, nape, mantle, back and rump without white but usually some concealed white centres to feathers at back and sides of neck; scapulars, with white subterminal spots or patches and upper tail-coverts with concealed white spots; facial disk, posterior part dark chocolate-brown with a few whitish marks, anterior part mostly whitish with blackish-chocolate tips; chin, throat and breast reddish-chocolate, feathers with dull white centres mostly concealed; flanks and belly dull white, feathers with wide reddish-chocolate tips and varying amount of reddish-chocolate on central portions; tarsus and toes buffish-white with rather faint chocolate marks; under tail-coverts buffish-white usually with chocolate bars at tips; primaries, secondaries, tail, and primary-coverts and greater coverts as adult; median coverts with only a few white spots; lesser coverts without white.

First winter.—Like adults. No examples in moult have been available for examination, but apparently all the feathers are moulted except wing- and tail-feathers and primary-coverts.

Measurements and structure.—♂ wing 160–170 mm., tail 95–106, tarsus 20–23, bill from base of feathers 18–21 (12 measured). ♀ wing 165–180. Primaries: 3rd and 4th longest (4th often 1–2 mm. shorter), 1st 30–37 mm. shorter, 2nd 6–10 shorter, 5th 5–10 shorter; 2nd and 3rd primaries emarginated outer webs; outer edge of 1st primary and of emarginated portions of 2nd and 3rd with considerably longer serrations than in Little Owl. Outer secondaries about as long as 10th primary, rest becoming longer and longest about equal to 7th primary, tips rounded. Tail slightly rounded, 12 feathers, tips rounded. Under tail-coverts about three-fourths as long as tail. Tarsus and toes thickly covered with feathers. Rest of structure as Little Owl.

Soft parts.—Bill yellow; claws brown-black; iris yellow.

CHARACTERS AND ALLIED FORMS.—*Æ. f. sibiricus* (Ussuri, south parts of middle and east Siberia) is of a slightly paler shade of chocolate-brown; *Æ. f. magnus* (Kamtschatka, Kolyma) is larger

1, The European Hawk-Owl (*Surnia u. ulula*). 2, The White-breasted Barn-Owl (*Tyto a. alba*). 3, The Snowy Owl (*Nyctea nyctea*). 4, The Short-eared Owl (*Asio f. flammeus*). 4A, Flank-feather of the Short-eared Owl. 5, The Long-eared Owl (*Asio o. otus*). 5A, Flank-feather of the Long-eared Owl. 6, The Little Owl (*Athene noctua mira*). 7, The Eagle-Owl (*Bubo b. bubo*). 8, Tengmalm's Owl (*Egolijs f. junereus*). 9A, Juvenile, 9B, Adult, of the Tawny Owl (*Strix aluco sylvatica*). 10, The Scops-Owl (*Otus s. scops*).

and has much more white on upper-parts, tail and wings, and less brown on under-parts; *Æ. f. richardsoni* (N. America) has darker chocolate-brown upper-parts and more brown on under-parts; *Æ. f. caucasicus* (Caucasus) and *Æ. f. jakutorum* (Jakutsk) have also been separated. More reddish-chocolate and purer white colour, feathered toes, longer wing and tail, shorter tarsus, more deeply serrated edge of 1st primary distinguish it from Little Owl.

BREEDING-HABITS.—Haunts coniferous forest in mountain ranges of central Europe, but on low ground in the north. No nest, but eggs laid in holes of trees, often old borings of Great Black Woodpecker, sometimes in nest-boxes. *Eggs.*—Usually 4 to 6, occasionally 8 or even 10, white, fine grained. Average size of 107, 32.5×26.4. Max.: 36.5×27.5 and 32.5×28.5. Min.: 29×25 and 31.5×23.6 mm. *Breeding-season.*—Usually from mid-April to end of May or in June in the high north. Possibly second brood sometimes reared in lemming years. No details of incubation.

FOOD.—Chiefly small mammals and birds. Seen pursuing lemming, and remains of shrews, mice (*Mus musculus* and *M. sylvaticus*), voles (*Arvicola glareolus*, *A. agrestis*) and *Eliomys quercinus* in pellets; birds recorded include Thrushes (*Turdus* various sp. and *Monticola saxatilis*), Finches and Tits.

DISTRIBUTION.—*England.*—Rare vagrant. Over twenty authentic records chiefly in Yorks. (twelve), Northumberland, Durham, Norfolk, and Suffolk, also one or two so far south as Kent (three) and Somerset, Berks., Essex, Salop (one), Northants. (one), Lincs. (one), Lancs. (one), Cumberland (one). (In Oct. and Nov. 1901 it occurred in Suffolk (two), Norfolk, Yorks. and Shetlands.) *Scotland.*—Seven. Cramond Is. (Forth) Dec. 1860. Peterhead (Aberdeen), Feb. 1886. Near Blairgowrie (Perth) Feb. 1915. Shetlands, March 1897, Nov. 1901, January 1908 and 1912.

DISTRIBUTION.—*Abroad.*—North Europe, mountain-forests of central and east Europe, to Alps and Pyrenees, in east to Hungary, Montenegro, Bulgaria and Rumania, but breeding not proved, Siberia. In winter and autumn, vagrant. Replaced by allied forms in north-east Siberia, Caucasus, and North America.

Genus *ATHENE* Boie.

ATHENE Boie, Isis 1822, I, p. 549 (Type by subsequent determination of Boie 1826, Jan 1855, *A. noctua*).

Small Owls with large eyes and no indication even of ear-tufts. Ear rather small. Wings rounded, third and fourth primaries longest, first between 5th and 8th. Tarsus well feathered, toes with bristles or a scanty covering of feathers. Tail very slightly rounded. Europe, North Africa to Sahara, greater part of continental Asia. Two or three species with a number of subspecies.

ATHENE NOCTUA*

234. *Athene noctua mira* With.—THE LITTLE OWL.

ATHENE NOCTUA MIRA Witherby, Brit. B., XIII, p. 283 (1920—Holland).
Carine noctua (Scopoli), Yarrell, I, p. 178; *Athene noctua* (Scopoli),
 Saunders, p. 301.

Athene noctua noctua (Scop.), Hand-List, p. 106 (1912).

DESCRIPTION (Plate 1).—*Adult male and female.* *Winter.*—Whole upper-parts dark sepia, sometimes with a tinge of more rufous-brown, each feather with its centre white edged buff; centres narrower and in form of drop-like streaks on crown, larger and more rounded on upper mantle showing much white and on scapulars, but smaller and much concealed by brown edgings of feathers on lower mantle, rump and upper tail-coverts; (white tufted filoplumes rather numerous on back of crown and nape); facial disk white, feathers on loreal portion tipped black, those over eye white and below and behind eye marked with dark sepia (feathers normal above posterior portion of eye and disk incomplete here); chin and line under facial disk and patch on lower throat white; sides of neck and band across throat mottled dark sepia and buff; breast, sides and flanks dark sepia and white or buffish-white, white being mostly confined to spots on sides of breast, but flanks with less sepia which is more in form of streaks; centre of belly white; under tail-coverts same but with faint brown shaft-streaks; feathers on tibia marked with sepia; tarsus white, and toes thinly covered with bristle-like feathers; axillaries and under wing-coverts white with a few dark sepia spots and coverts at base of primaries with long dark sepia tips; tail sepia barred brownish-buff; primaries and secondaries sepia tipped and barred buffish-white, the bars being almost obsolete in centres of feathers and much paler and widened to somewhat tooth-like marks on edges of both inner and outer webs; primary-coverts dark sepia with a buffish spot on outer and inner web; greater and median wing-coverts dark sepia with large white spots; lesser coverts same but with much smaller and more buffish spots. This plumage is acquired by complete moult Aug.-Nov. *Summer.*—One was moulting slightly on body in March but this seems quite exceptional. Abrasion makes streaks on head rather white and more prominent and contrasts of brown and white of under-parts rather sharper.

Nestling.—Down white, short but plentiful covering whole bird to base of toes but back of tarsal joint bare.

Juvenile.—As in Snowy Owl feathers of body, and greater, median and lesser wing-coverts of very loose and downy structure

* The generic name *Athene* has been rejected on account of the previous *Athena* of Hübner for a genus of moths; but no explanation of the meanings of either name being given, both may stand. Otherwise *Carine* would have to be adopted.—E.H.

especially on head, rump, vent and lower flanks. Upper-parts and wing-coverts much as adult but decidedly paler brown, pale portions of feathers buffish and much less prominent than in adult especially on crown and rump; under-parts also like adult but brown considerably paler and streaks narrow and white more buffish.

First winter.—Like adult. The juvenile body-feathers and greater, median and lesser wing-coverts are moulted Aug.-Nov., but not wing- or tail-feathers or primary-coverts.

Measurements and structure.—♂ wing 153–165 mm., tail 75–83, tarsus 29–34, bill from base of feathers 18–21 (20 British measured). ♀ wing 156–165 (18 British measured). Primaries: 3rd and 4th longest, 1st 17–28 mm. shorter, 2nd 2–7 shorter (one equal to longest) 5th 2–7 shorter; 2nd to 4th primaries emarginated outer webs and 5th less clearly; outer edge of 1st primary and of emarginated portions of 2nd to 5th with very short serrations. Outer secondaries about as long as 10th primary, rest becoming longer and longest about equal to 6th primary, tips rounded. Tail nearly square, 12 feathers, tips rounded. Under tail-coverts about two-thirds as long as tail. Tarsus covered with feathers and toes thinly covered with bristle-like feathers. Three toes directed forwards and one backwards, claws long, strong and sharp. Bill short, strong and much compressed, upper mandible curved and projecting at tip, which is sharp; lower mandible broader and shorter with rounded tip. Nostrils covered by bristle-like feathers of disk.

Soft parts.—Bill greenish-yellow; claws dark horn-brown; iris lemon-yellow.

CHARACTERS AND ALLIED FORMS.—*A. n. noctua* (middle Europe) is of a more reddish (warmer) brown, not dark sepia, on upper-parts and streaks on under-parts and white is not so clearly contrasted; *A. n. vidalii* (Spain) is intermediate in colour between *A. n. noctua* and *A. n. mira* and white streaks on crown are narrower; *A. n. indigena* (Balkans, south Russia) is rather paler brown than *A. n. noctua* and middle tail-feathers have only small pale spots instead of bars and bars on rest of tail-feathers are broken; *A. n. glaux* (Egypt, northern north-west Africa) is paler and more rufous than last and usually has bars on tail fairly well marked; *A. n. saharae* (southern north-west Africa) is considerably paler, more rufous-sandy, than last; *A. n. lilith* (Palestine, Mesopotamia, south-west Persia) is much like last but still paler and not so rufous; *A. n. bactriana* (Transcaspia, Turkestan, east Persia) is much like *A. n. glaux* but rather paler and of a greyer tone of brown and bars on tail are prominent and toes are thickly feathered; *A. n. plumipes* (north China) also has thickly feathered toes and prominent bars on tail but is as dark as *A. n. glaux*; *A. n. sarda* (Sardinia) and *A. n. caucasica* (Caucasus, Caspian) have also been separated. Darker coloration, thinly covered toes, longer tarsus, shorter wing and tail, short serrations of 1st primary distinguish it from Tengmalm's Owl and small size and absence of "tufts" from other British Owls.

FIELD-CHARACTERS.—Most diurnal of our resident Owls. Often perches on fence-rail or tree-stump in bright sunshine, and whether on the wing or at rest, its small size, flat head, short tail, and greyish-brown plumage profusely spotted and streaked with white, are characteristic. Flight, dipping like that of Woodpeckers, but rounded wing and general appearance proclaim the bird an Owl. Noisy at all hours. The usual cry is “kiew-kiew,” or “kwow-wow,” or “kiew-wow-wow.” If nesting-place is invaded, old birds maintain a chattering “whék-whék-whék,” punctuated with an occasional barking “wherrow.” Hunger-cry of young a continuous wheezing call.

BREEDING-HABITS.—Now widely distributed but especially partial to low ground, well-wooded, pollarded willows by rivers, etc. *Nest.*—A mere scrape, with sometimes a few feathers and disintegrated pellets in hole of trees, also often in holes of walls of farm buildings, and occasionally in rabbit-burrows or under stacks of wood. *Eggs.*—Usually 3 to 5 or 6, but clutches of 7 have been recorded on several occasions and there is some evidence that nine have been once found in a nest. Colour white. Average of 67 British eggs, 34.8×28.9 . Max.: 38.6×29 and 34×31 . Min.: 33×28.4 and 33.5×27.7 mm. *Breeding-season.*—Second half of April and May. *Incubation.*—Sometimes begins with first egg, but not always, and lasts 26–28 days. Single brooded. *Fledging-period.*—About 26 days.

FOOD.—Very varied; including mammals (mice, shrews (two species), field voles), birds (Blackbird, Thrush, Meadow-Pipit and young Pheasants and Partridges as well as chickens recorded), frogs, blindworm, insects (especially beetles; larvæ of lepidoptera) spiders, centipedes and earthworms. Probably food varies according to locality, but beetles and worms are very freely taken, small birds and mammals not infrequently, while definite records of damage to young game are scarce.

DISTRIBUTION.—*England.*—Now resident as an introduced bird. About twenty early recorded examples may have been genuine vagrants. Large numbers have been introduced, notably by the late Lord Lilford near Oundle, Northants., some years previous to 1889, and by Mr. E. G. B. Meade-Waldo near Edenbridge, Kent, about 1874. Five turned out by Waterton in Yorks. in 1843 did not succeed, while a number released by Lord Rothschild in Tring Park almost completely disappeared; but from Oundle and Edenbridge birds spread rapidly, and now no doubt breed in all English counties (including I. of Wight) south of Lancashire and Yorkshire. Recently occurred as far north as Skipton and in Wolds, but no definite Yorkshire breeding record though probably does breed in south. No recent occurrences in Northumberland, Cumberland, Durham, Westmorland or Lancs. No definite breeding records for following counties but has frequently occurred and now almost

certainly breeds in all of them: Cheshire, Staffs., Worcester, Hereford, Gloucester, Devon, Cornwall, Suffolk. *Wales*.—Breeds Monmouth (1915) and Radnor (1918). Recently occurred Flint (1920), Montgomery (1919), Cardigan (1920) and Pembroke (1920), and thus now appears widely distributed in Wales. Occurrences Anglesey 1899 and 1909. *Scotland and Ireland*.—Kincardine, Feb. 1902, Fife, November 1910, Kildare, June 1903, may have been escapes or genuine migrants.

DISTRIBUTION.—*Abroad*.—Holland and Flanders, exact limits not yet defined. Replaced by typical form in middle Europe to Mediterranean and by other forms in Spain, north Africa, eastern Europe and Asia.

Genus BUBO Dum.

BUBO Duméril, Zool. Anal., p. 34 (1806—Type by tautonymy *Strix bubo*).

The largest Owls. Always with well developed "ear-tufts."* Ear-openings symmetrical, comparatively small and without operculum. Tarsus thickly feathered, toes feathered, at least in all European forms. Longest primaries decidedly longer than secondaries, generally 3rd or 3rd and 4th longest, two to four outer ones emarginated or notched on inner webs. Claws very powerful, that of middle toe larger than that of hind-toe. About 12 species and numerous subspecies. Europe, Asia, Africa and America, absent from Australia and New Zealand.

BUBO BUBO

235. *Bubo bubo bubo* (L.)—THE EAGLE-OWL.

STRIX BUBO Linnæus, Syst. Nat., ed. x, i, p. 92 (1758—Europe. Restricted typical locality: Sweden).

Bubo ignavus T. Forster, Yarrell, i, p. 168; Saunders, p. 309.

DESCRIPTION (Plate 1).—*Adult male and female. Winter*.—General appearance of upper-parts brown-black and tawny-buff, latter with wavy bars and vermiculations of black-brown; whole crown brown-black, each feather with creamy to tawny-buff edgings with wavy bars and vermiculations of brown-black; feathers of "horns" (longest feather 55–70 mm.) on each side of top of crown same but only inner webs edged buff; back of neck with broader and more tawny edgings less barred; feathers of mantle and scapulars with distal portions as crown and proximal portions cream to tawny with wavy bars and vermicula-

* These tufts of feathers can be laid down or erected, and arise on the fore-head, above the eyes and ear-openings.

tions of brown-black, outer webs of outer scapulars more uniform tawny like feathers of back of neck; back and rump tawny-buff with narrow wavy brown bars and with tips of feathers of rump vermiculated brown; upper tail-coverts same but bars and vermiculations more pronounced; facial disk incomplete, feathers over eye being normal and not radiating; loreal portion of disk pale cream, feathers tipped black, lower and middle portion of disk tawny-buff to brown-buff, feathers with brown shaft-streaks and bars; chin and upper-throat white divided by a narrow band of feathers with brown centres and tawny edgings; feathers of sides of lower-throat and upper-breast with wide black-brown centres and tawny edges more or less vermiculated, those of centre of lower throat and breast with white edgings and narrower brown centres thus carrying white of upper-throat down centre of breast to somewhat varying extent; feathers of sides of lower-breast pale cream to tawny-buff with narrow centres and edgings with more prominent dark brown wavy bars, lower flanks and sides of belly still more barred and no dark central streaks; centre of belly and legs and feet buff, with paler brown and thus less prominent bars; under tail-coverts and axillaries same but barring rather more prominent; under wing-coverts buff strongly barred and marked black-brown and those covering primaries with long black-brown tips; tail: central pair dark brown with cream to greyish-white vermiculations on edgings and tips and varying amount of larger vermiculations forming irregular bars, next pair with more definite and regular vermiculated bars which are more tawny on inner webs, outermost pair with bars much broader and more tawny; wing-feathers with dark brown tips and bars, paler portions being vermiculated dark brown and greyer on outer webs especially of secondaries and more tawny on inner webs, innermost secondaries central portions brown, edges vermiculated irregularly grey to buff; primary-coverts dark brown with a few pale brown vermiculations; greater and median coverts as innermost secondaries; lesser coverts dark brown with few vermiculations. This plumage is acquired by complete moult July-December. *Summer*.—Apparently no moult. Abrasion has not much effect but paler portions of feathers become more greyish and less buff. N.B.—There is considerable individual variation in extent and intensity of dark bars and vermiculations and some examples are of a deeper tawny than others; while some are considerably more greyish and occasionally grey with little buff, especially when in worn plumage.

Nestling.—Down short, soft and plentiful, covering whole surface including legs and toes to base of claws, buffish-white rather buffer on fore-head, wings, rump and below eyes.*

Juvenile.—Feathers of body and greater, median and lesser

* I can find no trace of a second nestling down as described by Mr. J. L. Bonhote (*Bull. B.O.C.*, xxvii, p. 83).

wing-coverts are of even more loose and downy structure than in Snowy Owl. Whole upper-parts and under-parts darkish-buff barred brown, tarsi and toes uniform buff.

First winter.—Like adults. The juvenile body-feathers and greater, median and lesser wing-coverts commence to moult before wing- and tail-feathers are grown but moult is often not finished until December. Wing- and tail-feathers and primary-coverts are not moulted.

Measurements and structure.—♂ wing 420–470 mm., tail 220–285, tarsus 65–80, bill from base of feathers 40–47 (12 measured). ♀ wing 450–495 mm. Primaries : 3rd and 4th longest, 2nd usually as long but sometimes 5–15 mm. shorter, 1st 30–60 shorter, 5th 20–30 shorter ; 2nd to 4th emarginated on outer webs ; outer edge of 1st primary with longer and more curved serrations than in Snowy Owl but not so long comparatively as in Long-eared and Tawny Owls, some very short serrations on emarginated portion of 2nd to 4th primaries, outer edge of outer “bastard” wing-feather also serrated. Outer secondary about equal to 10th primary, rest becoming longer and longest about equal to 1st primary, tips rounded. Tail slightly rounded, 12 feathers, tips rounded. Under tail-coverts about three-fourths as long as tail-feathers. Rest of structure as Snowy Owl.

Soft parts.—Bill and claws black ; iris orange.

CHARACTERS AND ALLIED FORMS.—*B. b. hispanus* (Spain) ground-colour is paler and less tawny especially on under-parts ; *B. b. ruthenus* (south-east Russia, Asia Minor) has ground-colour much as last but black streaks on back of head and hind-neck are narrower and barring on sides of breast and flanks very prominent ; *B. b. turcomanus* (Transcaspia, Turkestan) is very much like *B. b. ruthenus* but usually with less black markings and rather paler sandy and less tawny ground-colour ; *B. b. sibiricus* (western Siberia) is paler than any of above (ground-colour of under-parts creamy-white) and has very large bill and foot and longer wing ; *B. b. aharonii* (western Palestine and Jordan Valley) is much like *B. b. ruthenus* but is smaller ; *B. b. ascalaphus* (north Africa and Palestine) differs from all forms above in having feathers of sides of upper-breast with well-defined wavy brown-black cross bars and rounded white subterminal spots on each side of black-brown central streak which is extended laterally across tip of feathers ; *B. b. desertorum* is much paler than last and appears to inhabit desert country of north Africa and eastern Palestine, but distribution and differences require further investigation ; *B. b. nikolskii* (western Persia), *B. b. yenisseeinsis* (middle Yenesei), *B. b. jakutensis* (Jakutsk province) have been separated but have not been seen by me, while there are several other forms in eastern Asia. Very large size and long “horns” distinguish Eagle-Owl from other British species.

FIELD-CHARACTERS.—In north Europe hunts by day as well as by night. Large size and long conspicuous ear-tufts distinguish it from all other British Owls. Note a loud and deep “boo-hoo,” can be heard at a great distance. (N.F.T.)

BREEDING-HABITS.—Haunts forests, or mountain ranges. No nest, but breeds sometimes on ground in side of gullies, sheltered by rocks or shrubs, sometimes on ledge or in cleft of rock, in hollow trees or in old nests of birds of prey in trees, and in the steppes in depression on open plain. *Eggs.*—Usually 2–3, but 4 are occasionally met with. It is said that clutches of 5 and 6 have been found but this requires confirmation. Colour white. Average size of 47 eggs, 59.95×49.7 . Max.: 66×50.9 and 65×52.5 . Min.: 53.2×48 and 58.3×46.3 mm. *Breeding-season.*—From end March to end May. *Incubation.*—By female alone; period 35–37 days. Single brooded.

FOOD.—Mammals, chiefly rabbits, hares; also less often water-rat, hamster, brown rat, mole, mice, and I have seen a weasel in a nest. Also said to have killed young of roe-deer. Birds include game from Capercaillie to Partridge, Crows (Carriion and Hooded), Buzzard, Woodpeckers, Jays, etc., and Ducks. Also snakes, lizards, frogs and large beetles.

DISTRIBUTION.—*Great Britain.*—Very rare vagrant. Being frequently kept in captivity suspicion rests upon a good many recorded occurrences. Specimens have been taken in Yorks., Lincs., Oxon., Derby, Salop, Sussex, Hants., Wilts., Shetlands, Orkneys, and Argyll., and a good many others recorded as seen.

DISTRIBUTION.—*Abroad.*—Europe from Scandinavia and north Russia to Pyrenees and Italy. Replaced by more or less different races in Spain and Algeria, south-east Europe, Asia Minor, Turkestan, Siberia and other parts of Asia to Amur, China, Corea.

Genus ASIO Briss.

ASIO Brisson, Ornith., I, p. 28 (1760—Type by tautonymy, according to page 477, *asio* of ancient authors, i.e. *Asio otus*).

Middle-sized Owls with long and conspicuous or ill-developed and hardly visible ear-tufts. Ear-openings enormous, occupying whole side of head, anterior operculum as well as transverse fold strongly developed, ears asymmetrical. Wings comparatively very long, reaching to end of tail or beyond, 2nd and 3rd primaries usually longest in British species, otherwise 1st, 1st and 2nd, or 2nd to 4th. Only 1st or 1st and 2nd emarginated (sinuated or notched) on inner webs. Toes feathered, though not very thickly, at least in European species. About 15 species in all parts of World, but absent from Australia, New Zealand and most South Sea Islands, except Hawaiian group.

Key to species of genus ASIO.

Ear-tufts very long and conspicuous, scapulars with narrow whitish cross-vermiculations *A. otus*, p. 81

Ear-tufts quite small and not easily seen, scapulars with heavy more or less longitudinal markings only *A. flammeus*, p. 84

ASIO OTUS

236. *Asio otus otus* (L.)—THE LONG-EARED OWL.

STRIX OTUS Linnaeus, Syst. Nat., ed. x, i, p. 92 (1758—Europe. Restricted typical locality: Sweden).

Asio otus (Linnaeus), Yarrell, I, p. 158; Saunders, p. 293.

DESCRIPTION (Plates 1 and 2).—*Adult male and female. Winter.*—Crown, nape extending on to upper mantle varying golden-buff to paler buff widely streaked brown, and fringes of each feather greyish-white to pale buff, freckled brown, these pale freckled fringes being more prominent on crown than on nape and varying in individuals; feathers of "horns" (longest feather 35–40 mm.) on each side of top of crown dark brown fringed warm buff and with pale buff to white edging on distal half of inner webs usually lightly freckled or barred brown; lower mantle, back and scapulars so much freckled with fine wavy bars of brown that central streaks are not so prominent, some outer scapulars with large pale buff to white spots on outer webs; feathers of rump more uniform, lightly freckled brown at tips and tips of upper tail-coverts more heavily freckled; feathers forming "ruff" surrounding facial disk short and slightly curled and only tips showing, buff and greyish-white minutely and thickly freckled with wavy bars of dark brown; anterior part and most of upper part of facial disk greyish-white (feathers tipped black) divided from posterior and most of lower part, which are buff to pale buff, by an irregular band of black-brown, which passes round anterior part of eye (facial disk complete but above eye feathers do not radiate directly from orbit, the anterior whitish portion overlapping the dark posterior portion); feathers covering large apertures of ears, extending over middle of eye to base of mandible and forming outer posterior portion of facial disk, white tipped brown-black; chin and centre of upper throat white crossed by narrow band of buffish feathers streaked and tipped dark brown; throat and upper-breast varying golden buff to pale buff broadly streaked dark brown and with greyish-white edging to distal part of feathers varying in prominence individually, and cross-barring of brown either faint or absent; rest of breast, belly and flanks same but with white edgings much more prominent and brown wavy cross-bars always present though varying in prominence individually; centre of belly and feathers of legs and feet uniform rich buff to pale buff; under tail-coverts

same but with narrow brown streaks ; axillaries and under wing-coverts buff to white, those covering outer primaries with large dark brown tips forming a blackish patch ; tail buff, barred brown and tipped dull grey, bars on outer feathers and inner webs of inner feathers considerably narrower than on central pair and outer webs, central pair considerably freckled grey and brown and distal portions of other feathers, especially on outer webs, with varying amount of freckling, bases of outer feathers pale buff to white on inner webs ; primaries : basal part of outer 5 or 6 primaries rich buff to buff with two or three widely spaced brown bars, distal part with bars closer and interspaces buffish-grey to dull grey thickly freckled brown especially at tips, inner edges and bases of inner webs uniform pale buff to white ; inner primaries and secondaries greyer, more narrowly barred brown and more freckled and with most of inner webs whitish or white ; primary-coverts black-brown with almost obsolete grey freckled bars and buff bases to outer webs ; greater and median coverts as scapulars with number and disposition of large whitish spots varying individually and sometimes absent ; lesser coverts with white or whitish bases showing along edge of bone, rest dark brown with buff fringes. This plumage is acquired by complete moult Sept.-Dec. *Summer*.—No regular moult but a few feathers on body are sometimes moulted in Feb. Plumage as winter and no very noticeable change by abrasion but when very worn becomes rather paler. N.B.—Although there is considerable individual variation males tend to be paler than females.

Nestling.—Down white, short, soft and fairly plentiful covering whole body fairly well and tarsi and toes to bases of claws with a bare patch at back of tarsal joint. N.B.—In this stage exactly like nestling Tawny Owl but "face" longer.

Juvenile.—Except for primaries, secondaries, primary-coverts and tail, feathers of which are like adult, all feathers are very loosely constructed and of downy character especially on crown, throat and belly. Crown dark brown, each feather tipped cream to creamy-white ; "horns" not very marked but feathers longer than those of rest of crown ; rest of upper-parts brown, feathers tipped and barred creamy-white ; facial disk fore-part and upper-part black, lower part and hinder part brownish-buff and black-brown ; under-parts dull buffish-white narrowly barred with rather pale brown ; lower flanks, belly and under tail-coverts pale creamy-buff with no bars or only very faint ones ; lesser, median and greater wing-coverts pale creamy-buff barred brown ; wing- and tail-feathers and primary-coverts of normal structure and like adults.

First winter.—Like adults. The juvenile body-plumage, lesser, median and greater coverts commence to moult when wings and tail are only starting to grow, but moult is often not complete until Nov., though some have nearly completed moult even as early as May ; downy juvenile feathers on crown, vent and under

tail-coverts usually last to moult. Primaries, secondaries, primary-coverts and tail-feathers are not moulted.

Measurements and structure.—♂ wing 280–300 mm., tail 132–153, tarsus 35–40, bill from base of feathers 25–28 (12 British measured). ♀ wing 275–300. Primaries: 2nd longest, 3rd as long or 3–7 mm. shorter, 1st 23–35 shorter, 4th 15–25 shorter, 5th 32–50 shorter; outer edge of 1st with long serrations, rami being curved and without radii at their tips, 2nd slightly emarginated at distal end and this portion only with short serrations, outer edge of outer feather of “bastard” wing also serrated; outer secondaries about as long as 10th primary, rest becoming longer and longest equalling 7th primary, tips rounded. Tail slightly rounded, 12 feathers, tips rounded. Toes as tarsus covered with downy feathers, three toes directed forwards and one backwards, claws long, much compressed, curved and tapering to very sharp point. Bill short, compressed and strong at tip and upper mandible strongly curved and projecting at tip which is sharply pointed, lower mandible shorter with rounded tip. Nostrils covered by bristle-like feathers of disk.

Soft parts.—Bill blackish-horn, greyish flesh at tip; claws blackish horn; iris bright golden-orange.

CHARACTERS AND ALLIED FORMS.—*A. o. canariensis* (Gran Canaria, Tenerife, Palma) is darker and smaller; *A. o. abyssinicus* (Abyssinia) is much larger, browner, less grey on upper-parts and has more prominent and broader cross-bars on under-parts; *A. o. wilsonianus* (North America) is darker on upper-parts than *A. o. otus*, has more narrowly barred tail and cross-bars on under-parts are broad and prominent. Smaller size, freckled appearance of upper-parts and cross-barring of under-parts as well as long “horns” distinguish it from other medium-sized British Owls.

FIELD-CHARACTERS.—A woodland bird, especially partial to fir plantations and small clumps of conifers. Owing to its nocturnal habits, is seldom seen by day, unless encountered by chance as it stands, with much attenuated body, close to trunk of the tree in which it is resting. Its smaller size, ear-tufts, and yellow iris distinguish it at once from the Tawny Owl. Flight, noiseless and wavering. A low, long-drawn and continuous “oo-oo-oo,” a cooing moan rather than a hoot, is uttered in the early months of the year, and the male, in flight, smites the wings together beneath his body with a loud “bock.” When the nesting-place is invaded, the birds cry continually “oo-ack, oo-ack,” prefaced sometimes by a barking “woof-woof.” Discordant hunger-cry of young resembles noise of a gate swinging on unoiled hinges.

BREEDING-HABITS.—Haunts woodlands and plantations where there are conifers. Breeds in old squirrels’ dreys or nests of Magpie (sometimes taking possession of a new one), Wood-Pigeon,

Heron, Crow, Rook, etc., and also, but less frequently, on ground at foot of a tree or in heather in open country. *Eggs*.—Normally 4 or 5, sometimes only 3, while sets of 6 and 7 are occasionally met with. Colour white, fine grained, but without high gloss of Wood-Pigeon's egg. 100 eggs average 40.3×32.2 . Max.: 44.7×30.2 and 42.3×34.4 . Min.: 36×30.6 and 44×30 min. *Breeding-season*.—Usually latter half March and first half April; exceptionally early March. *Incubation*.—Begins with first egg; these are laid at intervals of 2 days; period variously estimated at 25 to 30 days. Single brooded. *Fledging-period*.—24–25 days.

FOOD.—Small mammals, birds and beetles form main food. Mammals include mice, rats, field and bank vole, mole, water-rat and shrews. Birds (Jay, various Finches (Chaffinch, Sparrow, Brambling, etc.), Yellow Bunting, Song-Thrush, Blackbird, Sky-Lark, Swallow and Goldcrest recorded). Also beetles (*Geotrupes*, *Necrophorus*, *Pterostichus*, etc.) Only one instance of a young game-bird being taken.

DISTRIBUTION.—*British Isles*.—Resident. Generally distributed in wooded localities, but rather local. To O. Hebrides and Shetlands uncommon migrant, but has bred Orkneys. On east coast Great Britain and northern isles noted in limited numbers as migrant in late autumn (second week Oct. to mid-Nov.) and occasionally in May.

DISTRIBUTION.—*Abroad*.—Europe and north Asia, also north-west Africa and Azores, casual Iceland and Færoes, Corsica and Cyprus. Replaced by allied races on some Canary Islands and in North America.

ASIO FLAMMEUS*

237. *Asio flammeus flammeus* (Pontoppidan)—THE SHORT-EARED OWL.

STRIX FLAMMEA Pontoppidan, Danske Atlas, I, p. 617, pl. xxv (1763—Denmark).

Asio brachyotus MacGillivray, Hist. Brit. B., III, p. 461.

Asio accipitrinus (Pallas), Yarrell, I, p. 163; Saunders, p. 295.

DESCRIPTION (Plates 1 and 2).—*Adult male and female*. *Winter*.—Whole upper-parts varying rich tawny-buff to palish buff widely streaked black-brown; feathers of lower mantle and scapulars with black-brown extending from central streaks in irregular bars and

* Pontoppidan clearly figured the Short-eared Owl and named it *Strix flammea* in 1763. Afterwards Linnæus, in 1766, published a very short description of an Owl, which he also called *Strix flammea*. This latter was partly based on a picture by Rudbeck, which represents the Short-eared Owl, partly on descriptions of the Barn-Owl. Evidently Linnæus did not know these Owls himself.—E.H.

markings (but not fine freckling as in Long-eared Owl), outer scapulars with large part of outer webs paler and often whitish ; rump and upper tail-coverts more uniform buff, feathers with dusky-brown subterminal marks ; "horns" much shorter than in Long-eared Owl, closer together and more in centre of fore-part of crown ; feathers surrounding facial disk and forming "ruff" short and curled, and only tips showing buff and white appearing thickly spotted dark brown ; anterior half of facial disk buffish-white, feathers tipped black, posterior half tawny to buff, feathers with black shafts, immediately round eye a circle of black (facial disk complete but above eye feathers do not radiate directly from orbit, the anterior whitish portion overlapping the dark posterior portion) ; chin buffish-white ; throat and upper-breast tawny to buff broadly streaked dark brown ; rest of breast, belly and flanks paler (often creamy-white) and with much narrower streaks ; centre of belly, tibia, tarsus and toes and under tail-coverts uniform buff to creamy-white with usually some very fine, faint brown shaft-streaks on feathers of tibia and longer under tail-coverts ; axillaries and under wing-coverts buff to pale buff (creamy-white on edge of wing) with a few narrow, dark brown streaks, those covering outer primaries with large dark brown tips forming a dark patch as in Long-eared Owl ; tail : tawny-buff to buff with dark brown shafts and black-brown cross-bars, on central feathers wide, and buff portions with broken spots or frecklings of black-brown, especially on distal half, outer feathers paler with narrower bars, outermost pair often creamy-white with very narrow bars, which are often absent on outer web and basal part of feathers ; primaries tawny-buff becoming pale buff to creamy-white on inner portion of inner webs, outer feathers with long black-brown tips and a few broad black-brown bars on distal half, inner feathers with greyish tips and more closely barred black-brown on outer webs and outer portion of inner webs ; secondaries as inner primaries but with their inner webs paler (usually creamy-white), and either unbarred or with much narrower bars, innermost secondaries like scapulars ; primary-coverts black-brown with a few broken bars of tawny-buff ; greater coverts broadly barred black-brown and tawny-buff to pale buff ; median coverts same but with large pale subterminal spots on outer webs, varying in number and conspicuousness, but sometimes creamy-white and very marked ; lesser coverts mostly black-brown edged tawny-buff. This plumage is acquired by complete moult Aug.-Nov. *Summer*.—A moult of body-feathers takes place Jan.-Mar., and this is much more regular and apparently more complete than in Long-eared Owl (one example was also moulting two central tail-feathers but this may have been accidental). Plumage as winter, and not very noticeable change by abrasion, but when very worn becomes rather pale. N.B.—Although there is considerable individual variation males tend to be paler than females.

Nestling.—Down pale creamy-buff to pale warm buff on upper-parts, base of down dark brown along wing, at base of wing and on each side of mantle, forming dark lines or narrow patches, white with very slight buffish tinge on under-parts. Fairly short, soft and plentiful, covering whole body fairly well and tarsi and toes to base of claws, with a bare patch at back of tarsal joint.

Juvenile.—Feathers of body and greater, median and lesser wing-coverts of very loose structure, especially on crown, rump and under-parts. Crown and rump dark brown, feathers tipped buff; mantle same but also with incomplete buff bars, which in scapulars and wing-coverts are more complete but do not quite meet in centre of feather; facial disk brown-black, feathers tipped buff and a greyish-buff patch at base of mandibles; chin and throat brown, feathers with long buff tips; rest of under-parts warm buff, feathers with narrow brown centres except those in centre of belly, lower flanks, under tail-coverts, and tarsi and toes, which are uniform buff.

First winter.—Like adults. The juvenile body-plumage, lesser, median and greater coverts commence to moult when wings and tail are only starting to grow, but moult often not complete until October. Primaries, secondaries, primary-coverts and tail-feathers are not moulted.

Measurements and structure.—♂ wing 300–325 mm., tail 141–151, tarsus 33–42, bill from feathers 25–29 (14 British measured). ♀ wing 290–323. Primaries: 2nd longest, 3rd occasionally as long but usually 4–12 mm. shorter, 1st 10–22 shorter, 4th 18–30 shorter, 5th 37–55 shorter; outer edge of 1st serrated but serrations much shorter than in Long-eared Owl, 2nd slightly emarginated at distal end and this portion with short serrations, outer edge of outer feather of “bastard” wing also with short serrations. Rest of structure as Long-eared Owl but tail slightly more rounded.

Soft parts.—Bill dark horn, tip paler; claws black; iris bright golden-yellow.

CHARACTERS AND ALLIED FORM.—*A. f. leucopsis* (west Siberia, Turkestan to Transcaspia) has ground-colour pale on upper-parts and white on under-parts but this appears to be a variable and uncertain form requiring further investigation. Much shorter “horns,” more definitely streaked appearance without freckling on upper-parts and flanks distinguish it at once from Long-eared Owl.

FIELD-CHARACTERS.—More diurnal in habit than most Owls, and, unlike them, is not arboreal, but spends its resting hours on the ground. Frequents open country at all seasons; moors, bogs, fens, and, in winter, is often flushed from turnip-fields. Wings appear to be longer and narrower than Long-eared Owl’s, and plumage is paler, lacking transverse bars on breast, and blotched rather than streaked, whilst ear-tufts are hardly discernible, even

at very close quarters. Flight, when hunting, is slow, erratic and undulating, close to ground, but, if disturbed at nesting-place, especially after young are hatched, bird passes to and fro overhead, occasionally shaking its body or actually turning a somersault, smiting the wings together both above and below the body with a loud clap, dashing now and then at head of intruder and uttering a hoarse, barking "whowc" of defiance.

BREEDING-HABITS.—Haunts open moors, marshes, commons, warrens and sand dunes. Nest merely a scrape among heather, grass or in sand; in marshes a trampled space among sedge or sheltered by dead reeds. *Eggs.*—White, very variable in number but generally ranging from 4 to 8, though 9, 10, 11, 12 and even 13 and 14 have been recorded during vole plagues. Usually laid at intervals of 2 days, but apparently large sets referred to above are laid in batches with an interval of several days between them. Average size of 100 eggs, 39.7×31.1 . Max.: 44.6×32.7 and 41×33 . Min.: 35.1×30 and 35.2×29.5 mm. *Breeding-season.*—From latter part April to June in Orkneys. *Incubation.*—Apparently by hen alone; period not ascertained. In vole plagues two broods are certainly reared but probably it is normally single brooded.

FOOD.—Main food consists of small mammals, also small birds and insects, chiefly coleoptera. Mammals, principally field voles; also field mice, occasionally young rats and young rabbits. Birds include Twite, Meadow-Pipit, Thrush, Blackbird, Hedge-Sparrow, Tree-Creeper (once), young Larks, Snipe (once), young Lapwings, Dunlin. Also seen to kill Black-headed Gull.

DISTRIBUTION.—*British Isles.*—Resident and winter-visitor (end Sept. to mid-May). In *England* and *Wales* nests occasionally in many counties but doubtfully regularly anywhere south of Lancs. and Yorks. except in Cambs. and possibly in Hants. Northwards and throughout *Scotland* nests locally and sparingly, but in *Shetlands* rarely and in *I. Hebrides* infrequently. Not known to nest in *Ireland*. As winter-visitor fairly generally distributed, and both as breeder and migrant numbers fluctuate considerably, and are greatly augmented in years of vole plague, e.g. 1874-6 and 1891-3 in south *Scotland*.

DISTRIBUTION.—*Abroad.*—Nearly cosmopolitan, but absent in Europe as a breeding-species from Spain. Occasional visitor Iceland and Færoes, Madeira, Canaries, Corsica. If no other races can be separated (which is by no means settled) certainly that inhabiting Hawaii is different, a pale Asiatic form has also been separated which may be valid.

Genus OTUS Penn.

OTUS Pennant, *Indian Zoology*, p. 3 (1769—Monotype: *O. bakkamæna*, an Indian form).

(*Scops* of some, *Pisorhina* of other authors.)

Small Owls with more or less conspicuous ear-tufts which arise above posterior margin of eyes. Ear comparatively small, oval. 2nd and 3rd primaries (in some American species 3rd to 5th or 6th; *bakkamaena* 4th or 4th and 5th) longest. Tail slightly rounded. Feathering more compact than in other European Owls, except *Surnia*. Toes of European species quite bare, but of Indian and American ones with bristles or scanty feathers. Only one European species, one in Cyprus, others in Indian region and Japan; Ridgway now recognizes for America alone 12 species with several subspecies.

OTUS SCOPS

238. Otus scops scops (L.)—THE SCOPS-OWL.

STRIX SCOPS Linnæus, Syst. Nat., ed. x, i, p. 92 (1758—Europe. Restricted typical locality: Italy).
Scops giu (Scopoli), Yarrell, I, p. 173; Saunders, p. 307.

DESCRIPTION (Plate 1).—*Adult male and female. Winter.*—Whole upper-parts varying brownish-grey to rufous-brown, feathers with black-brown shaft-streaks (usually widest on fore-part of crown) and black-brown wavy cross-bars and fine, close vermiculations; feathers of sides of crown, "horns," nape and upper mantle with conspicuous white, or less conspicuous creamy, subterminal patches divided centrally by dark shaft-streak (giving a somewhat speckled appearance); on each side of crown behind eye elongated feathers (15–20 mm.) forming "horns"; sides of mantle browner and more inclined to rufous; outer scapulars with outer webs and often distal part of inner webs, uniform white or cream-buff and with brown-black tips and shaft-streaks, making a conspicuous line of white or creamy-buff oval-shaped marks; feathers of lores bristle-like white, tipped black; feathers below and behind eye grey, very finely barred dark grey-brown, these and lores forming a partial disk, feathers above eye being normal; feathers of "ruff" surrounding lower part of disk tinged rufous and tipped black; feathers of under-parts with rufous-buff bases (mostly concealed) and white or whitish distal portions with black-brown shaft-streaks (especially wide on sides of breast) and cross-bars and fine wavy vermiculations, latter being sparser on belly and flanks, which show varying amount of white patches on each side of shaft-streaks; vent without dark markings; tarsi buff streaked dark brown; under tail-coverts like flanks but usually with more white and less vermiculations and often with rufous band; axillaries and under wing-coverts dull white to buff with penultimate marks or wavy bars of rufous and brown, feathers covering base of primaries with long brown tips; tail-feathers grey-brown to rufous-brown vermiculated black-brown and with rather ill-defined and irregular bars of pale buffish-brown to brownish-

grey and black-brown, these bars being better defined on outer feathers which are less vermiculated than central ones; wing-feathers, tips and outer webs brownish-grey finely vermiculated dark brown, outer webs of outer 6 primaries with wide bars of white tinged buffish near shaft, rest of primaries and secondaries with these bars more grey or buff and obscured by vermiculations, basal three-fourths of wing-feathers dark brown with dull white to buffish bars usually much obscured or obsolete towards shaft of feathers, innermost secondaries like rest of upper-parts; greater and median wing-coverts as rest of upper-parts, but some outer feathers with more or less conspicuous white or whitish oval patches on outer webs; lesser coverts rufous with fewer vermiculations especially along edge of wing. No autumn moulting specimens have been available for examination. *Summer*.—Specimens from Africa in Jan.-Feb. are moulting body, wings and tail, but as this is nearly complete in Jan. it may not represent a second moult. N.B.—There is considerable individual variation from grey to rufous and in conspicuousness of white markings and in a large series there is no difference in males and females in this respect.

Nestling.—Down white, fairly short, soft and plentiful, covering whole body and tarsi to base of toes.

Juvenile.—Feathers much more compact than in juveniles of other British Owls and not down-like except at base of neck and on vent, tibia, lower flanks and under tail-coverts, latter feathers are buff or grey, widely barred brown, rest of plumage much like adult but vermiculations and shaft-streaks paler brown and much less accentuated.

First winter and summer.—Apparently like adults but no specimens in moult have been available for examination.

Measurements and structure.—♂ wing 147–161 mm., tail 63–70, tarsus 25–30, bill from base of feathers 17–18.5 (12 measured). ♀ wing 148–161 (one 166). Primaries: 3rd longest, 2nd equal or 1–3 mm. shorter, 1st 13–18 shorter, 4th 2–5 shorter, 5th 11–16 shorter; 2nd and 3rd slightly emarginated outer webs, 1st with very short serrations on outer edge of outer web. Outer secondaries rather shorter than 10th primary, rest becoming longer and longest about equal to 7th primary, tips rounded. Tail nearly square but outermost feathers rather shorter than rest, 12 feathers, tips slightly rounded. Under tail-coverts about three-fourths as long as tail. Tarsus covered with feathers, toes bare. Shortest toe directed backwards, 2nd and 3rd long and directed forwards, 4th shorter and directed outwards and backwards, claws long, strong and very sharp. Bill short, strong and much compressed, upper mandible curved and projecting at tip, which is sharp, lower mandible broader and shorter with rounded tip. Nostrils rounded and covered by bristle-like feathers of disk.

Soft parts.—Bill bluish-black; feet grey; iris lemon-yellow.

CHARACTERS AND ALLIED FORMS.—*O. s. pulchellus* (north-east Europe, west Asia) is a doubtful form tending to be greyer with more prominent white marks on upper-parts but differences are not constant; *O. s. sibiricus* (middle Siberia) is stated to be pale grey without rufous tinge on upper-parts; *O. s. cyprius* (Cyprus) is very distinct with dark grey upper-parts and prominent white markings and grey under-parts with broad black shaft-streaks and black cross-bars and vermiculations. Small size, long “horns,” and much vermiculated plumage distinguish Scops from other British Owls.

FIELD-CHARACTERS.—Its presence is generally first detected by its monotonous single-syllabled note, uttered at rest, occasionally during day, and always towards evening: when at rest small size and prominent horns are, taken together, distinctive. More nocturnal than Little Owl, smaller, and has not the heavy, blunt head of that species. (F.C.R.J.)

BREEDING-HABITS.—Haunts old timber where holes are plentiful. No nest, eggs being laid on floor of hole of cork oak, olive, elm, date-palm, terebinth, etc. Sometimes also inside old nests of Raven, Magpie, etc., also in holes of ruins and walls. *Eggs*.—Generally 4–5, sometimes 3 only or 6, white, slightly glossy. Average of 100 eggs, 31.3×27 . Max.: 33×25.5 and 31.5×28.7 . Min.: 28×25 and 31.5×22.5 mm. *Breeding-season*.—From end April to mid-June, but mostly about mid-May. *Incubation*.—By female only; period, 24–25 days. Single brooded.

FOOD.—Chiefly insects, especially coleoptera and orthoptera (grasshoppers), but also lepidoptera (large moths). Mice and small birds rarely eaten. Exceptionally lizard and remains of crab found in stomach.

DISTRIBUTION.—*British Isles*.—Rare vagrant. *England*.—Cornwall (2), Wilts., Hants. (4), Kent (4 or 5), Berks., Bucks., Middlesex, Essex, Norfolk (6), Northants., Yorks. (about 5), Cheshire, Lancs., Cumberland (2). *Wales*.—Pembroke. *Scotland*.—Fife, Perth. (2), Aberdeen (2), Sutherland, Orkneys, Shetlands (3). *Ireland*.—Nine times.

DISTRIBUTION.—*Abroad*.—Europe from south Germany to Mediterranean, north Africa. Replaced by other races in parts of Asia and Africa. Palæaretic forms and their distribution not yet sufficiently known. Migrates through Sahara; winters in Senegambia, Abyssinia, Uganda and East Africa. Accidental Madeira.

Genus STRIX L.

STRIX Linnæus, Syst. Nat., ed. x, i, p. 92 (1758)—Type by subsequent designation of Newton 1874 and 1876 and by tautonymic quotation of “*Strix*” of ancient authors, i.e. *Strix aluco*, the common European species).

Middle-sized and large, very thick-headed Owls without ear-tufts. Eyes very large. Ear-openings large, very asymmetrical, i.e. right ear larger and of different shape than left, with a large operculum or skin-flap, but no transverse fold. Wings comparatively short, but wide, 4th and 5th, or 3rd, 4th and 5th primaries longest, first 5 or 6 sinuated on inner webs. Tail rounded. Toes feathered except at utmost end. Over 20 species, some with number of subspecies; Palæarctic region and well into tropics (China, Formosa), and America.

STRIX ALUCO

239. *Strix aluco sylvatica* Shaw.—THE BRITISH TAWNY OWL.*

STRIX SYLVATICA Shaw, Gen. Zool., VII, p. 253 (1809—New name for the English "Wood Owl").

Strix aluco Linnaeus, Yarrell, I, p. 146; *Syrnium aluco* (Linnaeus), Saunders, p. 297; *Strix aluco aluco* L., Hand-List Brit. B. (1912), p. 109.

DESCRIPTION (Plates 1 and 2).—*Adult male and female. Winter.*—General colour of upper-parts tawny (occasionally rich chestnut-tawny), tawny-buff, buffish-brown or greyish-brown but very rarely in British birds greyish-white, streaked and freckled blackish-brown. In brown examples feathers on sides of crown and mantle have white or buffish-white subterminal spots or rounded marks varying in shape and size, but in tawny examples these are not so conspicuous as they are more buff or tawny; each feather of upper-parts with blackish-brown to dark brown mesial streak and wavy cross-bars, varying in individuals but wider and more conspicuous on crown and mantle and narrower and not so strongly marked on back, rump and upper tail-coverts; outer scapulars with most of their outer webs except at base and tip (which is blackish) silky-white, sometimes tinged buff, forming a line of conspicuous white "mirrors"; facial disk, which is complete, dull white, feathers of loreal portion with black tips and of rest of disk in tawny specimens with considerable amount of rufous, in brown examples with only a tinge of rufous and spotted and barred with brown, in grey examples no rufous and more distinctly spotted and barred dark brown, feathers of "ruff" black-brown centrally mottled buff to whitish at tips, those of lower part of "ruff" usually more whitish and with dark cross-bars and in centre of chin always marked rufous even in greyest examples; under-parts white to pale buff, rufous examples suffused with buff on breast and flanks, but whitish

* The British Tawny Owl is distinguished from the typical Continental form by its smaller size: wing, males, British 245–270 mm., Continental 265–200; females British 255–275, Continental 270–305. Also the British bird is seldom grey, whereas in Continental birds grey are commoner than tawny individuals.—H.F.W., E.H.

in centre of throat and on belly, feathers with black-brown central streaks varying in width, and dark brown cross-bars and rufous-brown bars or marks, closer on sides of breast and wider apart on lower flanks, but varying greatly in form, quantity and colour in individuals; centre of belly and usually centre of lower throat with few or no streaks or marks; under tail-coverts as lower flanks but sometimes with only central streaks and no cross-bars; legs and feet, feathered to base of toes, white speckled rufous-brown to dark brown; axillaries pale buff to white occasionally with one or two brown central streaks; under wing-coverts same with brown central streaks and those covering outer primaries with long greyish-brown tips; tail-feathers brown to rufous-brown with greyish-white to buffish tips either uniform or freckled brown, central pair mottled dark brown and more uniform than rest, which have broad dark brown bars on their inner webs and in outer feathers across both webs; primaries and secondaries dark brown with paler and more buffish-brown bars which have dark brown mottlings, on outer primaries outer webs with paler buff to dull white bars with little or no mottling and inner webs with darker mottled bars, tips of feathers more greyish and mottled dark brown; primary-coverts barred dark brown and buff-brown or rufous-brown with dark mottlings; greater and median coverts much as outer scapulars with white "mirrors" (varying in size and often absent on inner feathers) on distal part of outer webs; lesser coverts as rest of upper-parts. This plumage is acquired by complete moult June-Oct. and occasionally not complete until Dec. *Summer*.—Several examples were moulting body-feathers in Jan. and Feb. but this does not seem regular and may have been due to the autumn moult being much delayed. N.B.—There is no difference in coloration in males and females. Individual variation in colour and markings is very considerable, but those with grey ground-colour on upper-parts are very rare in Great Britain.

Nestling.—Down white, fairly short, soft and plentiful, covering whole body and tarsi and toes to base of claws, with a bare patch at back of tarsal joint.

Juvenile.—Feathers of body and greater, median and lesser wing-coverts of very loose structure especially on under-parts. Crown brown to rufous-brown, feathers tipped and with indistinct bars of greyish-white; rest of upper-parts same but feathers with longer and whiter tips and barred buff to whitish, bars and tips on scapulars and wing-coverts wider and more prominent; feathers of facial disk rufous-buff with whitish tips or greyish-white with brown bars and those in loreal region greyish-white with black shafts and tips; rest of under-parts sandy-buff to buffish-grey barred pale brown, feathers with whitish tips on flanks and sides and without bars on centre of belly, tarsi and feet.

First winter.—Like adults. The juvenile body-plumage, greater, median and lesser coverts are moulted sometimes commencing

1, Tawny Owl: Loosely constructed feather of juvenile plumage with one short filament of nestling down adhering near tip. 2, Barn-Owl: First winter feather with long 2nd nestling down adhering to its tip and two filaments of very short 1st nestling down adhering to tips of 2nd nestling down.

Portions of outer webs of 1st primaries of: 3, Short-eared Owl, 4, Long-eared Owl.
5, Nestling in down, 6, Juvenile, of Long-eared Owl.

before wing- and tail-feathers are fully grown but often not complete until Oct. or even Nov. and occasionally Dec. Primaries, secondaries, primary-coverts and tail-feathers are not moulted.

Measurements and structure.—♂ wing 245–265 mm. (one 270), tail 145–165, tarsus 35–45, bill from base of feathers 27–29 (22 British measured). ♀ wing 255–275 (17 British measured). Primaries : 4th and 5th longest, 3rd 8–12 mm. shorter, 2nd 25–35 mm. shorter, 1st 65–80 mm. shorter, 6th 12–15 mm. shorter ; 2nd to 5th emarginated on outer webs ; outer feather of bastard-wing and outer web of 1st primary with long serrations, of emarginated portions of 2nd and 3rd with short serrations which are less distinct on emarginated portions of 4th and 5th. Outer secondaries shorter than 10th primary, rest becoming longer and inner ones equalling about 8th primary, tips rounded. Tail rounded, 12 feathers, tips rounded. Toes and tarsus covered with feathers, 1st toe short and capable of lateral motion, 4th toe not much longer and reversible, claws long, curved, compressed, tapering and very sharp. Bill strong, much compressed and upper mandible strongly curved and projecting at tip, which is sharply pointed, lower mandible shorter with rounded tip. Nostrils covered by bristle-like feathers of disk.

Soft parts.—Bill pale greenish-yellow, claws dirty white at base, blackish at tip ; iris bluish-black.

CHARACTERS AND ALLIED FORMS.—*S. a. aluco* (Europe) is like *S. a. sylvatica* but larger (wing ♂ 265–290 mm. ♀ 270–305) and grey or grey-brown examples are more frequent than tawny ones ; *S. a. mauritanica* (north-west Africa) has darker upper-parts and conspicuously marked under-parts, but is close to *S. a. aluco* ; *S. a. sancti-nicolai* (south-west Persia) has pale upper-parts with fine brown markings and fine dark markings on white under-parts ; *S. a. biddulphi* (north-west India) is larger, grey upper-parts with prominent blackish and rounded white markings on crown and mantle and broad, widely spaced dark bars on white under-parts ; *S. a. nivicola* (eastern Himalayas) is similar but darker and not so large ; *S. a. härmsi* (west Turkestan) has also been separated. Tawny or brown upper-parts, large rounded head and wing-formula distinguish Tawny Owl.

FIELD-CHARACTERS.—Essentially nocturnal. If forcibly ejected from its diurnal retreat among dense branches, in a hollow tree or ivy-covered crags, only visible as it seeks to regain cover. It then appears as a large brown-grey bird with rounded wings, disproportionately large head, and slow, noiseless flight. If detected at rest drawn up against a tree-trunk, black eyes and absence of ear-tufts distinguish it from smaller Long-eared Owl. Call-note, a clicking “ke-wick, ke-wack” heard oftenest in early summer after young have left nest, but best known call is melodious hoot, a long-drawn quavering “hoo-hoo-hoo-hoo.” Bold in defence of nest ;

does not hesitate to stoop at and strike head of an intruder with its sharp talons.

BREEDING-HABITS.—Prefers well-wooded districts, especially where old timber is mixed with some conifers. Makes no nest, breeding sometimes in holes of trees or old nests of Rook, Magpie, Heron, etc., occasionally but not often in barns, or ledges of rock, and also at times on ground, in rabbit-hole, or sheltered by stone or scrub. *Eggs.*—White, normally 2 to 4 in number; sets of 5 occasional and six recorded. Apparent clutches of seven and eight may be two layings in same hole. Average of 100 British eggs, 46.7×39 . Max.: 50.4×38 and 47×41.2 . Min.: 42.3×36 . *Breeding-season.*—Latter half of March and early April. *Incubation.*—Begins with first laid egg and is performed by hen only; probably about 28 days, but one egg said to have hatched out on 23rd day. Eggs laid at intervals of 2 (or 3) days. Single brooded.

FOOD.—Among mammals chiefly common shrew, long-tailed field mouse and short-tailed field vole; occasionally brown rat, water rat, bank vole, lesser shrew, young rabbit or leveret, and more rarely squirrel, mole and house mouse. Of birds, Sparrows and Starlings are far most often found in pellets; Thrush, Blackbird, Mistle-Thrush, Chaffinch, Brambling, Bunting sp.? and once remains of Green Woodpecker recorded. Fish not very infrequent, frogs and a toad also found; mollusca (*Limax agrestis*) and worms on record. Insects: chiefly coleoptera (*Melolontha*, *Geotrupes*, *Necrophorus*, etc.), and lepidoptera (*Mamestra brassicæ* and various *Noctuæ*); also *Perla* (sp.?).

DISTRIBUTION.—Confined to *Great Britain*. Resident. Generally distributed but becoming uncommon in Sutherland and very rare Caithness; very doubtful if ever occurred Orkneys or Shetlands, and has certainly not O. Hebrides or Ireland.

DISTRIBUTION.—*Abroad.*—Replaced by typical form in Europe generally, to forest-limit, east to Caucasus, Palestine, and north Persia and in south-west Persia and north-west Africa by closely-allied subspecies.

Genus TYTO Billb.

TYTO Billberg, Synops. Faunæ Scand., 1, 2, tab. A (1828—New name for *Strix* Savigny 1809, which is the genus of Barn-Owls).

Medium-sized Owls of great beauty, underside of British satiny-white or with buff tinge and few dusky dots. Several distinctive characters in skeleton. Facial disk most conspicuous, and reaching far above eyes. Ear nearly as long as skull, but opening small, operculum much larger than it would seem necessary.

No ear-like feather-tufts. Eyes comparatively small. Wings long, 1st, 2nd and 3rd primaries very nearly equal and longest, very wide and soft, without any emarginations on inner webs. Tarsus long, with short feathers, toes with bristles only, *not* feathered. Claw of middle toe with inner edge produced and even more or less pectinated. Tail slightly emarginated. One species in numerous subspecies nearly all parts of World, in addition another each in India and Africa, several more in Australia.

TYTO ALBA*

240. *Tyto alba alba* (Scop.)—THE WHITE-BREASTED BARN-OWL.

STRIX ALBA Scopoli, Annus 1, Historico-Natur., p. 21 (1769—Friuli, in N. Italy).

Aluco flammeus (Linnæus) (nec Pontoppidan), Yarrell, 1, p. 194 (part).

Strix flammea Linnæus (nec Pontoppidan), Saunders, p. 291 (part).

DESCRIPTION (Plates 1 and 2).—*Adult male. Winter.*—Whole upper-parts golden-buff, each feather with a central distal streak of alternate grey and dark brown and tips of feathers mottled grey with fine brown vermiculations, amount of mottling varying individually but less marked on crown and nape than on scapulars and mantle; facial disk, which is complete, white with a patch of reddish-rust colour in front of eye and sometimes extending immediately round eye; “ruff” (slightly curled feathers surrounding disk) well marked, inner feathers white, outer feathers on upper-part of “ruff” golden-buff and on lower part tipped buff and brown but occasionally entirely white; rest of under-parts silvery-white, often with a buff tinge on sides of breast and upper-breast entirely unspotted or with a varying number of fine dark brown spots on sides of breast and flanks; tibia and about half tarsus thickly covered with white feathers, lower half of tarsus more thinly covered with feathers having small tuft-like base and long bristle-like shafts, toes sparsely covered with white bristles; axillaries and under wing-coverts entirely white or with a few small brown spots and feathers covering outer primaries usually with faint greyish or greyish-brown tips; tail varying pale golden-buff to buffish-white, inner webs of all except central pair being whiter, with three to four (occasionally five) wavy bars of brown sometimes well marked and mottled with grey but often much broken, sometimes restricted to a few

* It has already been explained (p. 84) that the name *Strix flammea* belongs to the Short-eared Owl, and cannot be used for the Barn-Owl. The first name of the latter is *Strix alba* Scopoli 1769.—The type of the generic *Strix* is, by tautonomy, *Strix strix*, the Brown Owl, and the first generic term for the Barn-Owl is *Tyto*, Billberg, 1828. This cannot be rejected on account of a previous *Tyta*, the names being easily distinguished.—E.H.

patches in centre of feather and in one example absent altogether, tips and outer webs of feathers mottled grey and brown to varying extent; primaries and secondaries, outer webs and edge of inner webs along shaft pale golden-buff, rest of inner webs white, tips and to varying extent outer webs, freckled grey and brown, on inner webs adjoining shaft short brown bars, sometimes extending to outer webs, usually much restricted and broken and sometimes reduced to spots (absent altogether in one example); innermost secondaries, primary-coverts, greater and median coverts as scapulars; lesser coverts with little grey mottling and white along edge of wing. This plumage is acquired by complete moult July-Nov. (occasionally later, one in Jan. finishing moult and one *T. a. guttata* in February). *Summer*.—Apparently no moult and very little change by abrasion.

Adult female. Winter and summer.—Like adult male but upper-parts with more mottling and central grey and brown streaks wide; under-parts often indistinguishable from male but usually with rather larger and more numerous spots and often with more buff on breast; under wing-coverts covering outer primaries usually with darker tips; bars on tail and wings usually darker and more marked but not invariably so. N.B.—Some examples with whole under-parts pale buff, upper-parts more mottled, facial disk with more rusty-red and “ruff” more buff may be pale examples of *T. a. guttata* as the only such examples I have seen were taken in winter.

Nestling. 1st down, short and fairly plentiful on upper-parts but with bare patches on sides of neck and sparse on belly, front of tarsus and toes covered to claws, but back of tarsus bare, white.

2nd down very much longer, more plentiful, but lower half of tarsus and toes sparsely covered with short tufts, pale buffish-cream colour. N.B.—This second generation of creamy down replaces the short white down which is seen clinging to the tips of it when the nestling is 10–14 days old. It is a true down and appears to substitute the downy *feathers* of the *juvenile* plumage of other Owls.

First winter and summer.—Like adults. This plumage immediately succeeds the *2nd down* which is pushed out by the growing feathers and clings for a short time to their tips (*see fig. 2, Plate 2*).

Measurements and structure.—♂ wing 265–290 mm., tail 110–125, tarsus 55–62, bill from base of feathers 23–29 (25 British measured). ♀ wing 265–295. Primaries: 2nd longest, 1st often as long, sometimes 1–6 mm. shorter, 3rd 3–8 shorter, 4th 20–28 shorter, 5th 35–50 shorter; outer webs of primaries not emarginated, outer edge of 1st primary only with fairly long serrations. Outer secondaries shorter than 10th primary, rest becoming longer and inner ones about as long as 7th primary, tips rounded. Tail square,

12 feathers, tips rounded. Three toes usually directed forwards but 4th is reversible, claws long and very sharp, inner edge of third claw flattened and serrated. N.B.—These serrations are not present in nestlings and are less well marked in juvenile than in adults. Bill fairly strong, much compressed and upper mandible strongly curved and projecting at tip which is very sharply pointed, lower mandible shorter with rounded tip. Nostrils nearly covered by bristle-like feathers of disk.

Soft parts.—Bill yellowish-white to flesh-white; claws dark horn-colour; iris black.

CHARACTERS AND ALLIED FORMS.—For differences of *T. a. guttata* see under that form. British specimens of *T. a. alba* are on the whole less spotted than others but there is no constant difference.

T. a. ernesti (Sardinia, Corsica) is paler on upper-parts and purer white on under-parts with rarely any spots or buff tinge even in females, tail white sometimes with buff and with little barring, wing-feathers pale with little barring; *T. a. schmitzi* (Madeira) has dark upper-parts, spotted under-parts, very dark spot on facial disk and large, stout toes; *T. a. gracilirostris* (eastern Canary Islands) is smaller and has a fine bill; *T. a. detorta* (Cape Verde) is still darker than *T. a. guttata* with wider and more prominent black and grey mesial streaks on upper-parts and darker and broader bars on wings and tail; *T. a. maculata* (Nubia to South Africa) has spotted under-parts, long tarsi and long toes; many other forms are found outside the Palæarctic Region. Barn-Owls are easily distinguished from other British Owls by their golden-buff colouring and unstreaked under-parts.

FIELD-CHARACTERS.—Spends the day in ruins, church towers, dovecotes, clefts in cliffs, hollow trees, house-roofs, and similar places, seldom coming abroad before nightfall. If it does fly in day-time, bird is a conspicuous object in landscape, as, with buoyant, reeling flight, it quarters ground in search of prey, and orange-buff upper-parts and pure white face and under-parts are unmistakable. Usual cry, an eerie, long-drawn shriek. Hisses when disturbed, and, like other Owls, expresses anger by snapping bill. Purring chirrup denotes pleasure. Hunger-cry a loud sustained snore.

BREEDING-HABITS.—Generally breeds in unoccupied buildings, ruins, or old timber. No nest, eggs laid on floor of hole, which is often covered with disintegrated and fresh pellets, in dark corner of belfry or barn, or hole in ruinous wall, sometimes in hole of tree or occasionally in crevice among rocks, dovecotes, or old nests of Jackdaw, etc. *Eggs.*—Usually 4 to 6 in number, but occasionally 7 to 10 or 11, white, without gloss, and somewhat elongated in

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1

Middle toe of the Barn-Owl (*Tyto a. alba*), showing flattened and serrated inner edge of claw.

shape. Average size of 100 British eggs, 39.4×31.5 . Max.: 45×33.4 and 39×33.5 . Min.: 36.2×31.2 and 42.5×29.1 mm. *Incubation*.—By hen alone, but male is also present in the nest-hole, differing in this respect from Tawny Owl. Sometimes eggs are laid in pairs with an interval of roughly a week between, so that fresh eggs and well-grown young may be found in same nest. At other times the clutch is laid at short intervals, probably two days between each egg. Period probably about a month, but not exactly determined. *Breeding-season*.—Generally during April or early May, occasionally in late March, once in February. A second brood often in July and nests with eggs or young have been found from Sept. to December.

FOOD.—Of small mammals, shrews, long and short tailed field mice and bank-voles are most often taken; also occasionally house-mice, water-vole, young brown rats, long-eared bat and moles. Among birds Sparrows and Starlings are often taken; occasionally Blackbird, Thrush, Greenfinch, Sedge-Warbler, Sky-Lark, etc.; frogs occasionally; insects, chiefly coleoptera (*Melolontha*, *Geotrupes*, *Pterostichus*, etc.), and sometimes also lepidoptera (*Noctuæ*).

DISTRIBUTION.—*British Isles*.—Resident. Generally distributed but not abundant, and scarcer, especially in Scotland, than formerly. Breeds very rarely in north-west and only rare vagrant to north-east Scotland; no certain record of its occurrence in Orkneys or Shetlands; one heard in Outer Hebrides by P. H. Bahr, June 1907, and one (? subsp.) Galson (O.H.), March 1915.

DISTRIBUTION.—*Abroad*.—West France, Portugal and Spain, south Europe generally and north Africa to Mesopotamia. Replaced by allied forms in central Europe and various parts of Africa, Asia, Australia, and America.

241. *Tyto alba guttata* (Brehm)—THE DARK-BREASTED BARN-OWL.

STRIX GUTTATA Brehm, Handb. Naturg. Vög. Deutschl., p. 106 (1831—In winter in Germany).

Aluco flammeus (Linnæus) (nec Pontopiddan), Yarrell, 1, p. 194 (part).

Strix flammea Linnæus (nec Pontopiddan), Saunders, p. 291 (part).

DESCRIPTION.—*Adult male*. *Winter and summer*.—Upper-parts so much mottled grey that not much of the golden-buff shows, usually darker and more mottled than females of *T. a. alba* but occasional examples with white breasts have about as much mottling on upper-parts as females of *T. a. alba*; facial disk usually with reddish-rust colour spreading over most of disk, but occasionally as in *T. a. alba*, ruff usually more buff than in *T. a. alba*; rest of under-parts buff to deep buff with larger and more numerous dark brown spots than in females of *T. a. alba* and these spots frequently taking form of mesial streaks of alternate greyish-white and dark brown, occasional examples are as white as *T. a. alba* but such examples are

more spotted than males of *T. a. alba* ; under wing-coverts washed buff and spotted and feathers covering primaries with long dark grey and buff tips ; tail and wing-feathers darker, more mottled at tips and with darker and more complete bars than in *T. a. alba*.

Adult female.—Like male and not differing as female does in *T. a. alba*.

Nestling.—Like that of *T. a. alba*.

Measurements and structure.—♂ wing 275–305 mm., tail 115–125, tarsus 55–62, bill from base of feathers 25–30 (12 measured). ♀ wing 270–295. Primaries and rest of structure as in *T. a. alba*.

BREEDING-HABITS.—Exactly like those of White-breasted form ; separate details unnecessary. *Eggs*.—Average of 42 Continental eggs, 39.2×30.8 (Rey). Clutch seldom seems to exceed 7. Naumann gives incubation period as three weeks, probably underestimated. *Breeding-season*.—Second half of April, but autumn broods occasionally met with as in England.

FOOD.—Very similar to that of the British breeding form. Von Schweppenburg gives proportion of shrews as 30 per cent., mice 22 per cent., and voles 44 per cent. Altum records from 354 pellets : 7 bats, 1,064 mice, voles, etc., 12 Sparrows and 2 Swifts.

DISTRIBUTION.—*England*.—Vagrant or irregular migrant. Few occurrences can unhesitatingly be ascribed to this form : at least eight in Sussex (Aug. to Nov., Feb.), three in Kent (one March) two certainly Norfolk (Dec. and Jan.) and others probably (as in Aug. and early Sept. 1891, when forty Barn-Owls were brought to a Norwich taxidermist), one certainly Yorks. (Dec.) and others probably (Oct. and Nov.), one no doubt Northumberland ; one Berks. (Nov.) ; one Unst (Shetland) (Nov.). Probably also Hants. and Essex.

DISTRIBUTION.—*Abroad*.—South Sweden, Denmark, Germany to east France (where and even on the Rhine the ranges of this form and *T. alba alba* overlap), south to Alps, Austria and Hungary.

ORDER ACCIPITRES.

Contains diurnal Raptorial birds. Outwardly recognizable by curved sharp-pointed bill, cere in which nostrils are situated and strong, powerful feet and claws, only found otherwise in Owls (*Striges*). Basi-ptyergoid processes absent. Sternum without incisions. Oil-gland feathered. Lower tibial feathers elongated, except in *Pandion*. With more or less underdown. Habits diurnal. Eggs spotted red, in some cases unspotted.

Key to genera of Order ACCIPITRES.

1 {	Neck and head fully feathered	3
	Neck and head, at least partially, bare or covered with down	2

2	{	Nostrils horizontal, frill of feathers on crown and hind-neck	<i>Neophron</i> , p. 184
		Nostrils oblique, nearly perpendicular, no feathers on crown and hind-neck	<i>Gyps</i> , p. 181
3	{	Fore-head and lores with ordinary feathers and bristles or bristly tips to feathers 4	
		Fore-head and lores with small scale-like feathers, no trace of bristles or bristly ends	<i>Pernis</i> , p. 175
4	{	Toes with sharp-pointed prickly scales beneath, feathers without aftershaft, outer toe reversible	<i>Pandion</i> , p. 178
		Underside of toes not prickly, feathers with aftershaft, outer toe not distinctly reversible 5	
5	{	Bill with sharp tooth on upper and corresponding notch on under mandible	<i>Falco</i> , p. 100
		Bill festooned, but without sharp tooth on upper or notch on lower mandible 6	
6	{	Tarsus feathered throughout	<i>Aquila</i> , p. 130
		Tarsus bare or partially feathered, at least bare behind 7	
7	{	Tarsus scutellated in front, reticulated behind 8	
		Tarsus scutellated behind or feathered in front 9	
8	{	Tarsus very short, tail forked	<i>Milvus</i> , p. 165
		Tarsus long, tail even or rounded	<i>Circus</i> , p. 146
9	{	Huge birds, larger than Golden Eagle, scales beneath toes rough	<i>Haliaeetus</i> , p. 171
		Smaller than Golden Eagle, scales beneath toes smooth 10	
10	{	1st primary more than one inch longer than shortest secondaries, tail less than three-quarters length of wing	<i>Buteo</i> , p. 137
		1st primary less than one inch longer than shortest secondaries, tail three-quarters length of wing or more	<i>Accipiter</i> , p. 158

FAMILY FALCONIDÆ.

Vomer touching maxillo-palatinum, ending in an oval swelling. Both spina externa and interna well developed. Præcoracoid connected with claviculum. Eggs always heavily blotched and spotted red. Only one genus.

Genus FALCO L.

FALCO Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Type by subsequent determination in Check-List N. Amer. B.: *Falco subbuteo* L.).

Contains all real Falcons, including Peregrines, Merlins, Kestrels, Iceland Falcons, etc., the various groups not presenting sufficient characters for generic separation. Upper mandible with sharp "tooth" and corresponding notch in lower mandible. Nostrils free, round, with tubercle in middle. Second primary longest, sometimes (Merlin) 2nd and 3rd, 1st or 1st and 2nd with abrupt, strongly-marked attenuation before tip of inner web. Tarsus almost entirely bare. Eggs yellow if held against light Cosmopolitan.

Key to species of genus FALCO.

1 {	Larger, wing ♂ over 345, ♀ over 380 mm.	<i>F. rusticolus</i> , p. 101
	Smaller, wing ♂ under 345, ♀ under 380 mm.	2
2 {	Back rufous	3
	Back grey or brown	4
3 {	1st primary much longer than 4th	<i>F. naumanni</i> , p. 124
	1st primary about equal to 4th	<i>F. tinnunculus</i> , p. 119
4 {	Middle toe without claw over 40, culmen over 17 mm.	<i>F. peregrinus</i> , p. 107
	Middle toe without claw under 40, culmen not over 17 mm.	5
5 {	Middle toe without claw over 30 mm.	6
	Middle toe without claw under 30 mm.	<i>F. vespertinus</i> , p. 127
6 {	Tail grey with wide subterminal black bar, back bluish-grey with obvious black shaft-strips	<i>F. c. aesalon</i> , ♂ ad., p. 115
	Tail grey without wide subterminal black bar, back uniform grey, not obviously striated with black	<i>F. subbuteo</i> , ad., p. 113
	Tail brown with rufous bars, feathers of back and scapulars with buff or rusty edges	<i>F. subbuteo</i> , juv., p. 114
	Tail brown with light bars, feathers of back and scapulars barred or spotted with rufous	<i>F. c. aesalon</i> , ♀ ad. and juv., p. 116

FALCO RUSTICOLUS***242. Falco rusticolus rusticolus L.—THE GYR-FALCON.**

FALCO RUSTICOLUS Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Sweden.

cf. Fauna Suecica, ed. II, p. 19, No. 56).

Falco gyrfalco Linnæus, Saunders, p. 345.

DESCRIPTION.

—*Adult male and female. Winter and summer.*—

Fore-head white, finely streaked black; crown dark slate-brown, feathers with blackish shaft-streaks; feathers over eyes and down sides of back of crown with narrow, and feathers

The Gyr-Falcon (*Falco r. rusticolus*).

of nape with wider, buffish-white edgings; feathers of mantle and

* It seems impossible to avoid this name, for *gyrfalco* is undoubtedly a synonym, both names referring to Swedish birds in various plumages.—E.H

scapulars dark slate-brown with blackish shafts and barred pale bluish-slate; back, rump and upper tail-coverts paler slate-blue with black-brown shaft-streaks and brown-slate bars; ear-coverts and cheeks dark brown streaked white, sometimes with ill-defined moustachial stripe; chin white; throat and upper-breast white, feathers with drop-like streaks of dark brown; lower-breast and belly with larger dark brown spots; flanks, axillaries and under wing-coverts white broadly barred dark slate-brown; under tail-coverts same but bars considerably narrower; tail slate-grey, slightly mottled brown and closely barred brown, narrowly tipped dull white; outer primaries dark brown, outer webs mottled dull white and inner webs with comb-like barring of dull white more or less mottled brown, inner primaries and secondaries barred slate, mottled with brown; wing-coverts as mantle. Only moulting adults examined were dated April and May and in these inner primaries were partially grown but there was no body-moult.

Nestling.—Down white with a slight creamy tinge, rather short covering bird well on upper-parts, but thinly on sides of belly and bare patch at base of sides of neck. (Only a very young bird examined.)

Juvenile.—Crown dark brown with more or less buffish-white edgings to feathers, occasionally all over but usually confined to sides of crown; nape with more white as in adult; upper mantle usually uniform dark brown, rest of mantle and scapulars dark brown, feathers with brownish-white edgings and spots; back, rump and upper tail-coverts with rather larger spots and edgings, often forming bars on upper tail-coverts; chin white, streaked dark brown; rest of under-parts very widely streaked dark brown, feathers of flanks mostly dark brown with white edgings and spots; under tail-coverts less widely streaked usually with dark brown spots and shaft-streaks; axillaries and under wing-coverts dark brown edged with large white spots and streaks; tail dark brown with dull buffish incomplete bars, paler and more distinct on inner webs of all feathers except central pair, tips of feathers whiter; primaries dark brown with a few buff spots on outer webs and comb-like buff bars on inner webs, inner primaries and secondaries more spotted on outer webs and with comb-like bars on inner incomplete and much mottled; wing-coverts dark brown spotted with brownish-white or buff on edges as scapulars. Some have no light spots on mantle, scapulars and wing-coverts and are much darker on under-parts.

First winter.—Like juvenile. *First summer*.—No juvenile examples in actual moult have been examined, but moult is probably like that of Iceland Falcon.

Measurements and structure.—♂ wing 350–372 mm., tail 195–215, tarsus 50–61, bill from cere (see vol. 1, p. *xiii) 23–24 (4 adults measured). ♀ wing 385–402, bill 25–27 (7 adults measured). Primaries: 2nd longest, 1st 19–25 mm. shorter,

3rd 6-10 shorter, 4th 20-30 shorter, 5th 45-47 shorter; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rest of structure as Peregrine Falcon.

Soft parts.—Bill bluish-horn, darker at tip, yellowish at base; cere, legs and feet yellow in adult, grey in young; iris dark brown.

CHARACTERS AND ALLIED FORMS.—For differences of *F. r. islandus* and *candicans* see under those forms. Forms of *F. rusticolus* may be distinguished from *F. peregrinus* by their larger size, and in most paler coloration and want of definite moustachial stripe. Briefly Gyr-Falcon is usually darker on crown and mantle than Iceland and Greenland, and is smaller; some Greenland Falcons are like Iceland but most are very much whiter, these white birds not being found breeding in Iceland. Very dark brown juvenile Iceland and Greenland (*H. holboelli* Sharpe) are not quite as blackish as darkest juvenile *F. r. rusticolus*, while both juvenile and adult *F. obsoletus* (Labrador) seem even darker than *F. r. rusticolus*, but this requires confirmation.

BREEDING-HABITS.—As a rule breeds on ledges of cliffs. Wolley records pair breeding in trees. *Nest*.—Said to be substantial, built of branches and twigs and occasionally some dead grass in lining. Apparently birds add to and repair nest, which may in first instance have been that of Rough-legged Buzzard or Raven. *Eggs*.—Normally 4, sometimes 3, once 5, washed yellowish tawny-brown, and spotted darker reddish-brown. Some have quite a pink or purplish tinge, and others show more or less of the white ground. Average of 100 eggs, 58.7×45.6 . Max.: 62.6×46 and 57.3×48.5 . Min.: 55×45.7 and 56×48 . *Breeding-season*.—During second half of April, but incubated eggs may be found in May. *Incubation*.—By hen. Single brooded.

FOOD.—In Scandinavia chiefly Ptarmigan (*Lagopus mutus*), Willow-Grouse (*L. lagopus*), also Whimbrel, Pigeon and small birds. Mammals, especially lemming, but also squirrel, etc.

DISTRIBUTION.—*England*.—Very rare vagrant. Two admitted by Saunders:—Adult, Mayfield (Sussex), Jan., 1845 and young, Orford (Suffolk), Oct., 1867. One Hatfield Broad Oak (Essex), Dec., 1901, and another Thetford Warren (Norfolk) spring, 1883, doubtfully authentic (*Brit. B.*, I, p. 321).

DISTRIBUTION.—*Abroad*.—North Scandinavia and Lapland, straying occasionally to Baltic Provinces, Poland, Germany, Denmark, Heligoland, Belgium, and Holland. Said to have occurred in Iceland, Greenland, and North America, but probably due to error.

243. *Falco rusticolus islandus* Brünn.—THE ICELAND FALCON.

FALCO ISLANDUS Brünnich, Orn. Bor., p. 2 (1764—partim, No. 9 only. Brünnich doubtfully united the white and grey falcons, stating that the

various varieties were brought to Denmark by the Icelanders. From Kerr—1792—onwards *islandus* has generally been restricted to the grey-backed Iceland form).

Falco islandus J. F. Gmelin, Yarrell, I, p. 46 (part); Saunders, p. 343.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Occasionally very difficult to distinguish from *F. r. rusticolus*, crown being only slightly more streaked with whitish, nape rather whiter and rest of upper-parts with paler slate-grey bars. Usually crown creamy-white streaked black-brown, nape white with irregular black-brown markings, rest of upper-parts and tail with ashy-grey bars much paler than in *F. r. rusticolus*, ear-coverts and cheeks white streaked black-brown, under-parts as in *F. r. rusticolus*, but often with finer black streaks and smaller spots. This plumage is acquired by complete moult from June to January.

Nestling.—(Not examined.)

Juvenile.—Sometimes like that of *F. r. rusticolus*, but usually crown and nape with considerably more white, being usually white thickly streaked dark brown; feathers of mantle, scapulars and wing-coverts usually with whiter edgings; upper tail-coverts with more definite whitish bars; tail-feathers also more definitely barred white; ear-coverts and cheeks usually with more white; comb-like barring on inner webs of primaries whiter.

First winter.—Like juvenile. *First summer.*—The juvenile plumage is completely moulted from June (sometimes almost complete by July, when bird is about a year old) to January. New plumage like that of adult.

Measurements and structure.—♂ wing 366–380 mm., tail 190–210, tarsus 57–69, bill from cere 23–27 (11 adults measured). ♀ wing 410–430, bill 26–29 (12 adults measured). Primaries: 2nd longest, 1st 12–17 mm. shorter, 3rd 8–12 shorter, 4th 25–30 shorter, 5th 45–55 shorter; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rest of structure as Peregrine Falcon.

Soft parts.—Bill bluish-horn, darker at tip, yellowish at base; cere, legs and feet yellow in adult, grey in young; iris dark brown.

BREEDING-HABITS.—Necessarily cliff-breeder only. *Nest.*—Hantzsch describes it as flat and broad, with a few twigs and hard stalks. *Eggs.*—Normally 4, but good many instances of 5 (and even 6) on record, and 3 not uncommon, especially in second layings. Somewhat lighter in colouring than Gyr-Falcons' in a series but often indistinguishable, frequently showing good deal of light ground: exceptionally quite white. Average of 100 eggs, 59.1×46.38 . Max.: 64×48.2 and 60.1×49.3 . Min.: 53.8×44.2 and 57.5×41.8 . *Breeding-season.*—Eggs laid from end April to mid-May. *Incubation.*—Chiefly by female, but Faber asserts male takes a share. Period probably not less than four weeks, and young leave nest in first half July. Single brooded, but will lay again if first clutch is taken.

FOOD.—In Iceland mainly Ptarmigan, but also many species of ducks as well as sea-birds (Guillemot, Gulls, etc.), and various waders (Whimbrel, Golden Plover, etc.). In Shetlands also Rock-Dove and Pigeon.

DISTRIBUTION.—*British Isles*.—Rare vagrant. Identified examples obtained from time to time (generally in winter) in Northumberland, Westmorland, Yorks., Salop, Scilly Isles, and possibly Lincs.; in Shetlands, Orkneys, O. and I. Hebrides, and several localities Scottish mainland. Four times in north and west Ireland.

DISTRIBUTION.—*Abroad*.—Appears to be the only form breeding in Iceland, whence it strays very rarely southwards. Many Greenland birds indistinguishable, but “white” birds apparently not breeding in Iceland.

244. *Falco rusticolus candicans* Gm.—THE GREENLAND FALCON.

FALCO CANDICANS Gmelin, Syst. Nat., I, p. 275 (1788—“Habitat in Islandia et Scotia boreali”! As Gmelin distinguished between the white *candicans* and the dark *islandus*, the former name has generally been restricted to the Greenland form, though Gmelin did not know its real habitat).

Falco candicans J. F. Gmelin, Yarrell, I, p. 36; Saunders, p. 341.

DESCRIPTION.—

Adult male and female. Winter and summer.—

Some examples indistinguishable from *F. r. islandus*. Others very similar but whiter on crown and nape, with white or whitish instead of pale grey bars on upper-parts and tail and many fewer and finer black markings on under-

The Greenland Falcon (*Falco r. candicans*)

parts. From such examples every gradation to individuals entirely white on under-parts; crown and nape white with a few fine black shaft-streaks; mantle, scapulars, wing-coverts, back and upper tail-coverts white with black restricted to broad spots or incomplete bars not entirely crossing feather; tail pure white or with shafts, frecklings and a few spots of dark brown; wing-feathers white with shafts, subterminal bands and a few spots and mottlings of dark brown. This plumage is acquired by complete moult from June to January or even February.

Nestling.—(Not examined.)

Juvenile.—Some examples as dark as juvenile *F. r. rusticolus* or *F. r. islandus*. Others considerably whiter on crown; rest of upper-parts with white or buffish-white edgings and spots and usually bars on scapulars; tail more widely and evenly barred white; under-parts more finely streaked dark brown. From such examples there is, as in the adult, complete gradation to individuals entirely white on under-parts or with only a few fine brown streaks; crown and nape white with dark brown shafts; mantle, scapulars and wing-coverts white with dark brown shafts and brown streaks usually more or less drop-shaped; tail white; wing-feathers as adult white form but usually more barred with dark brown. Such birds are distinguishable from adults by having streaks instead of bars on upper-parts and these are usually paler brown and not so blackish.

First winter.—Like juvenile. *First summer*.—The juvenile plumage is completely moulted from June (when bird is about a year old) to December, moult being sometimes nearly complete as early as July. New plumage like adult and moulting specimens examined show that dark juveniles moult into dark adult plumage and whiter juveniles into white adults.

Measurements and structure.—♂ wing 360–405 mm., tail 190–225, tarsus 60–71, bill from cere 23–25 (12 adults measured). ♀ wing 400–425, bill 25–28 (20 adults measured). Primaries: 2nd longest, 1st 15–25 mm. shorter, 3rd 2–10 shorter, 4th 25–30 shorter, 5th 45–50 shorter; 2nd and 3rd emarginated outer webs, 1st very abruptly emarginated and attenuated near tip of inner web and 2nd not so abruptly. Rest of structure as Peregrine Falcon.

Soft parts.—Bill bluish-horn, darker at tip, yellowish at base; cere, legs and feet yellow in adult, grey in young; iris dark brown.

BREEDING-HABITS.—Necessarily cliff-breeder; breeding beyond tree limit. No true nest, but as same site is occupied year after year, heaps of pellets and excrement in time form substantial eyrie. *Eggs*.—Normally 4, sometimes 3 only, and 5 once recorded, closely resembling those of Gyr-Falcon, and in a series darker than those of Iceland Falcon. Average of 90 eggs, 58.7×45.7 . Max.: 63.8×47 , and 60.7×49.5 . Min.: 53.5×44.5 and 56.9×41.4 . *Breeding-season*.—Variable according to locality, but eggs usually in late April or May: in high latitudes not till end May. *Incubation*.—Chiefly at any rate by female: period about 29 days (Manniche). Single brooded.

FOOD.—In Greenland mainly lemmings: also Alpine hare, occasionally Ptarmigan, Turnstone, Ringed Plover, Snow-Bunting, and at some eyries mainly Guillemots. In British Isles recorded as taking rabbit, water-vole, Snow-Bunting, Lark, Rock-Dove, Pigeon, waders (Golden Plover, Snipe, Dunlin, Ringed Plover, etc.) and Kittiwake.

DISTRIBUTION.—*British Isles.*—Irregular winter and spring-visitor (sometimes May), chiefly Scotland (especially islands) and Ireland (especially north and west coasts), occasionally north England, and elsewhere very rarely, viz. :—Denbigh, Brecon, Pembroke, Norfolk, Suffolk, Sussex, Wilts., Devon and Lundy Island, Cornwall and Scilly Isles.

DISTRIBUTION.—*Abroad.*—Breeds in Greenland, arctic N. America and arctic Asia, east to Commander Islands, straying casually to west Europe (Færoes, north France, Germany, not so rarely to Iceland, and in America to Nova Scotia and Maine). (Difference of Labrador form doubtful.)

FALCO PEREGRINUS

245. *Falco peregrinus peregrinus* Tunst.—THE PEREGRINE FALCON.

FALCO PEREGRINUS Tunstall, Ornithologia Britannica, p. 1 (1771—Ex Brit. Zool., p. 136—Great Britain).

Falco peregrinus britannicus Erlanger, Journ. f. Orn., 1903, p. 296 (England).

Falco peregrinus J. F. Gmelin, Yarrell, 1, p. 53; *F. peregrinus* Tunstall, Saunders, p. 347.

DESCRIPTION

(Plate 4).—*Adult male.* *Winter and summer.*—Whole

crown, nape and back of neck blackish slate-grey, sometimes quite black with a bluish tinge; bases of feathers of nape white or tinged buff occasionally showing slightly; upper

mantle same, but feathers with blue-grey tips; lower mantle, scapulars, back and upper tail-coverts pale blue-grey, feathers with blackish shafts and dark slate-grey bars; round eyes, ear-coverts and broad moustachial stripe blackish as crown; between moustachial stripe and ear-coverts a small patch of greyish-white or buff finely streaked blackish; chin and throat white often tinged pinkish-buff; upper-breast same but often with deeper tinge of pinkish-buff, feathers with fine blackish shaft-streaks, often broadening to a drop-like shape and rarely with blackish spots; rest of under-parts somewhat darker and usually closely barred blackish, bars varying in width individually and sometimes reduced to spots down centre of

Juvenile Peregrine Falcon (*Falco p. peregrinus*).

breast, flanks greyer and more closely barred ; axillaries and under wing-coverts even more prominently barred than flanks ; tail-feathers, basal portions pale blue-grey (more whitish on inner webs except in central feathers) barred blackish, distal portions darker grey and with wider blackish bars, tips greyish-white ; primaries blackish with very narrow whitish edging at tips and inner webs closely barred (tooth-like) with greyish-white, tinged buff near shaft ; primary-coverts blackish with narrow whitish tips ; secondaries, greater and median wing-coverts as scapulars, but secondaries with tooth-like greyish-white bars along inner edges of inner webs ; lesser coverts blackish with narrow grey edgings as upper mantle. This plumage is acquired by complete moult which appears to take place usually Aug.-Dec. but birds examined have been in various stages of moult in every month of year and moult is not only slow and gradual but varies greatly individually, e.g. in some moult is nearly complete in Oct., Nov., Dec. and Jan., while in others it is nearly complete in April and in one about half-way through in May. There appears to be only one moult.

Adult female.—Like male but often rather darker on lower mantle and rump and whitish or buffish bases of feathers on nape more often showing and these feathers sometimes slightly edged buffish ; upper-breast usually with larger drop-like blackish markings and rest of under-parts especially centre of breast and belly usually more heavily barred than in male ; tooth-like barring of inner webs of primaries usually more rufous-buff than in male.

Nestling.—When first hatched not very thickly covered (round eyes and patch at sides of neck bare) with short creamy-white *down* (A) which is subsequently replaced by juvenile feathers, also some small, very short tufts of white *down* (B) amongst *down* (A). When nestling is about 10 days or a fortnight old it becomes very thickly covered with a coarse, long *down* (C), pale buffish-grey on upper-parts and pale creamy on under-parts. This *down* (C) replaces very short *down* (B) which can be seen clinging to its tips here and there, but it also grows in many parts where there is no previous *down*. *Down* (C) when fully grown almost conceals *down* (A). About same time or shortly after *down* (C) commences to grow, juvenile feathers begin to sprout and these entirely replace *down* (A), which adheres to tips of feathers. (N.B.—*Down* which is subsequently replaced by true feathers growing from same follicle has been called “*prepennæ*”). *Down* (C) is shed when feathers are almost fully grown. In no case have I found it adhering to tips of under-down of feathered bird which is of a finer and more silky structure and appears to grow quite independently when nestling *down* (C) is mostly shed.

Juvenile. Male.—Centre of crown, mantle and back dark brown, feathers edged pale brown and whitish ; fore-head and nape with dark brown much reduced generally only as shaft-streak widening at tip and rest of feather creamy or buffish-white ;

scapulars as mantle but feathers with tooth-like pale brown marks along edges ; upper tail-coverts barred dark brown and buffish-white ; moustachial stripe dark brown, narrower than in adult and most of ear-coverts buffish-white with a few dark brown shaft-streaks ; chin and throat buffish-white ; rest of under-parts buffish-white to pale buff, each feather with broad mesial brown stripe, much broader at sides and on flanks and usually extending to broad bars on lower flanks ; under tail-coverts with narrow widely spaced wavy brown bars ; under wing-coverts broadly barred buffish-white and dark brown, axillaries with white often reduced to large spots ; tail-feathers dark brown with a blue-grey tinge, barred buff, the bars being frequently incomplete, tips buffish-white ; primaries as adult but with wider pale brown and white tips, outer webs at base usually with faint greyish marks, barring on inner webs more rufous-buff as in adult female ; secondaries and greater coverts with small faint pale marks on outer webs and rufous-buff tooth-like bars on edges of inner webs ; median and lesser coverts as mantle. *Female*.—As male but scapulars sometimes with incomplete faint pale bars, throat usually with dark brown shaft-streaks, patch behind moustachial stripes with broader streaks and under-parts with broader stripes.

First winter. Male and female.—Like juvenile. *First summer*.—The juvenile plumage is completely moulted from March to December of year following that in which bird was hatched, after moult birds become like adults, from which there is no means of differentiating them so far as I can discover. As in adult moult is gradual but period varies individually, some being half moulted in April and others only starting moult several months later and often not quite finished in December (i.e. when bird is 18 months old).

Measurements and structure.—♂ wing 300–322 mm. (one 292), tail 137–158, tarsus 43–50, bill from cere 18–22 (18 measured), ♀ wing 340–368, bill 22–27 (30 measured). Primaries : 2nd longest, 1st 5–15 mm. shorter, 3rd 10–17 shorter, 4th 27–40 shorter, 5th 50–57 shorter ; 1st very abruptly emarginated and attenuated near tip on inner web, 2nd slightly emarginated outer web. Outer secondaries shorter than 10th primary, inner ones becoming long and longest equalling 7th or 8th primary, tips somewhat pointed except innermost, which are rounded. Tail very slightly rounded, 12 feathers, tips slightly rounded. About half of tarsus feathered, toes long and strong, claws long, strong, compressed, curved, and sharply pointed. Bill short, thick and very strong, upper mandible curved with a prominent triangular projection on each cutting edge, proximal to tip, tip long and very sharp, under mandible broad and much shorter, with rounded tip proximal to which is a notch on each cutting edge. Nostrils large, round and bare.

Soft parts.—Bill slate-blue, dark at tip and yellowish at base, especially of lower mandible ; cere and bare orbital spaces yellow

tinged greenish; legs and feet bright yellow, claws blue-black; iris dark hazel.

CHARACTERS AND ALLIED FORMS.—For differences of *F. p. anatum* see under that form. *F. p. calidus* (west Siberia to Kamtschatka) has narrower moustachial stripe and white patch behind it larger; *F. p. pealei* (north-west America) is greyer, not so blackish, on crown and has wide black bars on under-parts; *F. p. brookei* (= *F. punicus*) (S. Spain, N. Marocco, Mediterranean Isles) is small, has rufous under-parts with close dark bars; *F. p. pelegrinoides* (= *F. barbarus* auct.) (Canary Is., N. Africa) is slightly smaller than last, has rufous under-parts very lightly barred and rufous nape and rufous tinge on fore-head; *F. p. babylonicus* (Turkestan, Persia, Mesopotamia) has more rufous on crown and nape than last and less pronounced moustachial stripe, other forms occur outside Palæ-arctic Region. Peregrine Falcons are distinguished from other British Falcons by their large size (but smaller than Gyr-Falcons), strong black moustachial stripe and want of chestnut on thighs and belly.

FIELD-CHARACTERS.—Breeds on maritime cliffs and inland precipices, but out of nesting-season occurs in varied situations, marshes and estuaries, moors and open country generally. At rest, its blue-grey colour, barred under-parts, black crown, cheeks, and clearly marked moustachial stripe coupled with its size and square-cut, high-shouldered figure are unmistakable. On the wing Peregrine is embodiment of speed and strength; flight, swift and direct, is accomplished by a few rapid beats of long, sharply-pointed wings and a long glide on extended motionless pinions; form compact and trim with sharp-cut outline, large feet often visible beneath short and wedge-shaped tail. Its headlong stoop, when made from any height, is incredibly swift and produces a rushing sound out of all proportion to bird's size. Except in breeding-season silent, as all Falcons are, but when nesting-place is invaded both sexes are vociferous and the rocks ring with their harsh, shrill, chattering "hek-hek-kek," which differs perceptibly in tone in the sexes, and in moments of intense excitement becomes a fierce, screaming "werch-werch-werch."

BREEDING-HABITS.—Now confined chiefly to sea-cliffs and wilder mountainous districts. No nest, eggs being laid in hollow scratched out in turf or soil on ledge or recess of steep cliff as a rule. If ledge is large two or three alternative sites may be found close together, but are usually some distance apart. Exceptionally among heather on low islet and on Continent in old nests on trees. *Eggs*.—Normally 3-4, very rarely 5, generally covered with reddish-brown markings, varying from orange-tawny to deep red, sometimes very dark brown. In some varieties a good deal of light ground visible and cloudy-ashy shell-marks as well as surface markings. Average of 100 British eggs, 51.8×41 . Max.: 58.6×43.8 and $49.8 \times$

44.2. Min. : 46×38.2 mm. *Breeding-season*.—Usually from about April 10 to early May, exceptionally end of March. *Incubation*.—Chiefly by female, but male takes some part. Period : four weeks. Single brooded. *Fledging-period*.—5–6 weeks.

Food.—Varies according to site of nest. Pigeons (domestic and wild) are always favourite food ; on grouse-moor, Grouse freely taken, and on west coast, sea-birds ; while locally Rooks and Jackdaws form large proportion of food. Other species recorded definitely are Carrion-Crow, Jay, Chough, Magpie, Starling (many), Hawfinch, Greenfinch, Chaffinch, Pied and Grey Wagtails, Meadow-Pipit, Blackbird, Mistle- and Song-Thrush, Ring-Ouzel, Redwing, Cuckoo, Great Spotted Woodpecker, Kestrel, Merlin, Peregrine (♂), Buzzard, Sparrow-Hawk, Rock-, Stock- and Ring-Doves, wounded Barnacle-Goose, Sheld-Duck, Mallard, Teal, Wigeon, all Limicolæ which breed with us (except Stone-Curlew, Dotterel, Kentish Plover and Phalarope) and also Grey Plover, Knot, and Purple Sandpiper ; Kittiwake (many), Common, Lesser Black-backed and Herring-Gulls, Common and Arctic Terns, Puffin (many), Guillemot and Razorbill, Moor-Hen, Coot, Corncrake, Black Grouse, Partridge and Pheasant. Rabbits also occasionally taken ; also young hare, shrew and mice ; as well as frogs, toads and beetles.

DISTRIBUTION.—*British Isles*.—Resident and passage-migrant. In south England confined as breeding-bird to cliffs of south and south-west coasts, but in Wales, north England, Scotland (mainland and islands) and Ireland much more common and breeds both sea-cliffs and inland rocks. In autumn northerly-bred birds pass through Great Britain on migration, while in winter our residents are frequently observed inland.

DISTRIBUTION.—*Abroad*.—North and central Europe. Accidental in Greenland. Represented by allied forms in the Mediterranean countries, Africa, various parts of Asia, Australia, and America.

246. *Falco peregrinus anatum* Bp.—THE NORTH AMERICAN PEREGRINE.

FALCO ANATUM Bonaparte, Geogr. & Comp. List, p. 4 (1838—New Jersey). *Falco peregrinus*, E. Bidwell, Bull. B.O.C., xxvii, p. 103 ; cf. Brit. B., v, p. 219.

DESCRIPTION.—*Adult male and female*.—Very much like *F. p. peregrinus* and often difficult to distinguish but moustachial stripe usually wider and often joined to ear-coverts and sometimes patch between moustache and ear-coverts is grey ; under-parts sometimes very finely peppered grey but this is also sometimes so in *F. p. peregrinus*.

Juvenile.—Very distinct from *F. p. peregrinus*, upper-parts being very dark—usually blackish-brown, edged dark rufous-brown ; streaks on under-parts black-brown much darker than in

F. p. peregrinus, ground-colour of under-parts more rufous-buff and not so pale as in juvenile *F. p. peregrinus*.

Measurements and structure.—♂ wing 300–330 mm., tail 143–163, tarsus 44–50, bill from cere 18–21 (7 measured). ♀ wing 345–370, bill 22–24. Structure as in *F. p. peregrinus*.

BREEDING-HABITS.—Recorded as breeding not only on ledges and cavities of cliffs and clay bluffs, but also in wooded districts in hollows in large trees and occasionally in old nests of Eagle. No nest made, eggs being laid on ground in scratching or on decayed wood. *Eggs*.—3 or more usually 4, very rarely 5, much like those of Peregrine, sometimes almost uniformly washed with yellowish-brown, or spotted and blotched with brown varying from brick-red to chocolate, and not showing much of the creamy-white ground. Average of 61 eggs, 52.5×41 . Max.: 57×43 . Min.: 48.5×38.5 (Bendire). *Breeding-season*.—From late March in southern to April in northern States and as late as June and July in Arctic America. *Incubation*.—By both sexes; lasts about four weeks. Single brooded.

FOOD.—Mainly birds taken on the wing, mammals (mice) rarely recorded. Birds include many species of Passeres (Blue Jay, Kingbird, Nuthatch, Chickadee, Grosbeak, Tanager, Phoebe, Veery, Warblers, Thrushes, Thrasher and Catbird). Also Woodpeckers and Flickers, Pigeons and Mourning Dove, Waterhen and American Coot, Franklin's Gull and young Gulls, young Night Heron. Cinnamon Teal and smaller Ducks, Ptarmigan, Grouse, Bob-White and poultry, Dusky Petrel, Terns and Auklets. Insects also occasionally taken.

DISTRIBUTION.—*England*.—Two. One shot Newbold Verdon near Market Bosworth (Leicester), Oct. 31, 1891 (*ut supra*). One netted Humberstone (Lines.), Sept. 28, 1910 (G. H. Caton-Haigh, *Brit. B.*, v, p. 219).

DISTRIBUTION.—*Abroad*.—Breeds over greater part of North America (but replaced in north-west coast region by a very closely-allied race, *Falco peregrinus pealei*) from Norton Sound in Alaska, northern Mackenzie, Boothia Peninsula, and west Greenland to Lower California, Arizona, Texas, south Carolina, and winters from southern British Columbia to West Indies, Panama, and South America.

[NOTE.—A Lanner Falcon (stated to be *Falco feldeggii*) was picked up dead near Carnforth, Lancs., on April 26th, 1902, having been observed in the neighbourhood some weeks (H. W. Robinson, *Field*, Jan. 30th, 1904, and elsewhere). This species inhabits the Mediterranean region and the Nile Valley and South Africa. The S. European form (*F. biarmicus feldeggii*) breeds in the Italian and Balkan Peninsulas. The Algerian form is used for falconry in N. Africa and might be imported to this country, but the specimen in question was apparently not critically examined.]

FALCO SUBBUTEO

247. *Falco subbuteo subbuteo* L.—THE HOBBY.

FALCO SUBBUTEO Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—Europe. Restricted typical locality : Sweden).

Falco subbuteo Linnæus, Yarrell, I, p. 65 ; Saunders, p. 349.

DESCRIPTION.—*Adult male and female. Summer and winter.*

—Bases of feathers on forehead and narrow line over eye buffish-white ; crown dark slatish-brown to blackish-brown, feathers very narrowly edged greyish to rufous-buff ; nuchal band white, feathers with subterminal rufous-buff marks and dark brown tips, latter often interrupting band

Juvenile Hobby (*Falco s. subbuteo*).

especially on sides of nape ; rest of upper-parts dark brownish-slate, feathers with fine black shaft-streaks ; bases of outer upper tail-coverts and usually of longer scapulars with concealed buff or rufous-buff bars (N.B. : when worn, plumage of upper-parts becomes dark brown with little or no slate) ; under eye, upper part of ear-coverts and well-marked moustachial stripe brown-black ; rest of sides of neck, chin and throat white, often tinged buff, especially when freshly moulted ; breast, flanks and upper part of belly white to buff and sometimes rather rufous-buff, broadly and thickly streaked black-brown ; tibia, lower belly, vent and under tail-coverts rust-red, sometimes uniform but usually with some blackish streaks, especially on tibia (females generally have more and thicker streaks on tibia and under tail-coverts than males) ; under wing-coverts and axillaries creamy-white to buff with dark brown streaks and bars ; tail : central pair brownish-slate, outer webs of rest same but tips with a spot of buff and inner webs narrowly barred buff to rufous, usually not so prominently at distal end of feathers as on basal half ; primaries and secondaries black-brown (strongly tinged slate when freshly moulted), inner webs except at tip with close tooth-like bars of buff to rufous ; wing-coverts as mantle. This plumage is acquired by a complete moult which is very gradual, commencing with body-feathers in July and Aug., becoming more active in Sept. or Oct. when wing-feathers commence to moult and usually not complete until March or even April.

Nestling.—*Down* (A) fairly long and plentiful covering whole body except round eyes and small bare patch at base of sides of neck ; upper-parts very pale creamy-buff, under-parts nearly white. Only very young nestling in down examined, but judging by partly feathered birds a longer and coarser nestling *down* (C) of greyish colour grows as in Peregrine (see p. 108).

Juvenile.—Like adults but upper-parts and wing-coverts much darker, very dark brown or brownish-black, each feather with narrow edging of pale buff to rufous-buff, scapulars with more prominent buff bars than in adult; streaks on under-parts wider and blacker than in adult; tibia, vent and under tail-coverts buff to rufous-buff not rust-red; tail-feathers as adult but less slate, central pair as well as rest with longer buff tips, rufous bars encroaching on outer webs; wing-feathers and primary-coverts darker than adult and with pale buff tips.

First winter.—Like juvenile but pale edgings to feathers of upper-parts gradually become worn off. *First summer*.—The juvenile body-plumage frequently commences to moult in April and sometimes in March (i.e. when bird is nearly a year old) but birds in May have often not begun and those in full moult in August and later, judging by very worn state of old feathers, must have been hatched in previous summer, i.e. a year or more old. When this moult is complete bird is indistinguishable from adult.

Measurements and structure.—♂ wing 247 (one 240)–272 mm., tail 130 (one 122)–140, tarsus 34–37, bill from cere 12.5 (one 11.5)–14 (12 measured). ♀ wing 265–280. Primaries: 2nd longest, 1st 6–15 mm. shorter, 3rd 12–16 shorter, 4th 30–38 shorter, 5th 48–60 shorter; 2nd emarginated outer web and 1st very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

Soft parts.—Bill leaden-blue, tip bluish-black; cere, gape and bare skin round eye and legs and feet yellow; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*F. s. jugurtha* (north-west Africa) is slightly paler on upper-parts; *F. s. centralasiæ* (Turkestan) is slightly paler and slightly larger; *F. s. jakutensis* (north-east Siberia) is rather darker than typical form on upper-parts and streaks on under-parts are dark; *F. s. streichi* (south China) is like typical form but smaller. None of these races is very clearly separable. Hobby is distinguished from other British Falcons by moustachial stripe, rufous vent, nuchal band, thickly streaked under-parts and wing-formula.

FIELD-CHARACTERS.—Most sylvan of British Falcons; confined to well-wooded districts. At rest long wings, broad black moustache, white under-parts with conspicuous longitudinal black streaks and rusty thighs identify it at once. In flight, which is direct and rapid, as befits a bird that habitually flies down dragon-flies, Swallows and Martins, and, at times, even Swifts, long sickle-shaped wings and comparatively short tail suggest form of a giant Swift, but action is that of a Peregrine, alternate rapid winnowing and gliding on stiffly extended wings. Cry a shrill chatter described by Walpole Bond as a whistling repetition of “quir-ic.”

BREEDING-HABITS.—Builds no nest, but takes possession of old one of Carrion-Crow as a rule; occasionally that of Magpie, Heron,

Rook or squirrel. Site commanding wide outlook is preferred, so that great majority of nests here are in hedgerow trees. *Eggs*.—Normally 3, sometimes two. From Continent four have frequently been reported, but few English records will bear investigation. Generally pale in colour, often with yellowish tinge which becomes more pronounced as incubation advances, usually covered with minute reddish-brown spots; occasionally with red blotches, but in a series always lighter in colour than Kestrel's, larger and more elongated, though individual eggs cannot be distinguished with certainty. Size of 50 British eggs, 41.5×32.7 . Max.: 45.5×31.8 and 44.1×35.7 . Min.: 38.1×31.1 and 38.8×31 . *Breeding-season*.—Usually about second week in June, but sometimes not till towards end of June. *Incubation*.—About four weeks, mainly by female, though male apparently shares. Single brooded. *Fledging-period*.—30 days. (Lynes.)

Food.—Mainly insects, though occasionally small birds are taken and bats have been recorded on several occasions. Birds taken include Twite, Linnet, Sparrow, Meadow-Pipit, Blue Tit, Song-Thrush, Blackbird and not infrequently Swallows and Martins, while Swifts have been captured on the wing. Insects include many odonata (dragon-flies) and larger coleoptera, especially common dung-beetle, also orthoptera (large grasshoppers) and lepidoptera (*Triphaena pronuba*, *Hepialus humuli*, etc.).

DISTRIBUTION.—*England*.—Summer-resident (end April (early date 3.3.66) to Sept., occasionally Oct. and even Nov.). Breeds fairly regularly in counties south of Thames and as far west as Devon (rare migrant Cornwall) and in Oxon., Salop, Northants, and Gloucester; less regularly in counties on north side of Thames and in Cambs., Suffolk, Norfolk, and Lines.; only very occasionally in midlands and exceptionally in Derby., Cheshire, and Yorks. *Wales, Scotland, and Ireland*.—Rare vagrant. In Scotland once bred (Perth., 1887), and has occurred as far north as Shetlands and Fair Isle, but chiefly in south. In Ireland has occurred ten times, chiefly in south-east.

DISTRIBUTION.—*Abroad*.—Europe generally, eastwards to west Asia, in winter in Africa and north-west India. Represented by closely-allied races in north-west Africa and various parts of Asia.

FALCO COLUMBARIUS

248. *Falco columbarius æsalon* Tunstall*.—THE MERLIN.

FALCO *ÆSALON* Tunstall, Orn. Brit., p. 1 (1771—France).

Falco regulus Pallas, Hand-List Brit. B., 1912, p. 112.

Falco æsalon Gmelin, Yarrell, I, p. 74; *F. æsalon* Tunstall, Saunders, p. 351.

* For reasons for accepting Tunstall's names, see *Brit. B.*, ix, p. 5.

DESCRIPTION (Plate 4).—*Adult male.* *Winter.*—Bases of feathers of fore-head and line over eyes greyish-white finely streaked black ; rest of fore-head and crown dark slate, usually tinged buffish on fore-part, finely streaked black ; broad nuchal band, extending up sides of head in a narrow line to back of eye, rufous, each feather with thick black streaks at tip, bases white ; rest of upper-parts slate-blue, palest on rump and upper tail-coverts, darkest on upper mantle, each feather with narrow black mesial streak, basal part of inner webs of outer scapulars greyer and often barred brown ; lores greyish-white, tipped black forming a black line in front of eye ; cheeks and ear-coverts greyish-white, marked rufous and streaked brown-black, tips of ear-coverts darker with slatish tinge ; chin and throat buffish- or greyish-white, often unstreaked but sometimes with some very fine streaks on throat ; rest of under-parts pinkish-rufous (varying in shade individually but always deeper when freshly moulted and becoming whitish in worn plumage), each feather with mesial black-brown streak, usually fine but sometimes drop-shaped and usually forming large spots on flanks ; centre of belly, tibia and under tail-coverts with very fine streaks ; axillaries and under wing-coverts barred rufous-brown and white with dark shafts, upper series of feathers buff streaked black-brown ; tail-feathers, distal portion forming broad band black, tips greyish-white, basal three-quarters slate-blue with some incomplete black bars which are sometimes absent, especially on central tail-feathers, and rarely complete, inner webs of all except central tail-feathers more ashy with fine dark freckling and usually strongly barred black but exceptionally with only incomplete bars ; primaries grey-black with ashy-grey tips more conspicuous on inner feathers, outer webs tinged grey often in form of incomplete bars, outer web of 1st primary usually with whitish serrated edging, inner webs closely barred ashy-grey to white ; secondaries with black shafts and slate-blue outer webs (ashy at tips) and less whitish and less well-defined bars on inner webs, innermost secondaries without bars ; primary-coverts like secondaries but not quite so slate ; wing-coverts as mantle but upper series of lesser coverts often tinged buff. This plumage is acquired by complete moult, wing-feathers commencing in June and moult complete usually in Nov. but sometimes not until Dec. and exceptionally just finishing in Jan. *Summer.*—What certainly appears to be a second moult confined to body-feathers takes place Feb.-March and occasionally not finishing until April. Coloration as in winter.

Juvenile Merlin (*Falco c. aesalon*).

Adult female. *Winter.*—Bases of feathers of fore-head and

line over eye creamy-white; rest of fore-head and crown dark brown more or less washed rufous-brown and streaked black; nuchal band as male but usually whiter or not so rufous; mantle and scapulars dark brown, feathers slightly tipped rufous and with rufous spots or incomplete bars which are partially concealed, and fine dark shaft-lines, often a grey tinge on mantle and scapulars; back and rump greyer and sometimes slate-grey with dark shaft-lines and often less rufous spots or bars; upper tail-coverts paler, tipped whitish and with whitish bars; cheeks and ear-coverts white to buffish-white streaked brown with a blackish line in front of eye and an indication of narrow dark brown moustachial stripe; chin and throat white to creamy-white, sometimes with a few fine brown streaks; rest of under-parts same but with wide rufous-brown streaks and black shaft-lines, feathers of flanks with irregular broad bars of brown, centre of belly, tibia and under tail-coverts with few and fine streaks; under wing-coverts and axillaries as male but usually with less white and more rufous-brown; tail-feathers dark brown tipped creamy-white and barred buffish-white to rufous-buff, barring on central pair being usually less buff and sometimes dull ashy-grey; primaries, secondaries and primary-coverts dark brown tipped buffish-white, outer webs with rufous to pale buff spots and inner webs closely barred rufous, becoming paler on inner edge; wing-coverts as scapulars and mantle. Moults as male. *Summer*.—Body-moults as in male after which upper-parts are usually rather more tinged grey than in winter.

Nestling (Plate 3).—At first rather thinly covered with rather short *down* (A) creamy-white and some very short tufts of *down* (B) white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine, see p. 108). *Down* (C) brown-grey on upper-parts, paler grey on under-parts especially on chin, throat, tibia and belly where it is grey only at base and otherwise white.

Juvenile. Male and female.—Like adult female and so far as I can discover usually indistinguishable but never so grey especially on rump as some adult females.

First winter. Male and female.—Like juvenile.

First summer.—The juvenile body-plumage frequently commences to moult in Feb., Mar. and April, but wings and tail do not appear to be moulted before July and frequently moult is not complete until November, i.e. when bird is about 17 months old. When juvenile plumage is completely moulted males are indistinguishable from adult males and females from adult females.

Measurements and structure.—♂ wing 193–210 mm., tail 116–127, tarsus 35–39, bill from cere 12–13 (12 measured). ♀ wing 210–233. Primaries: 2nd and 3rd longest, 1st 20–24 mm. shorter, 4th 14–20 shorter, 5th 26–35 shorter; 2nd and 3rd emarginated outer webs, 1st and 2nd very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

Soft parts.—Bill blue-horn, blackish at tip, base of under mandible yellow; cere yellow; bare skin round eye bluish; legs and feet pale yellow; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*F. c. insignis* (Turkestan, China, Japan) male is slightly paler grey on upper-parts and female and young decidedly paler brown; *F. c. pallidus* (Khirkiz steppes) male is pale ashy-blue, female pale and more rufous on upper-parts; *F. c. lymani* (Altai) is said to be like last but larger, but is unknown to me; *F. c. columbarius* (N. America) is darker than *F. c. æsalon* in both sexes and bars on wing-feathers whiter and on tail broader. Merlin can be distinguished from other British Falcons by its small size, streaked under-parts, nuchal band, and want of moustachial stripe.

FIELD-CHARACTERS.—Smallest British Falcon, male scarcely exceeding Blackbird in size; frequents in nesting-season moors, mountains, heathy brows above sea-cliffs, and, less often, sand-dunes, but at other times resorts as well to marshes, low-lying coasts and open country generally. Coloration—slate-blue with broad black tail-band and no moustachial stripe—coupled with small size clearly indicates male. Female might be confused with hen Kestrel, but plumage is dark brown above and white streaked with brown below; not reddish-brown above and reddish-fawn below, whilst flight is very different—close to ground, buoyant, impetuous and dashing, and marked by few intervals of gliding. Bolder and more vociferous than Kestrel, resenting invasion of nesting-place by a chattering scream “kik-ik-ik-ik-ik-ik,” akin to, but shriller than that of Peregrine.

BREEDING-HABITS.—Haunts moorlands in north England and Scotland, but in Wales is found on sheep-walks, sea-cliffs, and dune-land. *Nest*.—Generally on ground, sheltered by heather, a mere scratching with apology for lining a few heather stalks or grass bents. In trees and cliffs old nests of other species (generally Crows) are annexed, while in sand-dunes a fairly neat nest of bents and marram grass is made. *Eggs*.—Usually 4, occasionally 5, while a few instances of 6 are on record. Normally thickly and evenly stippled with purplish-brown, ranging to red-brown; rather elongated in shape, with a character of their own but varieties cannot be distinguished with certainty. 100 British eggs average 39.9×31.2 . Max.: 42.4×32 and 41.4×33.8 . Min.: 37×29.1 and 40.3×29 mm. *Breeding-season*.—From early May to about May 20 for first layings. *Incubation*.—By both sexes but chiefly by female. Period 29-30 days (Paton). *Fledging-period*.—26 days in nest, but young remain close by till end of month (Paton). Single brooded. *Food*.—Small birds, exceptionally a few insects. Nearly all observers note entire absence of game-birds, but E. W. Taylor has recorded exceptionally young of Red Grouse, Partridge and Woodcock. Normally feeds on small birds, especially Meadow-

Pipit, also Sky-Lark, Linnet, Twite, Yellow Bunting, Ring-Ouzel and Thrush. More exceptionally Corn-, Reed- and Snow-Bunting, Bullfinch, Hawfinch, Greenfinch, Chaffinch, Mistle-Thrush, Black-bird, Redwing, Fieldfare, Tits, Pied Wagtail, Rock-Pipit, Starling, Wren, Goldcrest, Spotted Flycatcher, Swallow, Wheatear and Cuckoo, while there are definite records of occasional captures of such larger birds as Sandpiper, Dunlin, Sanderling, Snipe, Golden Plover, Redshank, Turnstone and even incubating Lapwing. Voles have been twice recorded, and insects taken include coleoptera (dung-beetles, *Ocypus olens*), lepidoptera (fox-moth and oak-egger) and dragon-flies.

DISTRIBUTION.—*British Isles*.—Resident. Breeds in many parts Wales, Pennine Range and spurs, moors of north-east Yorks., Cheviots, and throughout Scotland and Ireland in suitable localities. Said to have bred Exmoor (Somerset). In autumn descends to low ground and in winter becomes fairly generally distributed. Passage of Continental birds in autumn, chiefly observed northern and western Isles Scotland and east coast of England and Scotland (mid-Aug. to mid-Nov.). Return passage spring not so well marked, chiefly observed northern isles (early April to end May).

DISTRIBUTION.—*Abroad*.—Nesting in Færoes, Iceland, Scandinavia, north Russia south to Baltic provinces, and in Siberia. On migration to temperate parts of Europe and Asia, as far south as north Africa (one juv. recorded Natal) and north-west India. Paler forms represent this bird in the Khirgiz steppes and parts of Asia and a darker one in N. America.

FALCO TINNUNCULUS

249. *Falco tinnunculus tinnunculus* L.—THE KESTREL.

FALCO TINNUNCULUS Linnæus, Syst. Nat., ed. x, i, p. 90 (1758—Europe. Restricted typical locality : Sweden).

Falco tinnunculus Linnæus, Yarrell, 1, p. 78 ; Saunders, p. 355.

DESCRIPTION (Plate 4).—*Adult male. Winter and summer*.—Fore-head creamy ; crown, nape and hind-neck blue-grey, frequently washed with rufous or rufous-buff varying individually, each feather with a blackish shaft-streak varying in breadth individually but usually fine ; mantle and scapulars pale chestnut-red often with a mauvy-pink tinge especially when freshly moulted, with arrowhead-shaped or drop-shaped subterminal black marks varying in size and number ; upper-back as mantle but with only very small black marks ; rest of back, rump and upper tail-coverts blue-grey, feathers with rather darker shafts, and those of upper tail-coverts with indistinct greyish tips ; lores as fore-head cream, which often extends over eye forming a more or less defined eye-stripe ; ear-coverts ashy-grey, contrasting with darker but not very clearly defined, blue-grey moustachial stripe ; chin and throat pale cream to creamy-buff ; breast, flanks and belly pale buff

tinged rufous varying in shade, feathers of upper-breast with brown-black shaft-streaks which on flanks and lower-breast become drop-shaped and sometimes broader arrowhead-shaped marks (these marks vary individually in size and number); centre of belly and under tail-coverts uniform pale buff; tibia same but more tinged rufous and occasionally with a few small black marks; axillaries and under wing-coverts white or creamy-white with large spots or incomplete bars of brown-black often marked rufous; tail-feathers blue-grey with greyish-white tips and broad black penultimate band, shafts brown-black, inner webs usually narrowly barred black but this barring varies greatly individually, being usually entirely absent and only occasionally strongly marked on central pair, on rest sometimes entirely absent, often only on basal part of inner webs, sometimes very faintly and sometimes very strongly marked; primaries brown-black very narrowly edged and tipped whitish, inner webs with comb-like bars of white often tinged rufous at points of "comb," especially on inner feathers, outermost secondaries as primaries but rest with an increasing amount of rufous on both webs until innermost which are like mantle; primary-coverts brown-black often with some rufous marks; rest of wing-coverts as mantle and scapulars. Individuals are to be found moulting body-plumage in every month of year (though most are in full moult from Aug. to Nov.), and it is difficult to be sure whether there are two moults of body-plumage or only one. Wings and tail certainly moult only once commencing often in June and usually complete by Dec. (one just finishing in April!). In some individuals body-moult begins Jan. to April and as many show no signs of moult in May and June this may indicate that there is a second spring moult of body-plumage as in Merlin.

Adult female. Winter and summer.—Fore-head creamy-white, feathers often with black shafts; crown and nape pale chestnut-red, streaked brown-black, sometimes with a blue-grey tinge especially on nape; mantle and scapulars chestnut-red thickly and widely barred black-brown, sometimes much less thickly barred especially in centre of mantle where bars are frequently reduced to wide arrowhead marks; upper-back as mantle but bars narrower and sometimes reduced to spots; lower-back sometimes same but usually like rump and upper tail-coverts dull blue-grey with blackish shaft-streaks, usually with greyish-black bars and more or less tinged rufous; lores as fore-head, creamy-white which usually extends over eye; ear-coverts more hoary and finely streaked black-brown; moustachial stripe brown and less well defined than in adult male; under-parts as in adult male, ground-colour varying in shade and streaks also varying but never so reduced in size or number as in adult male; tibial feathers with more brown streaks than in adult male; axillaries and under wing-coverts as in adult male; tail-feathers pale chestnut-red with varying amount of grey tinge (occasionally no grey tinge and occasionally brownish-

1, Feathers of nestling Kestrel showing down (A) at tips. 2, Down (c) of same, showing
down (B) at tips. 3, Under-down of feathered Kestrel. 4, Merlin a few days old, and
5, about a fortnight old.

grey with no red) tips buff to creamy-white, brown-black sub-terminal band, rest of feather narrowly and rather closely barred brown-black, bars sometimes absent from, or reduced to spots on distal portion; primaries much as adult male but inner feathers with more rufous bars; secondaries barred rufous and brown with white edging to inner webs; primary-coverts black-brown barred rufous; greater coverts as barred scapulars; median and lesser coverts barred and spotted as mantle. Moults as adult male.

Nestling (Plate 3).—At first rather thinly covered with rather short *down* (A) and very short *down* (B) both white. Cere, lores, round eyes and patch at sides of neck bare. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine, see p. 108). *Down* (C) pale buffish-grey on upper-parts and still paler on under-parts.

Juvenile. Male and female.—Upper-parts as adult female but mantle, scapulars and wing-coverts more widely and evenly barred dark brown to blackish-brown, back, rump and upper tail-coverts as mantle but paler and sometimes with a tinge of grey at base; under-parts as adult female but more widely streaked with a rather paler shade of brown; tail rufous as rest of upper-parts, usually without any grey but occasionally with a tinge of grey at base, evenly barred brown-black, width of bars varying individually but usually fairly broad; wing-feathers as adult female.

First winter and summer. Male.—As in adult moult is gradual and some individuals commence much later than others. Moreover, moult even of body-feathers is usually very incomplete, while wing-coverts are often not moulted at all and never completely; wing-feathers are not moulted, but occasionally one or two tail-feathers are, but this is probably accidental. Moult extends from Aug. to April. Plumage is thus always a mixture, number of new feathers varying greatly individually. New feathers of crown and nape rufous, often, but not always, with grey tinge and rather finely streaked black-brown, other new feathers much as adult male but those of mantle, scapulars, breast and wing-coverts with longer brown-black spots and sometimes with broad bars. Easily distinguished from adult female by mixture of plumage and by new feathers of mantle being of a pinker tinge with generally smaller subterminal blackish spots.

Second winter and summer. Male.—Much like adult male, but crown rufous or heavily washed with rufous and moult of tail and wings apparently frequently incomplete so that some rufous, barred feathers remain even in April and May (i.e. when bird is two years old). Some examples have tail-feathers brownish-grey barred grey-black, and rump and upper tail-coverts brownish-grey with dark centres and often bars; others have tails pale rufous, more or less tinged grey and with narrow and often incomplete bars. Often much like adult female but new feathers of mantle pinker and with small black spots.

Third winter and summer. Male.—After third moult beginning June or July, bird appears to become like fully adult, i.e. when between two and three years old.

First winter and summer. Female.—As in first winter male moult gradual and individuals varying in period and number of feathers moulted but moult seems always even more incomplete than in male. New feathers of crown, nape, mantle, scapulars and wing-coverts (very few wing-coverts moulted) usually less broadly streaked and barred than in juvenile; new feathers of rump and upper tail-coverts dull bluish-grey often tinged rufous and with brown bars and blackish subterminal shaft-streaks, more barred and less pure grey than is usual in adult female; under-parts much as juvenile but brown streaks in new feathers usually less broad. Easily distinguished from adult female by mixture of plumages and more heavily barred and less grey tail.

Second winter and summer. Female.—Very difficult to trace sequence in female owing to want of distinct differences, which do not vary individually. New feathers in birds moulting into second winter and summer vary as those of adult, some having very grey or finely barred tails, greyish napes and light marked mantles, while others have these distinctions much less clearly marked, and upper- and under-parts much as first winter and summer, but tails always either greyer or more finely barred. N.B.—Females breed in their first summer.

Measurements and structure.—♂ wing 230–252 mm., tail 150–173, tarsus 37–41, bill from cere 13–15 (15 measured). ♀ wing 235–265. Primaries: 2nd longest, 3rd sometimes as long but usually 1–6 mm. shorter, 1st and 4th 18–24 shorter, 5th 35–45 shorter, 6th 48–60 shorter; 2nd emarginated outer web, 3rd less clearly so (varying); 1st very abruptly emarginated and attenuated near tip of inner web, 2nd much less clearly so. Tail considerably rounded. Other structure as in Peregrine Falcon.

Soft parts.—Bill blue-horn, base pale horn, tip blackish; cere and bare skin round eye yellow; legs and feet yellow, claws blackish; iris brown.

CHARACTERS AND ALLIED FORMS.—*F. t. dacotice* (eastern Canary Is.) is smaller, more rufous on under-parts and adult ♂ with larger black marks on mantle, scapulars and wing-coverts; *F. t. canariensis* (western Canary Is.) as last but considerably darker on upper- and under-parts and crown of adult ♂ browner and streaked; *F. t. neglectus* (Cape Verdes) is intermediate in colour between last two; *F. t. carlo* (tropical Africa) is also small and of a deeper and richer rufous on upper-parts than *F. t. canariensis*; *F. t. interstinctus* (= *saturatus*) (N. India, China) very similar to last but rather less heavily marked on upper-parts, crown of adult ♂ purer grey not so brown or streaked and tail usually less barred; *F. t. japonicus* (Japan) is very similar in size and colour to *F. t. tinnunculus* but rather darker on upper-parts, crown of adult ♂ darker grey and

black spots on upper-parts larger; *F. t. rupicolæformis* (Egypt) is intermediate in size and colour between *F. t. carlo* and *F. t. tinnunculus*. All forms of Kestrel require careful comparison of series owing to individual variation. For differences of Lesser Kestrel, see "Characters" under that species.

FIELD-CHARACTERS.—Coloration of male identifies it at once, chestnut upper-parts with slate-grey head, rump and tail, last having broad subterminal black band. Colours of female less pronounced, but rufous-brown upper-parts and streaked rufous-fawn breast and belly distinguish it from hen Merlin. Equally at home in woodlands, open cultivated districts, bare hill-country or rock-bound coasts, its food is always obtained in the open, and mode of hunting is outstanding feature in its behaviour and readiest clue to its identity. Its course, often at considerable height, is constantly checked by the bird hanging stationary, head to wind, with rapidly fanned wings and depressed and outspread tail as it scans ground below. If no quarry be sighted it slips forward for a few yards and manœuvre is repeated until discovery of some beetle or small mammal rewards its search and it drops to earth to secure it. The cry is a sharp scream, "kee-kee-kee."

BREEDING-HABITS.—Makes no nest, but lays eggs in hollow scratched out on ledge of cliff, or in wooded districts in old and flattened nests of Magpie or Crow, more seldom Rook, Sparrow-Hawk, Raven, Buzzard, or squirrel. Occasionally also lays in hollow in trunk of tree, or recess in ivy, in ruins, towers, windmills, and exceptionally on ground. *Eggs.*—Usually 4–5, sometimes 6, while 7 are rare and there are records of 8 and even 9. Ground white, freely washed or blotched dark red-brown, so that ground is frequently quite hidden; though in some varieties a good deal is visible and besides reddish or yellowish-brown spots and blotches, violet shell-marks are also found. 100 British eggs average 39.7×31.7 . Max.: 43.7×33.5 and 41.6×34.2 . Min.: 35.4×29.7 and 36.4×29.7 mm. *Breeding-season.*—About mid-April to mid-May or rather later. Eggs laid at intervals of about two days. *Incubation.*—By both sexes, but chiefly by female, lasts 27–28 days, beginning with first egg laid. Single brooded. *Fledging-period.*—About 32–33 days.

FOOD.—Largely small mammals, but birds frequently taken as well as insects, especially beetles. Mammals: generally long and short tailed field-mice, occasionally shrew, rat, mole, bank-vole and quite exceptionally bats (noctule and pipistrelle), once young rabbit. Birds, usually smaller species: Sparrow, Lark, Siskin, Redpoll, Goldfinch, Greenfinch, Linnet, Yellow Bunting, Rock-and-Meadow-Pipit, Blackbird, Thrush, Fieldfare, Hedge-Sparrow, Starling, etc. Larger birds occasionally recorded: wounded Red-shank, young Lapwing, Snipe, and seen devouring Wood-Pigeon and Hooded Crow! Generally harmless to game, but individuals will take young Pheasants, Red Grouse and Partridges in early

stages. Has also been known to take a Swift. Frogs, lizards, adder and slow-worms also recorded. Insects: chiefly coleoptera (*Geotrupes*, *Melolontha*, *Carabus*, etc.), orthoptera and larvæ of lepidoptera (*Noctuidæ*). Also earthworms. Collinge estimates 64.5 per cent. of food as beneficial and 6 per cent. injurious.

DISTRIBUTION.—*British Isles.*—Resident. Generally distributed, but leaves Shetlands for winter, and much rarer then in other parts of north Scotland as well as in north and east Ireland. In England numbers are swelled in winter by immigrants, and passage-movements take place on south-east and east coasts and through northern isles in autumn (early Aug. to end Nov.) and spring (mid-March to mid-May and occasionally June).

DISTRIBUTION.—*Abroad.*—Europe, north Africa, north, central and west Asia, in winter more southwards to east Africa and parts of India. Accidental Iceland and Færoes. Clearly-defined subspecies represent the European form on Madeira, the Canary and Cape Verde Islands, in north-east and east Africa, Japan, Mts. of India and of China.

FALCO NAUMANNI*

250. *Falco naumanni naumanni* Fleisch.—THE LESSER KESTREL.

FALCO NAUMANNI Fleischer, Sylvan, Jahrbuch auf 1817 und 1818, p. 174 (1818—Visitor to S. Germany and Switzerland).

Falco cenchris, Yarrell, I, p. 82 (in text); Saunders, p. 357.

Wing-formula of: A. The Kestrel (*Falco t. tinnunculus*). 1st and 2nd notched on inner web and 2nd and 3rd emarginated on outer, 1st always considerably shorter than 3rd. B. The Lesser Kestrel (*F. n. naumanni*). 2nd not notched on inner web, 3rd not emarginated on outer web, 1st usually longer and only occasionally shorter than 3rd.

* This name, correctly employed by Sharpe in the *Cat. B. Brit. Mus.*, I, 1874, as well as the names *tinnunculoides* and *xanthonyx*, antedate *cenchris*.

DESCRIPTION.—*Adult male. Winter and summer.*—Upper-parts as adult ♂ Kestrel but crown paler blue-grey and seldom washed rufous and feathers with only slightly darker grey shafts and very rarely with definitely dark brown shafts; mantle, scapulars and back unspotted, uniform pale chestnut-red, some outer scapulars with varying amount of blue-grey subterminally; rump and upper tail-coverts blue-grey, feathers with darker shafts; ear-coverts and sides of neck as crown but ear-coverts with slightly hoary streaks and round eye darker blue-grey; base of feathers of lores, chin and throat creamy-buff contrasting sharply with grey sides of neck and with breast and flanks, which are pinkish-buff with black-brown spots varying in size and number, often absent from upper-breast and occasionally absent altogether from under-parts; centre of belly and under tail-coverts paler creamy-buff and sometimes tinged grey; axillaries varying shade of pinkish-buff and grey and with varying number of black-brown spots; under wing-coverts white usually tinged cream and occasionally slightly washed rufous, with varying number of black-brown spots which very rarely are entirely absent; tail-feathers as in Kestrel blue-grey with blackish shafts, broad black subterminal band and whitish tips, but inner webs never barred; primaries brown-black very narrowly edged and tipped whitish, inner edges and bases of inner webs white mottled brown, very rarely with indications of comb-like marks; outer secondaries same but outer webs greyer, inner secondaries blue-grey with varying amount of chestnut-red; primary-coverts brown-black; greater coverts blue-grey with varying amount of chestnut-red, usually absent from outer feathers or confined to edges of outer webs and usually considerably more on inner feathers especially on outer webs and tips; median and lesser coverts chestnut-red as mantle but outer feathers of median usually and of lesser more rarely with varying amount of blue-grey. This plumage is acquired by a gradual moult extending from June to Jan.

Adult female. Winter and summer.—Like adult female *F. t. tinnunculus* and not to be distinguished with certainty by coloration, but brown-black bars on upper-parts usually narrower and moustachial stripe usually very ill defined. Moult as in adult male.

Nestling.—At first like Kestrel but whiter and rather more thickly covered (only one very young nestling in down examined). Judging by partially feathered bird *down* (c) is paler than in Kestrel.

Juvenile. Male and female.—Like that of *F. t. tinnunculus* but upper-parts and tail with brown-black bars less broad than is usual in juvenile Kestrel, rump and upper tail-coverts often with considerable amount of grey tinge and moustachial stripe very ill defined. In male tail-feathers are often blue-grey with a few black bars and a tinge of rufous.

First winter and summer. Male.—As in adult moult is gradual

beginning in Nov. or Dec. and continuing to March. Moul̄ of body-feathers and wing-coverts usually more complete than in Kestrel, wing-feathers not moulted but central two or three pairs of tail-feathers and sometimes all tail-feathers are moulted. New feathers of body and wing-coverts as in adult male but those of crown usually tipped rufous, and those of nape often with blackish shaft-streak and here and there on mantle and wing-coverts small black streaks or dots. In those individuals which have blue-grey juvenile tail-feathers these when worn lose rufous tinge and are much like those of adult except for their black bars.

First winter and summer. Female.—Moult as in male. New feathers like those of adult female more rufous than the worn and paler juvenile feathers, especially on nape and not so pale at tips and rather less widely barred, especially on wing-coverts.

Second winter and summer. Male and female.—When completely moulted indistinguishable from adults.

Measurements and structure.—♂ wing 226–244 mm., tail 135–150, tarsus 30–33, bill from cere 12–14 (12 measured). ♀ wing 224–246. Primaries : 2nd longest, 1st and 3rd 5–15 mm. shorter, 4th 20–28 shorter, 5th 38–47 shorter, 6th 55–65 shorter ; 2nd emarginated outer web, 1st very abruptly emarginated and attenuated near tip of inner web, 2nd not emarginated on inner web. Tail considerably rounded. Other structure as in Peregrine Falcon.

Soft parts.—Bill dark blue-grey, base orange and tip blue-black ; cere, gape, eyelids and bare skin round eyes yellow ; legs and feet deep yellow, claws brown, pale brown to whitish (sometimes black, M. J. Nicoll, *Ibis*, 1912, p. 436) ; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*F. n. pekinensis* (Himalaya, Turkestan, N. China) has more grey on median and lesser wing-coverts but this character is variable as is colour of mantle. Adult male easily distinguished from Kestrel by unspotted upper-parts and blue-grey ear-coverts and sides of neck, female and young by wing-formula, emarginations of primaries, smaller size, finer bill, legs and feet and paler claws.

FIELD-CHARACTERS.—Closely resembles Common Kestrel, but much more sociable in its habits, generally breeding in colonies and hawking all day long in company. At close quarters males can be distinguished from those of Common Kestrel without much difficulty, by slightly smaller size, richer and *unspotted* red of mantle. Females cannot be distinguished with certainty in field. As many breeding colonies are in buildings in towns and birds are very fearless it is often possible to look down on them from above at a few yards' distance, when smallest details are visible and even colour of claws can be distinguished. Note more musical and varied than that of Kestrel. (F.C.R.J.)

BREEDING-HABITS.—Sociable, breeding in colonies as a rule ; makes no nest, eggs being laid on scratching in hole, generally in

building but less commonly in cliff or hole of tree. In southern Europe often in high buildings in towns. *Eggs*.—Usually 5, sometimes 4 only, or occasionally 6, smaller on average than those of Common Kestrel and marked with light yellowish-red. Scarce variety shows a few yellowish-red markings only on white ground. 100 eggs average 34.7×28.6 . Max.: 37.5×31 . Min.: 31.6×27.7 and 35.6×26 mm. *Breeding-season*.—Full clutches about 2nd and 3rd week of May in S. Europe. *Incubation*.—By female in most cases, but exceptionally male found on eggs. Period not precisely known. Single brooded.

Food.—Almost entirely insects, especially coleoptera, orthoptera, and sometimes diptera. Lizards, scorpions and spiders have also been definitely recorded and frogs and small birds (and probably also small mammals) are said to be taken occasionally.

DISTRIBUTION.—*British Isles*.—Very rare vagrant. Nine times *England*—Yorks., Nov., 1867; April, 1892; Oct., 1909. Kent, May, 1877. Scilly Isles, March, 1891. Isle of Wight, Nov., 1895; April, 1903. Sussex, May, 1896, April, 1914. Once *Scotland* (Aberdeen., Oct., 1897). Once *Ireland* (Dublin, Feb., 1891). Chiefly adult males.

DISTRIBUTION.—*Abroad*.—Mediterranean countries generally, straying into Savoy and Germany, breeding as far north as southern Poland, east to Bokhara, in winter in tropical Africa. Replaced in China, Himalaya and Turkestan by allied subspecies.

FALCO VESPERTINUS

251. *Falco vespertinus vespertinus* L.—THE RED-FOOTED FALCON.

FALCO VESPERTINUS Linnæus, Syst. Nat., ed. XII, i, p. 129 (1766—"Ingria," i.e. province of St. Petersburg).

Falco vespertinus Linnæus, Yarrell, I, p. 69; Saunders, p. 353.

DESCRIPTION.—*Adult male*. *Winter and summer*.—Whole upper-parts dark slate-grey, usually still darker, almost black, on upper tail-coverts; lores, ear-coverts and cheeks as upper-parts; chin, throat, breast, flanks, paler slate-grey, feathers with dark grey shafts; centre of lower belly, vent, tibia and under tail-coverts chestnut, under tail-coverts sometimes marked with dark slate-grey; axillaries and under wing-coverts dark slate-grey; tail black; wing-feathers grey with silvery-grey outer webs and black shafts; greater and median coverts rather paler grey than upper-parts; lesser coverts as upper-parts. This plumage is acquired by complete moult from July to March.

Adult female. *Winter and summer*.—Fore-head creamy-buff; whole crown and nape buffish-chestnut, feathers often with dark shaft-streaks, feathers of nape with pale buff bases showing more or less; mantle and scapulars dark slate-grey barred blackish,

upper mantle more or less strongly washed rufous ; back, rump and upper tail-coverts paler slate-grey, barred blackish ; patch in loreal region and narrow line round eye black ; moustachial stripe chestnut ; ear-coverts, sides of neck, chin and throat buff ; rest of under-parts chestnut-buff (varying in shade) with a few fine blackish shaft-streaks chiefly on flanks and sometimes widening into narrow drop-like streaks ; centre of belly and under tail-coverts without streaks and usually paler, tibial feathers also unstreaked and usually darker ; axillaries and under wing-coverts chestnut-buff streaked, occasionally spotted and axillaries sometimes barred blackish-brown, under wing-coverts covering primaries buffish-white barred black-brown ; tail-feathers pale slate-grey with narrow bars and broad subterminal band of brownish-black, tips often tinged rufous ; primaries blackish, outer webs with silvery tinge, inner webs with comb-like marks of white to pale grey often tinged rufous ; secondaries same but often barred greyish-black and with white comb-like marks confined to inner portion of inner webs, innermost secondaries and wing-coverts slate-grey barred blackish ; primary-coverts slate-grey, outer webs with silvery tinge. Moults as in male.

Nestling.—At first *down* (A) covering bird fairly well (round eyes and patch on sides of neck bare) but short and very short tufts of *down* (B) both white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine, see p. 108). *Down* (C) pale buffish-grey on upper-parts and paler on under-parts, like Kestrel but slightly darker.

Juvenile. Male and female.—Fore-head creamy-buff, feathers with blackish shafts ; whole crown varying chestnut-buff to buffish-brown, narrowly streaked black ; nape pale buff to buffish-white with thicker black streaks ; rest of upper-parts brown-grey barred blackish and each feather broadly tipped rufous to buff or pale buff ; patch in loreal region, round eye and extending in short moustachial stripe black ; rest of ear-coverts, sides of neck, chin and throat creamy-white ; rest of under-parts pale buff to creamy-white thickly streaked brown except tibia, vent and under tail-coverts which are unstreaked ; axillaries and under wing-coverts pale buff thickly barred dark brown and rufous-brown ; tail varying, usually barred rufous and brownish-black with more or less tinge of slate-grey, sometimes (especially central pair) much more slate-grey only tinged rufous and with narrower bars of black, all tail-feathers tipped buffish-white ; wing-feathers and primary-coverts as in adult female but with less grey tinge and tipped buffish-white ; innermost secondaries and wing-coverts as upper-parts.

First winter. Male and female.—Like juvenile.

First summer. Male.—The juvenile body-feathers, some lesser and median wing-coverts, occasionally whole tail, but usually only one or two central pairs, moult gradually from Feb.-May, but not greater coverts, under wing-coverts, primary-coverts, or wing-

feathers. New feathers of upper-parts as in adult male but tinged with brownish and with black shaft-lines, nape chestnut, under-parts as adult male but breast and flanks with varying amount of chestnut often only on basal portion of feathers and with black-brown shaft-streaks varying individually in width and number, new tail-feathers usually not quite so dark as in adult male and with a black sub-terminal band, sometimes clear but sometimes rather obscured and broken and sometimes with some narrow black bars on rest of feathers.

First summer. Female.—Moult as in first summer male. Crown and nape sometimes much as adult female, but usually paler and more streaked, upper-parts usually more tinged with rufous, when worn crown becomes paler and more buff and upper-parts brownish; under-parts paler than in adult, sides of neck and throat usually creamy-buff, rest of under-parts pale chestnut-buff and with dark brown streaks varying individually in width and number but usually very prominent and often of drop-like shape, new tail-feathers as in adult female.

Second winter. Male and female.—Like adults. The rest of the juvenile feathers as well as the first summer feathers are replaced, moult commencing with wing-feathers in June (occasionally May), and sometimes not complete by Oct.

Measurements and structure.—♂ wing 230–260 mm., tail 120–130, tarsus 28–30, bill from cere 12–13.5 (12 measured). ♀ wing 230–253. Primaries: 2nd longest, 1st 5–15 mm. shorter, 3rd 10–15 shorter, 4th 25–35 shorter, 5th 40–55 shorter; 2nd emarginated outer web, 1st very abruptly emarginated and attenuated near tip of inner web. Rest of structure as in Peregrine.

Soft parts.—Bill bright orange, tip dark blue-grey, female and juvenile with base yellow and rest blue-grey; round eyes, cere, legs and feet bright orange; iris blackish-brown.

CHARACTERS AND ALLIED FORMS.—*F. v. amurensis* (Siberia, N. China) adult male has white axillaries and under wing-coverts, female with paler under-parts and blacker streaks than in *F. v. vespertinus*. Wing-formula and size, rufous vent and uniform dark slate of adult male, rufous crown and under-parts of female are distinctive.

FIELD-CHARACTERS.—Size, shape and flight very much like Kestrel but rather finer build and does not hover so persistently, usually hunts in fairly open ground with trees here and there, on top of which it often perches. Dark colour of male very distinctive, female at a little distance looks uniform sandy-brown above. Frequently hunts late in evening. Of gregarious habit, but also frequently seen singly. Note much like Kestrel but slightly sharper (H.F.W.).

BREEDING-HABITS.—Shows sociable tendency, several pairs often breeding close to one another. Often makes use of old nests of Magpie, Hooded Crow, Rook, etc., and apparently also breeds in

holes of trees like Kestrel. *Eggs*.—Almost always 4–5, but 6 said to occur. Smaller than those of Kestrel and similar in type of colour and markings, though often more boldly marked. 100 eggs average 36.8×29.2 . Max.: 41.5×30.5 and 40×32 . Min.: 33.8×29.4 and 36.5×27.3 mm. *Breeding-season*.—Rather late: latter part of May and early June. *Incubation*.—Male has brooding spots and takes part in incubation. Period not precisely known. Single brooded.

Food.—Mainly insects, coleoptera (*Melolontha*, *Cicindela*, etc.), odonata (dragon-flies), orthoptera (grasshoppers, locusts, mole-cricket, etc.) and hymenoptera (*Apis*). Occasionally also small mammals (mice and shrews), also small birds, frogs and lizards.

DISTRIBUTION.—*British Isles*.—Rare vagrant. About thirty-six *England*, chiefly south and east, but also Cornwall, Salop, Cheshire, Lancs. Two *Wales* (Pembroke and Denbigh). Four or five *Scotland* (Aberdeen (two or three), Fife, and Roxburgh). One *Ireland* (Wicklow). Most spring and summer, a few autumn, and exceptionally winter.

DISTRIBUTION.—*Abroad*.—Breeds in Russia and west Siberia as far east as the Altai, and in Hungary and the plains of the Lower Danube; migrates in winter to Africa. Accidental Holland and Canaries. Replaced by a paler form in east Siberia (which winters in the eastern parts of India) and north China.

FAMILY AQUILIDÆ.

Vomer not touching maxillo-palatium, without oval swelling. No spina interna. Præcoracoid not touching clavicle. Eggs spotted or unspotted. Containing Eagles, Buzzards, Sparrow-Hawks and allies, Kites, Harriers, Vultures and the very different Osprey, latter generally put in a special subfamily. Many genera.

Genus AQUILA Briss.

AQUILA Briss., Ornith. i, p. 28 (1760)—Type by tautonymy and general consent: "*Aquila*," i.e. the Golden Eagle, according to p. 419).

The real Eagles, large birds with free, ear-shaped or round large nostrils. Bill strong, not with sharp but with flat, rounded "tooth," and without corresponding notch on lower mandible. 1st primary much shorter than 2nd, generally 4th and 5th longest, the outer 5 primaries or more deeply emarginated on inner webs. Tarsus feathered to toes, tail rounded. Eggs greenish if held against light.

Key to species of genus AQUILA.

Nostrils longer than broad, larger bird, wing over 560 mm.	<i>A. chrysaëtus</i> , p. 131
Nostrils round, smaller bird, wing under or not over 560 mm.	<i>A. clanga</i> , p. 135

AQUILA CHRYSÆTUS

252. *Aquila chrysaëtus chrysaëtus* (L.)—THE GOLDEN EAGLE.

FALCO CHRYSÆTOS Linnæus, Syst. Nat., ed. x, i, p. 88 (1758—Europe. Restricted typical locality : Sweden).

Aquila chrysaëtus (Linnæus), Yarrell, I, p. 11 ; Saunders, p. 327.

A. Golden Eagle (*Aquila c. chrysaëtus*). B. Sea-Eagle (*Haliaeetus albicilla*).

Middle toes of : A. Golden Eagle. B. Sea-Eagle.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Feathers of crown, nape and sides of neck lance-shaped, bases and shafts rufous-brown to dark brown, tips and edges bright tawny-buff, becoming much paler and often whitish when worn (fore-part and centre of crown usually darker than nape); mantle, scapulars, back and rump dark or blackish brown with a purplish sheen (becoming much paler brown when worn), bases of feathers white with a few brown markings, bases of scapulars much marbled with brown; central upper tail-coverts as rump, bases white or mottled or barred with white, lateral tail-coverts paler brown, often yellowish-brown at tips, bases more regularly barred white; feathers of lores bristle-like, black with short white tufts at base; ear-coverts as crown; under-parts much as upper-parts but not

quite so dark and glossy, feathers of breast with more or less tawny edges ; feathers of tibia and tarsus rufous-brown becoming paler and more buffish at base of toes, feathers with dark shafts ; under tail-coverts rufous-brown with variable amount of darker brown mottling, bases white or whitish ; axillaries dark brown with variable amount of rufous-brown ; under wing-coverts dark brown, round bend of wing tawny and fading to whitish ; tail-feathers, tips brown-black (8-12 cm.), rest irregularly banded dark grey and dark brown, paler on edges of inner webs of outer feathers ; wing-feathers brown-black, basal three-fourths of inner webs of 5 or 6 outer primaries usually with some whitish streaks, basal part of inner and outer webs of rest of primaries and of secondaries with varying amount of grey-brown or grey mottling usually forming ill-defined bands, paler and often whitish on inner webs ; primary-coverts and greater coverts black-brown mottled grey about the middle and white at base ; median and lesser coverts same but not so blackish and lesser coverts round bend of wing edged tawny or whitish. This plumage is acquired by complete moult and insufficient moulting birds are available to determine exact period, but moult seems very gradual and individuals are scarcely ever in entirely perfect plumage there being always some worn pale feathers.

Nestling.—At first *down* (A) white with pale smoky-grey tips, very short *down* (B) purer white. Later a much longer, thicker and more “woolly” white or creamy-white *down* (C) replaces *down* (B) (exactly as in Peregrine, *see* p. 108). Back of tarsal joint bare and toes bare, otherwise bird very thickly and closely covered.

Juvenile.—Crown and nape darker and duller, not so “golden” as in adult ; rest of upper-parts rather darker than in adult especially tips of lateral upper tail-coverts ; under-parts blacker than in adult, and feathers of breast without tawny edges ; tibia and tarsus not so rufous, tarsus occasionally pure white and often white with brown marks ; axillaries and under wing-coverts more uniform brown-black with little or no rufous ; under-parts show more of the white bases of feathers than in adults ; tail-feathers, extreme tips whitish (soon become worn off), tips for about 10 to 16 cm. brown-black sometimes somewhat mottled greyish, remaining portion of feathers white more or less speckled with brown-black and mottled with grey between the black tip and the base which is uniform white ; outer primaries as adult, inner ones and secondaries white on basal part of inner webs.

First winter.—Like juvenile.

First summer.—The juvenile plumage does not commence to moult apparently until April, is occasionally completed by June, but sometimes not until Oct. Moult complete including wings and tail. When this moult is complete (i.e. when bird is one year to eighteen months), crown and nape much as adult but duller, not so bright rufous-tawny ; rest of body-plumage including upper tail-

coverts much as adult but breast not so rufous and tarsi paler and often whitish; tail with shorter black tip and proximal portion very little speckled but more or less washed grey immediately proximal to the black, rest white; inner primaries and secondaries as juvenile with white bases to inner webs.

Second summer.—(When bird is two to two and a half years old) crown and rest of body-plumage indistinguishable from adult; tail as in second winter but with narrower bands of black at tip and one or two alternate grey and black irregular bands proximal to black, rest white.

Third summer.—(When bird is three to three and a half years old) like adult but extreme base of tail-feathers under the coverts white and inner primaries and secondaries with some white at base but much less than in second summer. At the next moult, i.e. when bird is four to four and a half years old it appears to become adult, but there are not enough moulting specimens available to make quite certain of the sequences.

Measurements and structure.—♂ wing 60.5–66 cm. (measured with tape, see vol. 1, p. *XIII), tail 290–325 mm., tarsus 82–110, bill from cere 38–47 (10 measured). ♀ wing 62.5–70.5 cm., bill 40–50 mm. Primaries: 1st between 8th and 9th, 3rd to 5th longest, 6th 10–20 mm. shorter, 2nd 35–50 shorter; 2nd to 6th emarginated on outer webs, 1st to 5th abruptly emarginated and attenuated on inner webs for a little less than distal half. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest about equal to 8th primary, tips sharply rounded. Tail fairly square but outermost feathers shorter than rest, 12 feathers, tips rounded in adult but more pointed in juvenile. Tarsus feathered to base of toes. Claws much compressed, strong and curved. Upper mandible deep, much compressed, sharply curved, projecting much beyond under mandible which has rounded tip and is straight and shallow. Nostrils oblong and very sparsely covered by tips of bristle-like loreal feathers.

Soft parts.—Bill black, greyish at base; cere and toes rich yellow, claws black; iris hazel.

CHARACTERS AND ALLIED FORMS.—*A. ch. occidentalis* (Spain, N.W. Africa) is darker and duller, not so tawny and rufous on crown, nape and under-parts in adult but juveniles are similar, also slightly smaller; *A. ch. daphanea* (Himalaya, Mongolia, China) is like *A. ch. chrysaëtus* but usually larger. Golden Eagle is distinguished from other British Accipitres by its large size, square tail and bill and toes.

FIELD-CHARACTERS.—Except for much greater size, not always noticeable in air, closely resembles Common Buzzard. Has similar broad wings with widespread upward curving primaries and powerful soaring flight. Immature birds show white on tail with dark bar at end when seen from above, but adults are almost

uniform tawny to chocolate-brown with tinge of yellowish on head. Young and old distinguished from Sea-Eagle by longer and squarer tail. Rather silent, but occasionally utters barking note and has also a yelping cry. (F.C.R.J.)

BREEDING-HABITS.—Haunts mountains and moorlands and resorts to same locality year after year for breeding. *Nest.*—Bulky edifice of sticks renewed partly every year and lined with clumps of dead grass and almost always *Luzula sylvatica*. More usual site is on ledge of steep cliff, but some nests are very easy of access; while a few are built in trees (Scotch pine). *Eggs.*—Normally 2, only 1 in case of old hens, and very rarely 3, while there is record of 4 on one occasion. In many cases one egg is white or nearly so, while the other is more or less flecked or blotched with red-brown and ashy-grey. Occasionally both eggs are well marked, but sometimes neither shows more than traces of colour. Average size of 100 British eggs, 76.7×59.4 . Max: 88.9×66 . Min: 70.1×57 and 77.6×51 mm. *Breeding-season.*—Begins late in March, but usually about 1st or 2nd week April. Eggs laid with interval of 2 or 3 days. *Incubation.*—In captivity shared by male (Lilford) but Cameron says male takes no part. Period about 30–35 days. Young remain about 11 weeks in nest (Macpherson). Single brooded.

FOOD.—Varies to some extent according to haunts. In deer-forests chiefly blue hares and Grouse; also Ptarmigan on higher ground, and lambs not infrequently taken on sheep-walks in spring. Probably in case of eyries on sea-cliffs (now mostly unoccupied) sea-birds were largely taken. In Scotland there are records of red-deer calves being attacked; and carrion is devoured at times. There are also definite records of following: rabbit, brown rat, mole, squirrel, stoat, Hooded Crow, Meadow-Pipit and, according to Macgillivray, Black-game, Partridge, Curlew, Plover, Lapwing, and probably other species.

DISTRIBUTION.—*England and Wales.*—Very rare vagrant. Occasionally Yorks. and northwards, but southwards authentic examples procured only in Sussex, Norfolk, Lincs., and Northants. Formerly resident Wales, Derby. (about 200 years ago), Lake District, and Cheviots (about 100 years ago). *Scotland.*—Resident in Highlands and I. and O. Hebrides, formerly Orkneys, but unknown Shetlands. To Lowlands very scarce visitor, but formerly bred in south-west (about 60 years ago). *Ireland.*—Formerly resident, now extinct.

DISTRIBUTION.—*Abroad.*—Northern parts of Northern Hemisphere, south to north Africa and the Himalayas, in North America to Texas and N. Mexico. Replaced by other races in Spain and N.W. Africa, and in central Asia.

AQUILA CLANGA

253. *Aquila clanga* Pall.*—THE SPOTTED EAGLE.

AQUILA CLANGA Pallas, Zoogr. Rosso-Asiat., i, p. 351 (1827—Russia),
Aquila nævia (J. F. Gmelin), Yarrell, i, p. 20; *Aquila maculata* (J. F. Gmelin), Saunders, p. 325; Hand-List, 1912, p. 114.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Upper-parts dark brown when freshly moulted with a strong purple gloss, when worn paler brown; feathers of crown and nape lance-shaped with pale brown edgings; lateral upper tail-coverts usually with some white on tips and edges; feathers of lores bristle-like, black with short buffish tufts at base; under-parts, including axillaries and under wing-coverts as upper-parts but slightly paler and with little purple gloss; under tail-coverts often with some white on tips and edges; feathers of tarsus at base of toes often white; all body-feathers with white bases; tail blackish purple-brown slightly tinged dark grey and occasionally with faint indications of dark grey bars; distal portion of primaries black, rest and secondaries blackish purple-brown, inner webs paler brown, and extreme bases white or whitish; primary-coverts and greater coverts blackish purple-brown; median and lesser coverts as rest of upper-parts. This plumage is acquired by complete moult April-December which is evidently very gradual as in most examples there is a mixture of old and new feathers, though not to same extent as in Golden Eagle.

Nestling.—(Not examined.)

Juvenile.—Upper-parts darker purplish-brown than adult; feathers of crown and nape generally with buffish-brown tips; feathers of mantle with central streak of buff-brown at tip varying in size individually; feathers of scapulars, back and rump with very broad central streaks or spots of buff to whitish-buff; upper tail-coverts with long buffish-white tips; chin and throat purplish-brown; feathers of rest of under-parts with dark purplish-brown edges and broad buff to buffish-brown central streaks; under tail-coverts uniform buff; amount of buff on under-parts varies and plumage when worn is much paler; tail as adult but with pale buff tip and more frequently with indistinct bars; wing-feathers as adult but inner primaries and secondaries with pale buff tips and inner webs paler and usually more or less distinctly barred; primary-coverts and greater coverts as secondaries; median coverts as scapulars; lesser coverts as mantle.

First winter and summer.—Moult of juvenile plumage does not appear to commence until April and is sometimes not complete until Dec. When this moult is complete (i.e. when bird is one year to eighteen months old) plumage is much as juvenile but feathers of upper-parts and wing-coverts with rather narrower

* *Falco maculatus* Gmelin, 1788, and *Aquila fusca* Brehm, 1823, are both antedated by prior use for other species (see *Brit. B.*, ix, p. 6).

buff centres, feathers of under-parts sometimes with narrower buff centres but sometimes as juvenile; tail and wing-feathers with shorter buff tips.

Second summer.—(When bird is two to two and a half years old). Pale centred feathers confined to some longer scapulars, some wing-coverts, and lower-breast where pale centres are small, rump, belly and tibia where they are still usually broad; tail and wing-feathers with short buff tips.

Third summer.—(When bird is three to three and a half years old). Like adult but with a few feathers on rump and tibia with narrow buff centres at tip and under tail-coverts with varying amount of buff and dark brown. At the next moult, i.e. when bird is four to four and a half years old, it appears to become adult, but not enough moulting specimens are available to make quite certain of the sequences.

An individual variety ("*A. fulvescens*") has upper-parts orange-buff with tips of feathers whitish and those of mantle with some brown in centre, scapulars with more brown (some have upper-parts mostly brown); under-parts uniform salmon-buff, sometimes with dark shaft-streaks to feathers of fore-part of crown, chin and throat.

Measurements and structure.—♂ wing 49–53 cm., tail 220–255 mm., tarsus 100–115, bill from cere 33–39 (12 measured). ♀ wing 50–55 cm., bill 34–40 mm. Primaries: 4th longest, 5th and 6th as long or 5–15 mm. shorter, 3rd sometimes as long but usually 10–20 shorter, 2nd 25–50 shorter, 7th 40–55 (sometimes 70–75) shorter, 1st between 8th and 9th but sometimes between 7th and 8th; 2nd to 7th emarginated outer webs, 1st to 6th abruptly emarginated and attenuated on inner webs. Nostrils round, otherwise rest of structure as Golden Eagle.

Soft parts.—Bill horn-brown, bluish-grey at base; cere and toes yellow; iris brown.

CHARACTERS AND ALLIED FORMS.—No subspecies. *A. pomarina* (north Germany, Russia, Austria, Balkans, Greece, Caucasus) is like *A. clanga*, but adult is paler especially on crown, wing-coverts and under-parts, juvenile and immature birds have considerably smaller pale streaks especially on upper-parts than in *A. clanga* of same age; wing-formula slightly different, 3rd being frequently as long as 4th and 5th, 6th usually 10–20 mm. shorter, 2nd 15–40 shorter, 7th 65–80 shorter, 1st longer than 8th or occasionally equal to it, 7th not clearly emarginated on outer web; size usually smaller, ♂ wing 45.5–49 cm., tail 210–245 mm., tarsus 90–100, bill 27–33. ♀ wing 46–51 cm., bill 29–34 mm. As measurements and wing-formula of the two species intergrade care must be taken to examine all the characters.

FIELD-CHARACTERS.—Large dark brown bird, young with light spots. When flying distinguished from Buzzard by tips of wings

being bent slightly downwards, not upwards, when gliding or circling and larger size. Note resembling barking of a high-voiced small dog. Haunts woodlands and open country like marshes and steppe. (E.H.)

BREEDING-HABITS.—Haunts forests, steppes and marshes, breeding in trees, and probably also on ground in steppe districts. *Nest.*—Large, built of sticks, turf, etc., and lined dead grasses and twigs. *Eggs.*—2-3 (but material unsatisfactory owing to confusion with *A. n. orientalis* and *A. pomarina*) white, sparingly spotted and blotched with red-brown and a few ashy shell-marks. Average of 56 eggs, 68.2×54.1 . Max.: 74.6×55.6 and 74.4×58 . Min.: 64.4×52.8 and 67.2×51.2 mm. *Breeding-season.*—Latter half April to early May. *Incubation.*—No reliable information.

FOOD.—Rabbit, water-rat and Partridge have been recorded from birds killed in British Isles, but in natural haunts main food consists of frogs, fish, snakes, lizards, small mammals (voles, mice, *Lagomys*, etc.), and an occasional wounded or surprised bird.

DISTRIBUTION.—*England and Ireland.*—Very rare vagrant. *England.*—Cornwall, *Dec., 1860; *Nov., 1861. Hants., Dec., 1861. Lancs., 1875. Northumberland, *Oct., 1885. Essex, *Oct. and Nov., 1891; April, 1908. Suffolk, *Nov., 1891 (one shot and one seen). Hereford, *Nov., 1915. *Ireland.*—Two near Youghal (Cork), Jan., 1845.

DISTRIBUTION.—*Abroad.*—From shores of Baltic (Livland) east to Turkestan, south Siberia, north India, and China, and south to Balkan Peninsula and Palestine. On migration to north-east Africa, and India to Burma, casual in west and south Europe.

Genus BUTEO Lacépède.

BUTEO Lacépède, Tabl. méthod. Ois., p. 4 (1799—Type by tautonymy: *buteo*, i.e. *Buteo buteo*.)

Closely allied to *Aquila*, but weaker birds. Bend of bill sharper and shorter, nostril with straighter upper edge and somewhat longitudinal in horizontal direction. Only four outer primaries sharply emarginated, 5th less distinctly. Tarsus bare, in Rough-legged Buzzard feathered, but bare at back. About forty forms in all continents and many islands. Eggs spotted, greenish if held against light.

Key to species of genus BUTEO.

Tarsus bare in front	<i>B. buteo</i> , p. 141
Tarsus in front feathered to toes	<i>B. lagopus</i> , p. 138

* The only British taken example we have examined is the Hereford bird now in the British Museum. This bird is *A. clanga*, as were no doubt the others marked with an asterisk. The remaining ones should be critically examined if possible. For details see *Brit. B.*, vol. xiv, pp. 180, 209.

BUTEO LAGOPUS

254. *Buteo lagopus lagopus* (Brünn.)—THE ROUGH-LEGGED BUZZARD.

FALCO LAGOPUS Brünnich, Orn. Bor., p. 4 (1764—Christiansoe near Bornholm, Baltic).

Buteo lagopus (J. F. Gmelin), Yarrell, 1, p. 115 ; Saunders, p. 323.

DESCRIPTION. —

Adult male and female. Winter and summer.—

Crown and nape white heavily streaked dark brown, feathers having dark brown centres, (sometimes with rusty tinge) and white edgings ; mantle and scapulars dark to blackish - brown, feathers usually tipped greyish or greyish - brown and with varying amount of white and rusty or rufous - buff on

edges, concealed part of feathers, especially of scapulars, irregularly barred brown and white ; back and rump uniform dark to blackish-brown ; shorter upper tail-coverts blackish-brown often with short white tips, longer upper tail-coverts white, with broad penultimate patch and shaft-streak of blackish-brown followed by varying number of blackish-brown irregular bars ; feathers of lores bristle-like, black with short white tufts at base ; chin and throat white streaked dark brown, streaks varying in width but usually broad with little white ; breast varying considerably, feathers occasionally having rather wide dark brown shaft-streaks on white or creamy-white ground, but usually dark brown (often tinged with rust-colour) covers most of distal part of feather and white is confined to concealed basal portion and semicircular marks on edges of feathers, breast thus very dark mottled irregularly with white ; lower-breast and centre of belly white or creamy-white sparsely marked with varying number of irregular dark brown, spot-like marks or irregular bars ; long feathers on sides of breast covering flanks dark brown often with greyish tips and often broadly barred white and greyish-

A. Rough-legged Buzzard (*Buteo l. lagopus*). B. Common Buzzard (*B. b. buteo*).

white but always forming large long blackish patch on each side breast and belly; lower flanks, sides of belly and tibial feathers more or less regularly and closely barred white or buffish-white and dark brown; tarsus to base of toes dark brown, feathers with whitish tips and often with white edgings and only dark brown centres; under tail-coverts white with here and there dark brown shaft-streak or spot; axillaries white with dark brown and rust-coloured centres and irregular bars; under wing-coverts dark brown with white bases forming a black patch; tail: basal two-thirds white with occasionally a few black-brown spots here and there, extreme tip greyish-white, followed by broad black-brown penultimate bar, occasionally no other definite bar but usually one more and often two more narrower ones divided by greyish-brown or somewhat rufous-buff (sometimes rufous) or white more or less obscured with brown, in those examples with only one definite blackish bar this is extended 30–40 mm. up the feather with brown often slightly tinged rufous; outer four primaries (occasionally 5th) white with black-brown tips to notch on inner webs, outer webs black-brown with a hoary tinge, rest of primaries and secondaries with outer webs and distal part of inner webs pale brown barred dark brown, bases and inner edges of inner webs white; greater and median coverts brown, faintly barred darker brown and with concealed white bases; lesser coverts brown edged rufous and on point of wing white. This plumage is acquired by complete moult April to Nov.

Nestling.—Down like that of Common Buzzard but *down* (A) often slightly paler grey on upper-parts. Front and sides of tarsus with down to base of toes.

Juvenile.—Feathers of upper-parts like adults but with paler brown centres and usually more buff or cream edgings giving a more uniform or less contrasted appearance, concealed portions of feathers of mantle and scapulars more uniform than in adult not being definitely barred; longer upper tail-coverts with paler brown penultimate patch and shaft-streak and not definitely barred; under-parts also paler brown and more buff or cream than in adults; upper-breast streaked brown and not mostly brown as is often case in adults; sides of lower-breast more uniform brown and not barred as is usual in adults; feathers of lower flanks and tibia occasionally with some incomplete brown bars but not strongly barred as is usual in adult and usually mostly buff or cream with brown shafts and brown spot of varying size at tip; feathers of tarsus also with less brown than in adult; axillaries cream with brown shaft-streaks and with very little rust-coloured tinge; tail: brown of distal part paler than in adult, often extending much farther up feather, often without bars and when present these are much less distinct and less prominent than in adult; wing-feathers and wing-coverts paler brown than in adults.

First winter and summer.—Like juvenile until moult which

appears to take place from April to Nov. and is complete. After this (i.e. when bird is about a year or more old) plumage appears to be same as adult.

Measurements and structure.—♂ wing 400–435 mm., tail 200–225, tarsus 65–75, bill from cere 21–23 (12 measured). ♀ wing 420–455. Primaries: 1st between 7th and 8th, 4th longest, 3rd as long or 5–15 mm. shorter, 5th 5–20 shorter, 6th 55–70 shorter, 2nd 35–50 shorter. Rest of structure as in *Buteo b. buteo* except that tarsus is feathered to base of toes.

Soft parts.—Bill dark horn, bluish at base; cere and toes yellow; iris brown.

CHARACTERS AND ALLIED FORMS.—*B. l. pallidus* (Siberia, Kamtschatka) has more white on upper-parts and purer white on tail and under-parts; *B. l. sancti-johannis* (N. America) is very like *B. l. lagopus* but slightly smaller, dark markings usually blacker and tail often more barred. Larger size, white base of tail and tarsus feathered to toes distinguish *B. lagopus* from *B. buteo*.

FIELD-CHARACTERS.—A true Buzzard, its soaring flight and broad wings closely resembling those of common species and with a similar mewing cry, perhaps rather deeper in tone. Distinguishable in flight by a much whiter under-surface, with dark shoulder patch and primaries: tail looks transparent white with conspicuous black band at end. Considerable variation in plumage but has not white on head characteristic of Osprey. (F.C.R.J.)

The Rough-legged Buzzard (*B. lagopus*), two common variations as viewed from below. (From a diagrammatic sketch by H. M. Wallis.)

BREEDING-HABITS.—Breeds usually on shelf or recess in face of rocks, but where undisturbed will nest on top of boulders or even on ground, and in southern part of its range, often in trees. *Nest.*—Usually large, built of sticks, heather, twigs, etc., mixed with turf, cup being lined dry grasses, fresh shoots of pine, *Vaccinium*, and lichen (*Usnea*). *Eggs.*—Normally 3–4, not infrequently 2 only, and occasionally 1. When food is plentiful clutches of 5 and even 6 occur, and there is reason to believe that 7 are met with rarely. Colour white with spots and blotches, sometimes also streaks of varying shades of reddish- or purplish-brown. Some very sparsely marked; others with cloudy patches and smears. Average of 110 eggs, 54.9×43.5 . Max.: 62×49.5 . Min.: 48×41 and 57.5×40.5 . *Breeding-season.*—Latter half May and early June, varying according to latitude. *Incubation.*—Chiefly, at any rate, by female; period not precisely known. Single brooded.

FOOD.—In its native haunts chiefly lemmings, Ptarmigan and fell mice; occasionally Arctic hare and small birds such as Snow-bunting and Wagtail. In British Isles chiefly rabbits; often also brown rat, and occasionally water-rat or field-voles. Mole, stoat, shrew, Pheasant (once) and small birds, such as Chaffinch, also recorded.

DISTRIBUTION.—*Great Britain*.—Irregular winter-visitor (Oct., rarely earlier, to March, April, and even May (once June)), occurring most years east coast Scotland and England as far south as Norfolk, and at intervals in considerable numbers, as in winters 1875–6, 1880–1, 1891–2, 1903–4, 1915–16. Also fairly frequent along Pennine Chain, rarer in south-east England, and only occasional vagrant elsewhere, being especially rare on west side. In O. Hebrides twice. *Ireland*.—Seventeen, most frequently in Ulster.

DISTRIBUTION.—*Abroad*.—North Europe and north Asia, said to nest very exceptionally as far south as Germany. In winter vagrant and partially migrant, now and then reaching Pyrenees, Mediterranean regions, Caspian and Black Sea. Replaced by other subspecies in North America and Siberia.

BUTEO BUTEO

255. *Buteo buteo buteo* (L.)—THE COMMON BUZZARD.

FALCO BUTEO Linnaeus, Syst. Nat., ed. x, i, p. 90 (1758—Europe. Restricted typical locality: Sweden*).

Buteo vulgaris Leach, Yarrell, I, p. 109; Saunders, p. 321.

DESCRIPTION (Plate 4).—*Adult male and female. Winter and summer*.—Varying greatly individually. Whole upper-parts dark brown, some feathers usually with rusty-brown edges, feathers of back of crown and nape with white bases usually showing and giving streaked appearance, mantle and scapulars with a more or less strong purple gloss, scapulars barred greyish-brown and white on basal portions, upper tail-coverts tipped rufous and usually barred with rufous and at base with white; feathers of lores bristle-like, black with short white tufts at base; ear-coverts and sides of neck dark brown more or less streaked pale brown or whitish often with rufous; chin and throat as ear-coverts but often with more white and sometimes white with narrow dark brown shaft-streaks; rest of under-parts varying greatly; breast (A) dark brown with varying amount of rufous and white edgings and spots or partial bars (B) white or creamy-white, feathers with wide dark brown stripes; across middle of lower-breast usually

* Linnaeus took his diagnosis almost word for word, with slight alterations, from *Fauna Svecica*, No. 65, where he has also the same quotations, i.e. Gesner, Willughby and Ray. Therefore we must accept the fixation of Sweden as terra typica by Hellmayr and Laubmann, *Nomenclator der Vögel Bayerns*, 1916. The quotation of "Savoy" in *B.O.U. List*, 1915, cannot be accepted, as Linnaeus's authors quoted did not mention Savoy. Linnaeus forgot to quote his own *Fauna Svecica* 65, but this is obvious.—E.H.

a white region with few dark marks; long feathers on sides of breast covering flanks dark brown tipped rufous or buff and with varying amount of spots and bars of rufous and white; lower flanks and belly usually regularly barred white or creamy and dark brown but sometimes white with varying amount of irregular dark brown spots or marks; feathers of tibia and half-way down tarsus in front dark brown tipped and spotted and sometimes barred rufous or buff; under tail-coverts as belly but usually with fewer dark bars or marks; axillaries and under wing-coverts barred dark brown and often rufous and white, under wing-coverts covering base of primaries with blackish tips forming a dark patch; tail-feathers with narrow buff tips and broad dark brown subterminal band and rest of feather narrowly barred (bars about 5 mm. wide), dark brown and greyish-brown or dull grey, these paler bands becoming whitish or white on inner edges of inner webs, bases of feathers under coverts white or whitish and not uncommonly tail is more or less strongly tinged with rufous; primaries with long purplish-black tips, outer four or five with greyish tinge on outer webs and inner webs white, rest and secondaries brown with dark brown bars, edges of inner webs and bases white; wing-coverts as mantle. This plumage is acquired by complete moult from April to Oct. or Nov. N.B.—An albinistic variation which seems more frequent on Continent than in British Isles has upper-parts brown, feathers broadly edged white and crown with much white; upper tail-coverts often white and tail usually white at base; under-parts white or creamy-white with varying number of brown streaks. A melanistic and apparently scarcer variation is almost entirely very dark brown or blackish.

Nestling.—At first *down* (A) fairly long with silky hair-like tips, covering bird fairly well but rather sparse on under-parts and three-fourths of tarsus bare. Varying pale brownish-grey to pale buffish-grey on upper-parts, round eye usually darker, sides and under-parts white and usually small white patch at back of crown. Very short tufts of *down* (B) white. Later thickly covered with longer and coarser *down* (C) which replaces *down* (B) (exactly as in Peregrine, *see* p. 108). *Down* (C) dark greyish-brown to paler buffish-grey, concealing most of *down* (A) when fully grown.

Juvenile.—Much like adult and when worn difficult to distinguish. Crown more streaked with white or cream; mantle, scapulars and wing-coverts not so uniform, feathers having edgings of whitish, buff or rufous-buff; under-parts with fewer dark markings than is usual in adults and these usually in form of streaks of varying width and very rarely definite bars on belly where markings are usually in form of irregularly shaped spots; tibial feathers barred; some adults indistinguishable from juveniles on under-parts; tail usually not with a distinctly broader subterminal band and only occasionally with rufous tinge.

First winter.—Like juvenile.

First summer.—Moult of juvenile plumage appears to take place from April to Nov. In birds a year old before moult feathers are often so worn that pale edgings on upper-parts do not appear different from those in adults. After moult as adults.

Measurements and structure.—♂ wing 370–395 mm., tail 190–210, tarsus 70–80, bill from cere 22–24 (12 measured). ♀ wing 380–410. Primaries: 1st between 7th and 9th, 4th longest, 3rd equal or 5–15 mm. shorter, 5th rarely equal, usually 3–15 shorter, 6th 40–50 shorter, 2nd 30–50 shorter; 2nd to 5th clearly emarginated outer webs, 1st to 4th very abruptly emarginated and attenuated at tips for about one-third of length. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest equalling 8th primary, tips rather sharply rounded. Tail nearly square, very slightly rounded laterally, 12 feathers, tips rounded. Half (occasionally slightly less than half) tarsus feathered on front only, toes short in comparison with *Falco* and claws not so much curved. Bill much compressed, rather slender, upper mandible curved with long slender point projecting beyond under mandible which is short and blunt, no notches on cutting edges as in *Falco*. Nostrils somewhat elliptical and sparsely covered by hair-like tips of feathers of lores.

Soft parts.—Bill dark horn, paler at base; cere, legs and feet yellow; iris dark brown to yellowish-brown.

CHARACTERS AND ALLIED FORMS.—For differences of *B. b. vulpinus* see under that form; *B. b. zimmermannae* (north-west Russia south to Balkans) has been separated as intermediate between *B. b. buteo* and *B. b. vulpinus* but is doubtfully separable from *B. b. buteo*; *B. b. arrigonii* (Corsica, Sardinia) is like *B. b. buteo* but rather smaller, with a slightly finer bill and under-parts are striped and apparently never thickly barred; *B. b. insularum* (Canary Is.) is like *B. b. buteo* but with shorter wing and slightly larger bill; *B. b. japonicus* (Turkestan to Japan) is like *B. b. buteo* but with more than half tarsus feathered; *B. b. harterti* (Madeira), *B. b. rothschildi* (Azores) and *B. b. bannermani* (Cape Verde Is.) have also been described; owing to great individual variation there is considerable intergradation between various forms. Much rounded wing, weak bill and feet, bristle-like feathers of lores and half-feathered tarsus distinguish *B. b. buteo* from other British "hawks."

FIELD-CHARACTERS.—No longer a common woodland species, but now restricted to uncultivated hill-country and districts with rocky coastline. At rest its size, robust build, dark brown upper-parts and streaked yellowish-white under-parts are good characters, unfeathered tarsi and lack of white in tail preventing confusion with Rough-legged Buzzard. Flight in passing from place to place slow and heavy, but its great wing-power appears to advantage when bird soars, as it often does for hours at a stretch, and its

appearance then is very characteristic. Ringing up in great spirals, with broad rounded wings held almost horizontally, and broad, slightly rounded tail expanded, a Buzzard looks like a large moth silhouetted against the sky; and its identity is confirmed by long-drawn, plaintive mewing "pee-yeou," audible at great distance. Hunger-cry of young is an iterated whistling "whee-ou, whee-ou."

BREEDING-HABITS.—Formerly haunted our English woodlands, but now almost entirely confined to moorlands and mountain districts, where most nests are on rocks or steep broken hillsides, only occasionally in trees. *Nest.*—Bulky, built of sticks, heather stems and twigs, while inner cup is decorated with fresh green boughs of pine, ivy, larch or other tree. One nest contained several bones of sheep. Dead grass, *Luzula* and bits of bark also found in lining. *Eggs.*—Normally 2 or 3, in old birds only 1, while sets of four are exceptional and twice sets of 5 have been met with in England. Colour white, sometimes with light bluish tinge, either unmarked or blotched, smeared and spotted with red-brown of varying shades, sometimes evenly distributed and sometimes as zone or cap at large end. Average of 100 British eggs, 56.8×45.4 . Max.: 61×45.6 and 59×49 . Min.: 52.1×43 and 53.1×42.5 . *Breeding-season.*—Usually last fortnight of April and early May in Great Britain. *Incubation.*—Chiefly by female, often begins with first egg and lasts 28–31 days. Single brooded. *Fledging-period.*—About 6 weeks.

FOOD.—Chiefly small mammals (especially voles, moles and sometimes rabbit), dead lambs and placenta of ewe, an occasional bird, picked up from ground in most cases, and earthworms. Other mammals occasionally killed include hare, rat, mice, shrew, stoat and once marten. Birds taken include Jackdaw, various Finches and Tits, Blackbird, Thrushes, Fieldfare, Redwing, Sky-Lark, Meadow-Pipit, Partridge, Red Grouse (old as well as young), Wood-Pigeon, Moor-Hen, Lapwing, and young wild duck and domestic chickens. Also snakes (viper and grass snake), frogs, small toads, lizard, slow-worm, bivalve molluscs, coleoptera (dung-beetles) and larvæ of lepidoptera (*Sphinx* as well as *Noctuidæ*).

DISTRIBUTION.—*Great Britain.*—Resident, breeding commonly in Wales, Devonian peninsula and Lakeland (as well as very sparingly in Pennines and New Forest), and in central, west and north Scotland including I. Hebrides; only exceptionally elsewhere. On east coast irregular migrant, but elsewhere only occasional visitor, although numerous in some winters; occurrence at any time in Shetlands doubtful, and only once O. Hebrides (Lewis). *Ireland.*—Exterminated as resident probably between 1880 and 1890, now only autumn to spring vagrant.

DISTRIBUTION.—*Abroad.*—Europe from about lat. 66° in Sweden, but local and rare in south-east Europe. Replaced by other races

1. The Peregrine Falcon (*Falco p. peregrinus*). 2. The Kestrel (*F. t. tinnunculus*). 3. The Merlin (*F. c. aesalon*). 4. The Common Buzzard (*Buteo b. buteo*). 5. Montagu's Harrier (*Circus pygargus*). 6. The Sparrow-Hawk (*Accipiter n. nisus*).

[Face p. 144.]

in most parts of Russia, and parts of Asia, also in the Atlantic isles, Corsica and Sardinia.

256. *Buteo buteo vulpinus* Gloger.—THE STEPPE-BUZZARD.*

BUTEO VULPINUS Gloger, Abänd. Vög. Klima, p. 141 (1833—South Africa).
Buteo desertorum (Daudin), Yarrell, 1, p. 113 (in text); Saunders, p. 322 (in text); B.O.U. List (1915), p. 337.
Buteo buteo desertorum (Daud.) Hand-List (1912), p. 116 (in note).

DESCRIPTION.—*Adult male and female. Winter and summer.*—Like *B. b. buteo* and upper-parts sometimes indistinguishable but usually feathers edged more rufous and often broadly edged rufous and crown and nape sometimes more rufous than brown; under-parts varying greatly usually with markings more rufous than in *B. b. buteo* especially tibial feathers and sometimes whole under-parts almost uniform rufous with some whitish streaks on chin and throat and some dark shaft-lines on rest of under-parts; axillaries and under wing-coverts also more rufous than in *B. b. buteo* but dark patch at base of primaries blackish in most rufous examples; tail usually more rufous and with bars on proximal half absent or broken and sometimes absent altogether on central pair. (Occasional examples are almost black.)

Juvenile.—Upper-parts with feathers usually more broadly edged with rufous than in any juvenile *B. b. buteo*; under-parts deeper cream or buff and dark markings rufous or tinged rufous especially on tibia; tail usually tinged rufous and without broad subterminal band.

First summer.—Moult apparently as in *B. b. buteo* after which becomes like adult; new feathers of tail usually more rufous than in juvenile and with broad subterminal band. N.B.—Moulting adults show that tail does not become more rufous or less barred after first moult.

Measurements.—♂ wing 350–385 mm., tail 175–195, tarsus 65–75, bill from cere 20–23 (15 measured). ♀ wing 350–390. Thus smaller than in *B. b. buteo* but measurements overlapping. Structure as in *B. b. buteo*.

BREEDING-HABITS.—Much written on the breeding of this race really applies to other forms (*B. b. zimmermannæ* and *B. ferox cirtensis*). Nest usually placed in tree of some kind. *Eggs.*—2 or 3 in number, decidedly small for Buzzard's eggs, spotted and blotched with yellowish or reddish-brown on white ground. Average of 12 eggs, 53×41.7 . Max.: 56×40.5 and 55×44.2 . Min.: 50.7×41.8 and

* According to Domaniewski and Grassmann both *Buteo buteo buteo* and *Buteo b. zimmermannæ* nest in large areas of Russia, from the Bug to the Volga, and therefore they recognize two species, but this requires further confirmation as *B. b. zimmermannæ* is a very inconstant form, some specimens of *B. b. buteo* and *zimmermannæ* being indistinguishable.

52 × 40.1 mm. *Breeding-season*.—Last week April and early May. No details of incubation, but undoubtedly single brooded.

FOOD.—Few records can be definitely assigned to this race, but main food lizards, frogs, etc. and very largely insects, especially orthoptera (grasshoppers) and coleoptera.

DISTRIBUTION.—*England*.—One Everley, Wilts., Sept., 1864 (J. Gould, *Birds Great Britain*, 1, p. xxx, skin preserved in Brit. Mus.) [Male Bywell, nr. Newcastle, 1830, stated to be of this form (J. H. Gurney, *Ibis*, 1878, p. 118) is *B. b. buteo* (see *Brit. B.*, xiv, p. 183), while another male Tynemouth (Northumberland) also stated to be of this form (*loc. cit.*) is not available for examination.]

DISTRIBUTION.—*Abroad*.—Russia from Volga and Ural throughout west Asia to Altai, Turkestan to Issik-Kul, Caucasus, apparently Asia Minor, Arabia to Sokotra, N. Persia. Wintering in Africa from Nile to S. Africa, Arabia, India, but rare in eastern parts, to Malay Peninsula.

[NOTE.—The occurrence of the American Buzzards, *Buteo lineatus lineatus* (Gm.) in Scotland (Yarrell, 1, p. 113; Saunders, p. 322) and *Buteo borealis borealis* (Gm.) in Notts. (Saunders, p. 322) has been recorded.]

Genus CIRCUS Lacépède.

CIRCUS Lacépède, Tabl. méthod. Ois., p. 4 (1799—Type by subsequent designation of Lesson 1828: *C. æruginosus*).

Plumage soft, feathers of face narrow, forming a more or less incomplete ruff. Bill short and strongly curved, nostrils longitudinal, thinly covered by loreal bristles which are directed upwards. Tarsus long, thin, claws very strongly curved and very sharp. Wings long and pointed, secondaries very much shorter than primaries. Tail long. Almost cosmopolitan. Eggs either unspotted or (as a rule faintly) spotted.

Key to species of genus CIRCUS.

1 {	Outer web of 2nd, 3rd, and 4th primaries notched	<i>C. pygargus</i> , p. 150
	Outer web of 2nd to 5th primary notched	2
2 {	Primaries barred	<i>C. cyaneus</i> , ♀ and juv., p. 155
	Primaries not barred	3
3 {	Upperside, throat and chest bluish-grey, abdomen white	<i>C. cyaneus</i> , ♂ ad., p. 155
	Back and abdomen brown	<i>C. æruginosus</i> , p. 146

CIRCUS ÆRUGINOSUS

257. *Circus æruginosus æruginosus* (L.)—THE MARSH-HARRIER.

FALCO ÆRUGINOSUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).

Circus æruginosus (Linnæus), Yarrell, 1, p. 127; Saunders, p. 315.

DESCRIPTION.—*Adult male. Winter and summer.*—Whole crown and nape cream-buff to rufous-buff streaked varying width dark brown to blackish; mantle, scapulars and back dark brown to blackish, feathers with varying amount of narrow rufous edging; upper tail-coverts tipped rufous and brown, varying and with creamy-white, whitish or ashy-grey bases; feathers of lores with black bristle-like tips and creamy tufts at base; ear-coverts pale buff marked varying amount of brown and rufous; feathers below ear-coverts streaked dark brown with creamy edgings, short and slightly curled forming an ill-defined ruff; chin creamy-buff finely streaked dark brown; throat and breast buff to rufous-buff with brown streaks varying greatly in width; rest of under-parts chestnut, feathers with varying amount of rufous-buff to buff edges; axillaries rufous-buff with brown shaft-streaks varying in width; under wing-coverts same but usually paler (often creamy-white) and less streaked; tail-feathers dull silver-grey with brownish tinge (in tail and wing-feathers rami are brown with ashy-white distal radii which are mostly lost in worn plumage, making feathers browner) inner edges of inner webs of all except central pair whitish to rufous-buff, tips whitish; outer five primaries with distal halves black but outer webs and tips more or less tinged grey, proximal half of inner webs white to buffish-white slightly marked dark brown, rest of primaries becoming more silvery-grey on outer webs and distal portion of inner webs with a few dark spots; secondaries still more silvery-grey except three or four innermost which are brown; primary-coverts silvery-grey; outer greater coverts same but inner brown to dark brown; median coverts dark brown with varying amount of rufous on tips and edges, outer feathers usually with some silvery-grey; lesser coverts and innermost median buff to pale buff, streaked dark brown much as crown and forming a buff line down inner edge of wing. N.B.—In worn plumage buff becomes whiter but much of pale edging on upper-parts is worn off, tail and wings become browner. This plumage is acquired by complete moult but there seems no regular period as specimens in moult in every month have been examined.

Adult female. Winter and summer.—Like adult male but crown and nape usually more uniform and less streaked (rarely broadly streaked); feathers of centre of mantle broadly edged cream to rufous-buff; chin and throat creamy-buff often without dark brown streaks; lower throat and breast dark chestnut-brown, feathers broadly edged cream-buff to rufous-buff and often a patch on upper-breast with very little dark brown (not streaked as in adult male); rest of under-parts uniform dark chestnut-brown; axillaries and under wing-coverts darker than in adult male; tail-feathers dark brown with varying amount of silver-grey, occasionally almost as much as in adult male on central pair and outer webs of rest, but usually less and often scarcely noticeable especially in worn plumage, inner webs (except of central pair)

with varying amount of rufous markings ; wing-feathers blackish chocolate-brown with much less white at base than in adult male, and never with more than a wash of silver-grey on outer webs, and usually with only a slight greyish tinge disappearing in worn plumage ; primary-coverts as wing-feathers ; rest of wing-coverts as adult male, but without any silver-grey.

Nestling.—At first *down* (A) short, rather scanty, with bare patches on sides of body and base of neck, white with a faint creamy tinge on upper-parts of body and a narrow dark brown ring round eye. Older birds in down have not been available for examination.

Juvenile.—*Male and female*.—Much as adult female but crown and nape usually with very fine streaks or none but sometimes crown dark brown and nape cream or buff streaked dark brown ; ear-coverts uniform dark brown ; whole of under-parts sometimes uniform dark to chocolate-brown but usually chin cream to buff and some feathers of breast edged same but usually less buff on breast than in adult female ; tail dark brown with buff tips, occasionally with a little rufous on inner webs of outer pair ; wing-feathers same with a little whitish at base ; wing-coverts dark brown with buff tips, lesser coverts often as rest but sometimes with buff edgings, but not forming a distinct buff line down inner edge of wing as in adult male and female.

First winter.—As juvenile.

First summer. *Male and female*.—Body-plumage commences to moult from Jan.-Mar., but wings and tail do not moult before May. After this moult both sexes are much like adult female but crown usually more streaked, tail and wings of both sexes without any silver-grey but tails of males with slight greyish tinge and outer feathers usually with more rufous which sometimes takes form of bars. After this plumage I have been unable to trace sequence with certainty in females.

Second summer. *Male*.—Crown, nape and under-parts streaked and as adult male ; tail-feathers silver-grey but more tinged brown than in adult and inner webs rufous with brown bars usually extending across outer webs of outer feathers and a broad brown penultimate band ; wing-feathers and wing-coverts with much less silver-grey than in adult male. After next moult plumage appears to become as adult.

Measurements and structure.—♂ wing 375-415 mm., tail 210-230, tarsus 85-90, bill from cere 21-23.5 (12 measured). ♀ wing 390-420. Primaries ; 1st between 6th and 7th, 3rd and 4th longest (4th occasionally 5 mm. shorter), 2nd 10-25 shorter, 5th 15-30 shorter, 6th 70-90 shorter ; 2nd to 5th emarginated on outer and 1st to 4th on inner webs. Outer secondaries shorter than 10th primary, inner ones about as long as 7th and 8th, tips rounded. Tail rounded laterally, 12 feathers, tips rounded. About a third of tarsus feathered on front. Toes long and slender, 3rd and 4th connected

at base by web, claws long, slender and tapering to very sharp point. Bill somewhat short, fairly broad at base, compressed at tip of upper mandible which is curved and projects in a sharp point over lower mandible, which is flat and with rounded tip, cutting edge of upper mandible with curved projection. Nostrils oblong, thinly covered with bristle-like feathers of lores. On each side of back from insertion of wing to rump narrow patch of "powder" down, with long, closely set and very fine barbs matted together, friable and greasy to touch, much as in Herons but longer, less matted and not lying so close to skin.

Soft parts.—Bill black, bluish-grey at base; cere and legs and feet yellow; claws dark slate; iris yellow-brown.

CHARACTERS AND ALLIED FORMS.—*C. æ. harterti* (north Africa) in adult male is rather whiter less creamy on crown, blacker on mantle, whiter on lesser wing-coverts. Dark colour and creamy head of young males and females, large size and absence of white on rump distinguish Marsh- from other British Harriers.

FIELD-CHARACTERS.—Harriers are large, long-legged, long-winged hawks of slender build, frequenters of moors, wastes and fens. They fly a few feet above ground, which they quarter with much regularity, but at times rise in wide circles to considerable height. This, the largest British species, haunts low swampy places exclusively, has rounder wings and slower flight than the others, and is readily distinguished by its chocolate-brown coloration, creamy-white head, black primaries, and—in adult male—grey secondaries and tail. Cry, a low whistling scream which Dresser renders "keew."

The Marsh-Harrier (*C. æruginosus*), adult male in flight.

(From a diagrammatic sketch by H. M. Wallis.)

BREEDING-HABITS.—Haunts marshes and fens, breeding in reed-beds and rank marsh vegetation. *Nest.*—Much larger than those of the other Harriers, built up of dead reeds and sedges, with sometimes a bough of alder or willow worked in, and lined with finer dead marsh grasses; placed in reed-bed or marsh, sometimes in water 3 or 4 feet deep. *Eggs.*—Usually 4 or 5, rarely 6, bluish-white in colour, and scarcely ever showing traces of markings. Average of 106 eggs, 49.5×38.6 . Max.: 54.6×39.1 and 51×42.1 . Min.: 45×37.3 and 46.3×35.6 . *Breeding-season.*—From beginning of April onward in southern Europe, and occasionally in latter part of March, but fresh eggs may be found much later, probably second or third layings. In central Europe generally in May

Incubation.—Chiefly by female, but male has been found on eggs occasionally. Period over five weeks. Single brooded. *Fledging-period*.—About five weeks.

Food.—Mainly amphibians, reptiles, eggs of birds and water-fowl taken unawares. Frogs, toads, water-snakes and an occasional fish, together with eggs and nestlings of marsh-breeding birds (such as Coot, Waterhen, Purple Heron, etc.) and an occasional water-rat or wounded bird form bulk of food. Remains of rabbit have also been found in nest.

DISTRIBUTION.—*England and Wales*.—Occasionally breeds Norfolk (as in 1915 and 1919) but elsewhere now only rare autumn and winter-vagrant. *Scotland*.—Rare vagrant. Has occurred several times in Solway area, but elsewhere only some eight recorded. *Ireland*.—Still lingers or some midland and western tracts of bog.

DISTRIBUTION.—*Abroad*.—Nesting in Europe and northern Asia ; in winter in parts of Africa and India. Accidental Canaries and Færoes. Represented in north-west Africa by *C. æ. harterti*.

CIRCUS PYGARGUS

258. *Circus pygargus* (L.)—MONTAGU'S HARRIER.

FALCO PYGARGUS Linnæus, Syst. Nat., ed. x, i, p. 89 (1758—Europe. Ex Albin. Typical locality: England).

Circus cineraceus (Montagu), Yarrell, i, p. 138 ; Saunders, p. 319.

DESCRIPTION (Plate 4).—*Adult male. Winter and summer*.—Whole upper-parts ashy-grey usually and especially when worn brownish or mixed dark brown, radii only of feathers being ashy-grey and rami dark brown ; upper tail-coverts with narrow white tips and white bases barred or spotted with dark grey and basally with rufous ; feathers of lores with black bristle-like tips and whitish tufts at base ; round eye hoary (only very slight indication of facial ruff) ; ear-coverts, sides of neck, chin, throat and breast ashy-grey as upper-parts but seldom becoming brown in worn plumage ; rest of under-parts white more or less washed grey (varying somewhat individually), feathers streaked pale chestnut, varying in width ; axillaries white barred chestnut, under wing-coverts white streaked varying amount chestnut and sometimes pure white, those covering primaries widely and irregularly barred greyish-black ; tail-feathers narrowly tipped white, central pairs and outer webs of rest ashy-grey wearing to brown as upper-parts, inner webs of inner pairs brownish-grey more or less mixed with white on basal portion and widely barred dark brown to brown, outer pairs white and barred rufous-brown to pale chestnut, which sometimes encroaches on to outer webs ; outer six primaries black with grey tips (lost when worn), 7th with considerably more grey on distal portion, 8th to 10th ashy-grey with inner webs with varying amount of white broadly barred brown-black, secondaries as 8th

to 10th primaries but brown-black bars crossing both webs, innermost secondaries as rest of upper-parts; primary-coverts pale ashy-grey; rest of wing-coverts rather darker as rest of upper-parts. This plumage is acquired by complete moult which appears to take place at no regular period as individuals in moult taken in every month have been examined.

Montagu's Harrier
(*C. pygargus*).

The Hen-Harrier
(*C. c. cyaneus*).

To show difference in wing-formula and emarginations.

Adult female. Winter and summer.—Crown dark brown, feathers edged rufous (whitish-buff basally on fore-head); nape and hind-neck with wider and paler edgings, those in centre of nape usually white; rest of upper-parts dark brown, feathers with rufous tips when new; some scapulars with large buff spots; upper tail-coverts white with penultimate spot or bar (sometimes reduced to narrow streak) of dark brown to rufous-brown;

lores as male; round eyes buffish-white; ear-coverts dark brown, feathers edged rufous; under-parts buff to pale creamy-buff streaked dark brown to rufous-brown, darker and less rufous on throat and breast than on belly and flanks; axillaries and under wing-coverts as male but more buffish and with wider streaks; tail-feathers broadly barred black-brown, bar at tip very broad, central pair greyish-brown, bars usually not very prominent, next two pairs paler often with some rufous and with bars more prominent, and three outer pairs with varying amount of white and rufous and bars except at tip usually rufous; wing-feathers, tips black-brown, very narrowly edged whitish when fresh, outer webs and distal part of inner webs dark brown washed varying amount of grey, basal part of inner webs pale brown to white, all barred black especially prominent on under side of wing; primary-coverts dark brown washed varying amount of grey, barred black; greater coverts brown, tipped rufous when new; median and lesser coverts with dark brown centres and broad rufous-buff to pale buff edges, except outer ones which usually have no pale edgings. This plumage is acquired by complete moult as in male.

Nestling.—At first *down* (A) short but covering bird fairly thickly except on belly where it is rather scanty, white with buffish tinge on sides of head, neck, centre of back and wings, round eye a narrow dark brown ring. Later thickly covered with long *down* (C) which is of about same colour but rather more creamy-buff on upper-parts. (N.B.—In this stage only partially feathered birds examined.)

Juvenile. Male and female.—Upper-parts like adult female but edges of feathers of crown and nape more rufous; wider rufous to buff tips to all feathers of upper-parts and especially all wing-coverts; upper tail-coverts white with dark shafts and often rufous-buff tips; chin creamy unstreaked; rest of under-parts including under tail-coverts, axillaries and under wing-coverts deep rufous-buff almost uniform but feathers with slightly darker rufous shaft-streaks; under wing-coverts covering primaries paler buff with large black centres; tail much as in adult female but central pair darker, bands more prominent, blacker and more rufous; wing-feathers much as adult female but darker and whitish tips more prominent; wing-coverts also darker brown and with prominent rufous tips.

First winter. Male and female.—Like juvenile.

First summer. Male.—Body-plumage sometimes begins to moult in Dec. and occasionally tail, but usually moult does not start until spring. After this moult upper-parts are dark grey-brown, feathers of crown and nape more or less edged rufous; ear-coverts, sides of neck, chin and throat streaked dark brown and rufous-brown, edgings of feathers whitish or pale buff and with varying amount of grey; sometimes mostly dull grey on chin and

throat; rest of under-parts white broadly streaked chestnut-brown; wings when moulted much as adult male but not so pure grey and lesser coverts with narrow rufous edgings; bars on tail considerably darker than in adult, and usually extending across both webs except in central pair which have very faint indications of broken bars.

Second summer. Male.—After second moult becomes like adult male but feathers of crown and nape and to less extent chin, throat and breast very narrowly edged rufous; rest of upper-parts browner and less grey than in adult; grey of breast restricted to upper part; pale chestnut streaks of rest of under-parts wider than in adult; barring of tail-feathers darker; grey of wing-feathers more tinged brown than in adult and black bars on secondaries more prominent.

First summer. Female.—Like adult female but upper-parts rather darker, under-parts darker, tail-feathers darker and central pair dark brown not greyish, wing-feathers without grey tinge. After next moult females appear indistinguishable from adult.

N.B.—The melanistic variety has whole body-plumage brown-black with varying amount of greyish tinge on upper-parts and throat, wing-coverts and especially primary-coverts, upper tail-coverts and tail; sometimes (probably in female or young) bases of wing-feathers are whitish and tail browner with faint dark bars and occasionally feathers of nape with rufous-buff edges. An example of the melanistic variety had when in the nest “long blackish-brown down.”

Measurements and structure.—♂ wing 350 (one 340)–370 (one 380) mm., tail 200–220, tarsus 55–60, bill from cere 15.5–16 (12 measured). ♀ wing 350 (one 335)–380. Primaries: 1st between 5th and 7th, 3rd longest, 2nd and 4th 10–25 mm. shorter, 5th 55–65 shorter, 6th 85–105 shorter; 2nd to 4th emarginated on outer and 1st to 3rd on inner webs (emargination on outer web of 2nd 15–30 mm. beyond tips of primary-coverts). Rest of structure as Marsh-Harrier but only about one-fourth of front of tarsus feathered.

Soft parts.—Bill black, greenish-grey at base of lower mandible; cere, legs and feet yellow; iris yellow to yellowish-brown (juv.).

CHARACTERS.—No subspecies. Long wings and striped belly distinguish adult male and almost uniform rufous-buff under-parts juvenile from *C. cyaneus*, while in all plumages much shorter and unemarginated 5th primary and rather shorter 4th primary are distinctive. Female and young of *C. macrourus* are very similar but emarginations of their primaries both on outer and inner webs are higher i.e., nearer bases of feathers, that on outer web of 2nd being nearly hidden by primary-coverts.

FIELD-CHARACTERS.—Not unlike Hen-Harrier in behaviour and appearance, but of even more slender build. Male has some

streaks on under-parts, rufous-brown marks on white thighs, and black bars on secondaries; and in both sexes white on rump is less in extent and not so pure in colour. Flight, graceful and buoyant, accomplished by three wing-beats alternating with glides on half-raised wings. Cry, a low, tremulous chatter, remarkably feeble for a bird of its size.

BREEDING-HABITS.—This species where numerous is distinctly sociable in breeding-habits, but in England is not sufficiently common for more than a couple of pairs or so to nest together. *Nest.*—A hollow in sedgy ground overgrown with rank vegetation, or on moors or downs and at times in cornfields, sheltered by heather and gorse or growing crops. Eggs laid on pad of grasses or rushes. *Eggs.*—Usually 4, sometimes only 3, or 5 and very rarely 6, bluish-white and generally unmarked, though rarely showing traces of rusty spots. Average of 100 eggs, 41.5×32.6 . Max.: 46.5×32.5 and 42.5×35.7 . Min.: 37×30.2 and 41.5×29.6 mm. *Breeding-season.*—In England about last ten days of May and early in June, but two or three weeks earlier in southern Europe. *Incubation.*—By female alone beginning with first or second egg laid. Period about 30 days. Single brooded. *Fledging-period.*—About 32 days (Saunders).

FOOD.—Picked up from ground by quick stoop as it hawks low. Chiefly reptiles, amphibians, birds' eggs and birds and mammals taken unawares. Frogs, toads, snakes, lizards, mice, small birds, especially Pipits, Larks, Chats and occasionally Finches, Buntings or Thrushes, as well as young birds, nestlings and eggs of ground building birds. Also earthworms and larger insects, especially beetles.

DISTRIBUTION.—*England and Wales.*—Summer-resident (April to Oct., sometimes Nov.). Nests annually East Anglia, fairly regularly in Cambs., Hants., Dorset and Devon, and occasionally elsewhere, as in Cornwall, Isle of Wight, Sussex, Surrey, Yorks. and Merioneth, and possibly Somerset, Notts. and Northumberland. *Scotland.*—Rare vagrant; about seven in southern half of mainland, one of which (June 15, 1881) may possibly have nested in Solway area. *Ireland.*—Rare vagrant. One Queen's co., one co. Dublin, eleven in or near co. Wicklow, where may possibly sometimes breed.

DISTRIBUTION.—*Abroad.*—Temperate portions of Europe and western Asia, also north-west Africa. In winter in Africa and India. Accidental Canaries.

CIRCUS CYANEUS

259. *Circus cyaneus cyaneus* (L.)—THE HEN-HARRIER.

FALCO CYANEUS Linnæus, Syst. Nat., ed. xii, i, p. 126 (1766—Ex Edwards). Typical locality: near London).

Circus cyaneus (Linnæus), Yarrell, i, p. 132; Saunders, p. 317.

DESCRIPTION.—*Adult male. Winter and summer.*—Whole upper-parts ashy-grey as in Montagu's Harrier but usually paler and purer grey; feathers of back of crown to nape with white bases and often with brown or brownish edgings; upper tail-coverts pure white; feathers of lores with black bristle-like tips and white tufts at base; round eye hoary; (feathers behind and under ear-coverts and extending across chin short and slightly curled forming a more distinct facial ruff than in Marsh- or Montagu's Harrier); sides of neck, throat and upper-breast (not extending so far as in Montagu's) pale ashy-grey; rest of under-parts, axillaries and under wing-coverts pure white often with a few grey feathers or indications of incomplete grey bars on flanks and axillaries; tail-feathers tipped white, central pair ash-grey, mottled white at extreme base, next two pairs with narrow dark grey incomplete bars and inner webs white on basal halves, outer feathers with more white extending to outer webs, especially on outermost pair and bars darker. (N.B.—Amount of white and amount of barring varies greatly individually.) Outer five primaries with about basal third white, distal portion black with ash-grey tips and more or less tinged grey on outer webs, especially of 1st, 6th with some grey in middle of inner web and white extending farther, rest of primaries and secondaries grey with blackish shafts but inner webs white on inner edges almost to tip but with brownish penultimate patch; all wing-coverts ashy-grey. This plumage is acquired by complete moult apparently as in Marsh- and Montagu's Harriers at no regular period.

Adult female. Winter and summer.—Crown and upper-parts as adult female *C. pygargus* but buff spots on scapulars larger and more prominent; upper tail-coverts white usually with narrow brown or rufous shaft-marks; under-parts also as in adult female *C. pygargus* but streaks usually broader and less rufous; facial ruff more distinct and

much more complete, extending across chin as in male but still more distinct; axillaries and under wing-coverts browner and less rufous than in *C. pygargus*; central tail-feathers grey-brown, usually with considerable amount of grey tinge on basal half, widely barred black-brown and with wide penultimate bar much as in *C. pygargus* but rest of feathers barred buff to rufous-buff not so pale or rufous as in *C. pygargus*, and some inner ones often

The Hen-Harrier (*Circus c. yaneus*). Female showing facial ruff.

with grey tinge; wing-feathers as in *C. pygargus* but basal part of inner webs of primaries and under side of all wing-feathers whiter; wing-coverts as in *C. pygargus* but pale edgings and spots on median and lesser varying but usually larger and more prominent and often extending to outer feathers.

Nestling.—At first *down* (A) short but covering bird fairly thickly but scanty on belly, white with buffish tinge on sides of head, neck, centre of back and wings, round eye a narrow dark brown ring. In this stage indistinguishable from *C. pygargus*. Later thickly covered with long *down* (C) which replaces very short white *down* (B). *Down* (C) buffish-brown on upper-parts but paler on sides of back, under-parts pale buff, whitish on belly.

Juvenile.—Like adult female and usually not possible to distinguish with certainty, pale edgings of feathers especially on crown and wing-coverts usually more rufous than in adult female and under-parts often more rufous-buff; pale barring of tail-feathers often paler and whiter especially in males but no reliable difference. Distinguished at once from juvenile *C. pygargus* by its streaked under-parts.

First winter. Male and female.—Like juvenile.

First summer. Male.—Moult occasionally begins March but apparently usually takes place summer (June) and is sometimes not quite complete as late as Nov. and Dec. (i.e. when bird is eighteen months old) but insufficient moulting birds are available. Upper-parts as adult but not so pure grey (more tinged brown) often with some brown-edged feathers on fore-part of crown and on rump; under-parts as adult but almost always with a few spots or streaks of rufous-brown and sometimes these are well marked and fairly numerous on lower-breast and under tail-coverts.

Second summer. Male.—After second moult seems indistinguishable from adult.

Measurements and structure.—♂ wing 330–355 mm., tail 200–220, tarsus 65–75, bill from cere 15–17 (12 measured). ♀ wing 360–390. Primaries: 1st between 6th and 7th and sometimes shorter than 7th, 3rd and 4th longest, 2nd 20–30 mm. shorter, 5th 15–25 shorter (equal to or longer than 2nd), 6th 65–75 shorter; 2nd to 5th emarginated on outer and 1st to 4th on inner webs. Rest of structure as Marsh-Harrier.

Soft parts.—Bill black, base bluish; cere, legs and feet, iris, and eyelid yellow.

CHARACTERS AND ALLIED FORMS.—In *C. c. hudsonius* (N. America) adult male is spotted on under-parts and female and young usually more rufous on under-parts and edges of feathers of crown and nape. Distinguished from *C. pygargus* in all plumages by much longer and emarginated 5th primary, and rather longer 4th primary besides other differences.

FIELD-CHARACTERS.—Resembles Montagu's Harrier, but slightly larger, under-parts of blue-grey male not streaked, and black bar on secondaries lacking; in female tail-bars are rather more pronounced. Best distinction, which obtains in both sexes, is conspicuous pure white, not grey, rump. Feeble cry is akin to that of last species, a rapid, quacking chatter, "quek-ek-ek-ek," which, according to Walpole Bond, differs slightly in the sexes.

The Hen-Harrier (*C. cyaneus*). Female (above), male (below) in flight. (From a diagrammatic sketch by H. M. Wallis.)

BREEDING-HABITS.—Haunts heaths, commons, and moorlands, and on Continent breeds in cornfields among growing crops. *Nest*.—A hollow among rushes and heather, lined with a thick pad of dead rushes, and a few heather twigs arranged round it. *Eggs*.—Usually 5 or 6, occasionally only 4, or 7 in Scotland and sets of 8 have been recorded, but probably in most cases through gradual removing of eggs. Pale bluish-white, generally unmarked, but sometimes spotted rusty-brown or with bold dark red-brown streaks and spots. Average of 100 British eggs, 46.2×36.1 . Max.: 52.1×38 and 49.5×40 . Min.: 40×32 . *Breeding-season*.—From about mid-May in Orkneys, as a rule; occasionally early in month. In central Europe eggs may be found in April and in Scandinavia in June. *Incubation*.—Begins apparently with second egg and is performed by female. Period not less than four weeks. Single brooded.

FOOD.—Chiefly birds and mammals taken by surprise on ground. Mice, voles, water-voles, rats and young rabbits; among birds an occasional duck, Golden Plover, young Lapwing, Snipe, Dunlin, Grouse or Partridge, but usually Meadow-Pipits, Sky-Larks, Finches, and less frequently Blackbird or Ring-Ouzel. Lizards, slow-worms, frogs, etc., are also taken.

DISTRIBUTION.—*British Isles*.—Resident and winter-visitor. As breeder now practically confined to Orkneys, O. Hebrides and some mountain districts of Ireland. In England and Wales has nested in last twenty years Cornwall, Hants., and Carnarvon, and possibly Devon, but otherwise only a winter-visitor and autumn and spring migrant.

DISTRIBUTION.—*Abroad*.—North and central Europe to north Spain, north Italy, north Asia, in winter in north India, Burma, Japan and China, and Africa as far as the Sahara, Nubia and, apparently, Abyssinia.

Genus ACCIPITER Briss.

ACCIPITER Brisson, Ornith., i, p. 28 (1760—Type, according to p. 310 "*accipiter*," by tautonymy, i.e. *Accipiter nisus*).

Feet and bill as in *Circus*, nostrils round or oval, also thinly covered by bristles, but wings very much shorter, no kind of "ruff" on face. Separation into genera *Accipiter* and *Astur* cannot be upheld. Eggs as a rule unspotted or boldly patched. About 100 species in all parts of world.

Key to species of genus ACCIPITER.

Larger, wing over 300 mm., 2nd primary about equal to 6th	<i>A. gentilis</i> , p. 158
Smaller, wing under 300 mm., 2nd primary much shorter than 6th	<i>A. nisus</i> , p. 162

ACCIPITER GENTILIS

260. *Accipiter gentilis gentilis* (L.)—THE GOSHAWK.

FALCO GENTILIS Linnaeus, Syst. Nat., ed. x, i, p. 89 (1758—"Habitat in Alpbibus," by which, however, the Scandinavian Alps are meant in the first instance, as is quite clear from other statements of Linnaeus).
Astur palumbarius (Linnaeus), Yarrell, i, p. 83; Saunders, p. 331.

DESCRIPTION.—*Adult male and female.*

Winter and summer.—

Centre of crown blackish-brown with slight slatish tinge; sides of fore-part of crown and line over eye to back of crown whitish, streaked blackish-brown; back of crown and nape same, feathers being white with blackish-

brown tips, those of sides of nape usually also barred as are sometimes those over eyes; rest of upper-parts brown with tinge of grey especially when freshly moulted and very narrow pale tips, shafts of feathers dark; bases of scapulars and upper tail-coverts barred with white; feathers of lores with black bristle-like tips and white tufts at base; hind-part of ear-coverts brown to black-brown, sometimes uniform but usually with some whitish streaking, fore-part of ear-coverts white narrowly streaked black-brown; chin white streaked and usually with some narrow bars of dark brown; rest of under-parts, axillaries and under wing-coverts white, feathers with black-brown shaft-streaks and brown to black-brown bars varying considerably in width individually; under tail-coverts white with a few dark

The Goshawk (*Accipiter g. gentilis*) adult.

bars or indications of them here and there; tail-feathers slate-brown, tips white or mottled white, broad penultimate band of dark brown and 3 or 4 similar but narrower bands, feathers somewhat mottled with white, especially on outer pair and on basal portions of inner webs of rest, except central pair which usually has some indication of white near shaft; wing-feathers brown, barred darker brown, with very narrow whitish tips, outer webs with slight greyish tinge, inner webs, except at tip, with a good deal of white mottled with brown (N.B.—On under side wing- and tail-feathers appear dull greyish-white barred dark brown); wing-coverts as rest of upper-parts, but whitish tips usually more noticeable. N.B.—There appears no constant difference between ♂ and ♀ in colour or markings. This plumage is acquired by complete moult commencing with wing-feathers in April and body apparently not starting until June but few moulting examples are available.

Nestling.—At first *down* (A) rather short with silky tips, covering bird rather thinly, white with faint greyish tinge on upper-parts, dark or grey on lores. *Down* (B) short, white, very sparse. Later *down* (C) grows thickly, pushes out *down* (B) and conceals most of *down* (A), and is of "woolly" structure, head and under-parts creamy-white, upper-parts pale buffish-grey. (See Peregrine, p. 108.)

Juvenile.—Crown dark brown, feathers edged rufous (becoming paler when worn); nape with wider and usually more whitish edges; feathers of rest of upper-parts conspicuously tipped rufous to buff, those of upper mantle, scapulars, rump and upper tail-coverts with basal portion creamy or buff barred brown, this feature varying and being conspicuous in some individuals; whole under-parts rufous-buff (almost white when worn), with drop-shaped streaks of dark brown, narrower on throat, tibia and under tail-coverts; tail-feathers much as in adult but usually bands more contrasted and more mottled creamy-buff on outer feathers; wing-feathers as in adult but pale tips longer and more creamy and often some creamy mottling on outer webs; wing-coverts with rufous to buff tips as rest of upper-parts, greater and often median with basal portion creamy or buff barred brown.

First winter and summer.—As juvenile. (Breeds in first summer.—E.H.)

Second winter.—The juvenile plumage does not appear to be moulted until second autumn but very few moulting examples have been examined. After this first moult bird appears to become indistinguishable from adult, except that often a few juvenile feathers are retained on rump.

Measurements and structure.—♂ wing 305–330 mm., tail 210–230, tarsus 70–78, bill from cere 21–24 (12 measured). ♀ wing 340–375. Primaries: 1st between 8th and 9th or shorter than 9th, 4th longest, 5th 3–8 mm. shorter (very nearly equal to 4th), 3rd 3–10 shorter, 2nd 30–45 shorter, 6th 30–35 shorter; 2nd to 6th emarginated on outer and 1st to 5th on inner webs. Outer secondaries rather

shorter than 10th primary, inner ones about as long as 8th, tips rounded. Tail rounded laterally, 12 feathers, tips rounded. About half tarsus feathered on front. Toes rather long, claws long, strong, compressed, very sharp. Bill short, strong, upper sharply curved, compressed and pointed, with slight festoon on cutting edge, lower broad, short and flattish with rounded tip. Nostrils oval, thinly covered by bristle-like loreal feathers.

Soft parts.—Bill bluish-black, base paler blue; cere greenish-yellow; legs and feet yellow; iris reddish-orange.

CHARACTERS AND ALLIED FORMS.—For differences of *A. g. atricapillus* see under that form. *A. g. arrigonii* (Sardinia, Corsica) is darker (more slate-black) on upper-parts and bars on under-parts are closer and darker; *A. g. schvedowi* (north and central Asia) has upper-parts more slate-grey and less brown and barring of under-parts usually paler and narrower. Distinguished from other British hawks by its much rounded wing and large size.

FIELD-CHARACTERS.—Resembles a Sparrow-Hawk of huge dimensions, having similarly long tail and comparatively short wings. Inhabits forests. Note as a rule a short “gyak-gyak-gyak” or a screaming “kirk-kirk-kirk.” (E.H.)

BREEDING-HABITS.—A forest-haunting species. *Nest*.—Large and well built of sticks and twigs, sometimes on foundation of older nest, but always freely added to year by year. Round edge of cup fresh twigs are placed. *Eggs*.—Usually 4, or frequently 3, while sets of 5 are rare and 2 are at times a full set. Colour usually bluish-white, rarely dead white, without markings or only a few faint rusty spots. Average of 100 eggs, 58×45.2 . Max. : 64.5×45 and 62×51 . Min. : 51×43 and 56×41.5 . *Breeding-season*.—About mid-April in central Europe and up to end of May in north. *Incubation*.—So far as is known by female alone; exact period not ascertained. Single brooded.

FOOD.—Able to take mammals up to size of hare or rabbit with ease (especially squirrels); also birds such as Partridge and Pigeon, and occasionally Pheasant, Blackgame, Hazel Grouse, Rooks, Crows, Magpies, as well as domestic fowls, well-grown goslings and ducks, both tame and wild. In default of larger prey will also feed on smaller mammals and birds.

DISTRIBUTION.—*British Isles*.—Rare vagrant. Most recorded examples immature from east coasts England and Scotland; elsewhere and especially in west, extremely rare. One O. Hebrides winter 1887–8, but authenticity of three recorded in Ireland doubtful (R. J. Ussher, *List of Irish Birds*, p. 28). Nest, probably of wild bird, with four eggs found and female shot near Grosmont (Yorks.) May, 1893 (*cf. Brit. B.*, i, p. 319); pair attempted to nest (female shot) 1864, Normanby Park (Lincs.) (J. Cordeaux, *List B. B.*, p. 18); also perhaps bred formerly in Spey valley and elsewhere.

DISTRIBUTION.—*Abroad*.—Europe generally, and north-west Africa, but replaced by allied races in various parts of northern Asia, Sardinia, and North America.

261. *Accipiter gentilis atricapillus* (Wilson)—THE AMERICAN GOSHAWK.

FALCO ATRICAPILLUS Wilson, Amer. Orn., VI, p. 80, pl. 52, fig. 3 (1812—Philadelphia).

Accipiter gentilis atricapillus W. J. Williams, Brit. B., XIII, p. 31.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Differ from *A. g. gentilis* in crown being slate-black; rest of upper-parts dark slate tinged brown (purer slate when freshly moulted) feathers with blackish shafts and except when worn with very narrow blackish edgings; hind-part of ear-coverts blackish; under-parts not white barred black-brown, but each feather closely mottled or irregularly barred brown-grey on whitish ground and varying number with prominent black shaft-streak varying in width and most prominent on throat and breast, brown-grey markings more definitely in form of bars in some examples than in others and most prominent on tibia and flanks; under wing-coverts white barred blackish; under tail-coverts white with varying amount of brown-grey barring and often slight mottling; central tail-feathers and outer webs of rest and outer webs of wing-feathers more slate-grey than in *A. g. gentilis*; wing-coverts as rest of upper-parts. Females are usually paler grey on upper-parts than males. No moulting examples examined.

Nestling.—(Not examined.)

Juvenile.—Like that of *A. g. gentilis*.

First winter and summer.—As juvenile.

Second winter.—Juvenile plumage appears to be completely moulted in second autumn as in *A. g. gentilis*. Bird then becomes as adult but feathers of breast have broad brownish shaft-stripes and some broad barring varying individually but distinguishing from adult; some juvenile feathers usually retained on rump and occasionally on lesser wing-coverts; feathers of fore-part of crown usually with buffish edgings.

Measurements and structure.—♂ wing 320–345 mm., tail 220–250, tarsus 73–80, bill from cere 21–23 (10 measured). ♀ wing 355–370. Primaries: 1st equals 9th, between 8th and 9th or shorter than 9th, 4th longest, 5th 3–8 mm. shorter (rarely equals 4th), 3rd 5–12 shorter, 2nd 30–45 shorter, 6th 20–40 shorter; 3rd to 6th emarginated on outer and 1st to 5th on inner webs.

BREEDING-HABITS.—Haunts well-wooded districts, breeding in both conifers and hardwoods. *Nest*.—Bulky, built of sticks with shallow cup lined with a few green twigs, feathers and bark. *Eggs*.—Varying from 2 to 5, but most frequently 3–4; bluish-white in colour, rather rough and coarse in grain. Average of 30 eggs,

57.7×44.8. Max.: 61.1×48.2. Min.: 51.3×42.1 and 53.5×41.5 mm. *Breeding-season*.—From beginning of April in south to April 20th-May 10th in Alaska (Bendire). *Incubation-period*.—About four weeks but not precisely known. Probably entirely by female. Single brooded.

FOOD.—Mammals and birds up to considerable size. Mammals include Arctic hare, lemming, squirrel, jack-rabbit, weasel, mouse, etc. Birds: Ruffed Grouse, wild Pigeons, duck (various species), Ptarmigan, Flickers, domestic poultry, Virginian Colin. Also beetles, orthoptera (locusts), larvæ of lepidoptera and centipedes (Fisher).

DISTRIBUTION.—*Ireland*.—One, an adult male, shot near Strabane (co. Tyrone), Feb. 24th, 1919 (*ut supra*). One said shot near Shehallion (Perths.) about May 1869 (*Ibis*, 1870, p. 292), another in Galtee Mts. (Tipperary), February 1870 (*op. cit.*, p. 538), and another shortly afterwards near Parsonstown (King's co.) (*Zool.*, 1871, p. 2525).

DISTRIBUTION.—*Abroad*.—North America from north-west Alaska, north-west Mackenzie, central Keewatin and north Ungava to Michigan and New Hampshire, and in mountains south to Pennsylvania and New Mexico. Winters from Alaska and south Canada to north Mexico, Texas, Missouri, Indiana and Virginia.

ACCIPITER NISUS

262. *Accipiter nisus nisus* (L.)—THE SPARROW-HAWK.

FALCO NISUS Linnæus, Syst. Nat., ed. x, i, p. 92 (1758—"Habitat in Europa." Restricted typical locality: Sweden).

Accipiter nisus (Linnæus), Yarrell, I, p. 88; Saunders, p. 333.

DESCRIPTION (Plate 4).—*Adult male*. *Winter and summer*.—Whole upper-parts dark slate, feathers of fore-head often edged cream to rufous, feathers over eyes, base of crown and nape white with slate tips, concealed portions of scapulars with considerable but varying amount of white narrowly barred with more or less rufous, longer upper tail-coverts narrowly tipped white; feathers of lores bristle-like, black with tufts of white at base; upper part of ear-coverts dark slate, lower part of ear-coverts and cheeks rufous, feathers often with dark brown shaft-streaks; chin and throat white to rufous-buff finely streaked dark brown; rest of under-parts white closely and narrowly barred mixture of rufous and dark brown (bars varying in width and usually narrower on belly and tibia than on breast and flanks), some fine dark brown shaft-streaks on breast (amount of rufous varies considerably individually, most marked on sides and flanks where it often covers most of the feathers obscuring the bars and occasionally whole breast and flanks are thus suffused with rufous); under tail-coverts white, sometimes with a few broken brown bars; axillaries white barred rufous and brown;

under wing-coverts white tinged buff especially on edge of wing and barred black-brown with little rufous ; tail-feathers brown washed dark slate and narrowly tipped greyish-white with broad dark brown penultimate bar and four and five narrower ones, under side appears grey barred dark brown ; primaries brown, outer webs and tips tinged grey, inner webs barred dark brown and basal portions white ; secondaries same but more grey on outer webs and tips and white on inner webs extending more towards tips ; primary-coverts brown tinged grey ; rest of coverts as upper-parts but lesser coverts round bend of wing more or less tipped rufous. This plumage is acquired by complete moult commencing with wing- and tail-feathers in May, body not starting usually until later and chiefly July-Aug., sometimes not complete before Oct., and exceptionally Nov. (one full moult Jan.!).

Adult female.—Like adult male but upper-parts considerably browner sometimes only tinged slate but often slate-brown with dark slate crown, feathers on sides of nape sometimes barred dark brown and white ; upper part of ear-coverts brown to dark slate-brown, lower part white to buffish-white streaked dark brown and often tinged rufous ; chin and throat white to buff streaked dark brown ; rest of under-parts white to pale buff closely barred dark brown tinged here and there rufous-brown (bars varying but usually fairly broad and dark, less often narrow and paler) usually some rufous on flanks and occasionally considerable amount on breast and flanks ; under tail-coverts more often with bars than in male ; axillaries and under wing-coverts strongly barred black-brown ; wing- and tail-feathers as in male but browner less grey. Moult as male.

Nestling.—At first rather thinly covered with shortish white down (A). Down (B) very sparse indeed, white. Later down (C) grows thickly, pushes out the few tufts of down (B), conceals most of down (A) and is coarser, longer and more "woolly," white except on wings and back which have pale buffish-grey tinge. (See Peregrine, p. 108).

Juvenile. Male.—Whole upper-parts dark brown, feathers narrowly edged rufous but those of upper mantle below white of nape broadly edged ; over eye, nape and scapulars as adult ; under-parts varying white to pale buff and sometimes rufous-buff, chin and throat streaked dark brown, under tail-coverts often tipped buff and usually with a few spots or short streaks and occasionally bars of dark brown, rest of under-parts barred brown and rufous-brown, bars somewhat irregularly shaped especially on breast where they form arrowhead markings of varying shape and on tibia often very narrow V-shaped ; tail- and wing-feathers sometimes much like adults but usually narrowly tipped and edged buff and with some buff marks on tail-feathers ; wing-coverts as upper-parts. *Female*.—Upper-parts like juvenile male but edgings to feathers seldom so wide or rufous and thus usually less conspicuous

(sometimes not noticeable on mantle especially); under-parts seldom buff or rufous-buff, usually white and bars usually broader and darker than in male.

First winter.—Like juvenile. Edgings to feathers on mantle sometimes get worn off, especially in females by early spring.

First summer.—Juvenile body-feathers sometimes start to moult Mar. and April but usually not before May, when primaries also start and moult is rather prolonged as in adult but is usually complete by July-Aug. After this moult birds become usually indistinguishable from adults but occasionally there are a few brown rufous-edged feathers on rump. N.B.—Both sexes breed in first summer.

Measurements and structure.—♂ wing 190–210 mm., tail 135–150, tarsus 50–56, bill from cere 11.5–12.5 (30 measured). ♀ wing 225–243. Primaries: 1st equal to or shorter than 10th, 4th longest, 5th as long or 2–3 mm. shorter, 3rd 5–15 shorter, 6th 10–18 shorter, 2nd 30–40 shorter, 7th 40–45 shorter; 3rd to 6th emarginated on outer and 2nd to 5th on inner webs. Tail square, 12 feathers, tips slightly rounded. Tarsus very slender and long and about one-fourth feathered in front. Other structure as Goshawk but nostrils more thickly covered with bristle-like loral feathers.

Soft parts.—Bill slate, tip blackish-horn; cere, legs and feet greenish-chrome; iris bright chrome-yellow; skin round orbits pale greenish.

CHARACTERS AND ALLIED FORMS.—*A. n. punicus* (N.W. Africa), is slightly larger and paler grey on upper-parts; *A. n. granti* (Madeira) is dark with very dark broad bars on under-parts; *A. n. wolterstorffi* (Sardinia) is similar but smaller; *A. n. nisosimilis* (north Asia) is large and pale; *A. n. melanoschistus* (Himalaya) is very dark on upper-parts and very rufous on under-parts. Distinguished from other British hawks by its much rounded wing and much smaller size than Goshawk.

FIELD-CHARACTERS.—Prefers well-wooded districts, but often nests in small plantations or isolated clumps of fir. Of more slender build than any of our native falcons, has distinctly barred—not streaked—under-parts, bars in male being less pronounced owing to white ground-colour being suffused with rufous. Tail looks very long in flight contrasted with short wings, which are broad and rounded, not sharply pointed as in falcons. Hunts by stealthy, albeit very rapid and gliding, flight just above ground on outskirts of woods and along hedgerows, frequently topping bushes to snatch an unsuspecting victim from its perch. At times, however, chases its prey to a standstill, and, laying aside its habitual caution, will even follow it into frequented thoroughfares or interior of houses. Cry, a harsh screaming “mew.”

BREEDING-HABITS.—Widely distributed in all wooded districts. *Nest*.—Often in conifers, but also frequently in deciduous trees,

such as oak, placed close to main stem. Usually built upon top of old nest of some other species, but superstructure always work of the hawk, bulky, built of twigs of larch and other trees, very flat at top, with usually bits of bark in lining. *Eggs*.—Usually 4 to 6, occasionally 7, while 8 have been recorded a few times. Colour bluish-white, with blotches of dark chocolate-brown, sometimes forming zone or cap, and not infrequently at small end. Some eggs almost unmarked; others have light red-brown cloudings or spots. Average size of 100 British eggs, 39.7×31.7 . Max.: 46.7×35 and 45.5×36 . Min.: 35×28.4 mm. *Breeding-season*.—Full clutches usually by end of first or second week in May. Eggs laid at intervals of 48 hours, but sometimes longer. *Incubation*.—By female alone, generally after larger half of clutch has been laid. Period usually 34–35 days. (For fuller details see J. H. Owen, *Brit. B.*, xii, pp. 61 and 74). Single brooded. *Fledging-period*.—Four weeks.

Food.—Very varied, but chiefly small and medium-sized birds taken on wing. Starling, Finches (Greenfinch, Goldfinch, Bullfinch, Sparrow, Chaffinch, Yellow Bunting, etc.), Tits, Meadow-Pipit, Sky-Larks Willow-Warbler, various Warblers, Mistle- and Song-Thrush, Blackbird, Hedge-Sparrow, Robin, Redstart, Kingfisher, Cuckoo, Great and Lesser Spotted Woodpeckers, Teal, Wood-Pigeon, Turtle-Dove, Moorhen, Lapwing (taken from nest), Partridge, young Pheasant, once Grey Hen! Also seen to kill young Little Tern and chasing Green Woodpecker. Mice and voles also taken and it is said, young rabbits; frogs, and occasionally insects, chiefly coleoptera and orthoptera (grasshoppers).

DISTRIBUTION.—*British Isles*.—Resident. Generally distributed where there are woodlands. Is rare Orkneys and extreme north and north-west Scotland. Rare vagrant Outer Hebrides, occurs rarely on passage Fair Isle and Shetlands. Frequently observed as autumn migrant on east coast Great Britain.

DISTRIBUTION.—*Abroad*.—Europe generally, east apparently to west Siberia, but replaced by very closely-allied subspecies in Madeira and Canary Islands, north-west Africa, Corsica and Sardinia, and in various parts of Asia.

Genus MILVUS Lacépède.

MILVUS Lacépède, *Tabl. méthod. Ois.*, p. 4 (1799—Type by tautonymy : *Falco milvus*.)

Differs from other British genera of *Accipitres* by long tail being more or less deeply forked. Wings long. Upper bill with very flat festoon or rounded “tooth.” Nostrils free, longitudinal and obliquely placed. Tarsus short, not or barely longer than middle toe, about half covered with feathers. 3rd and 4th primaries longest, 5th not much shorter. Old World. Eggs spotted.

Key to species of genus MILVUS.

Underside and nape rufous, fork of tail 70-100 mm. . *M. milvus*, p. 166

Underside and nape dark brown, fork of tail 30-40 mm. *M. migrans*, p. 169

MILVUS MILVUS**263. *Milvus milvus milvus* (L.)—THE KITE.**

FALCO MILVUS Linnaeus, Syst. Nat., ed. x, i, p. 89 (1758—Europe, Asia, Africa. Restricted typical locality : S. Sweden).

Milvus regalis, Seebohm, Hist. Brit. B., I, p. 74.

Milvus iclinus (Savigny), Yarrell, I, p. 92 ; Saunders, p. 335.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Crown and nape white with varying amount of rufous, closely streaked brown-black, feathers narrow and pointed ; upper mantle brown-black, feathers somewhat pointed and with broad chestnut edgings, rest of mantle and back same, but feathers rounder and with narrower and darker rufous edgings and tips ; scapulars same but browner and concealed portions of feathers with narrow brown bars ; upper tail-coverts chestnut with black shaft-streaks ; feathers of lores with black bristle-like tips and white tufts at base ; ear-coverts, sides of neck, chin and throat white narrowly streaked black, feathers loosely constructed ; rest of under-parts chestnut, feathers of breast widely streaked black with pale buff edgings at tips ; flanks rather less widely streaked, belly narrowly streaked, and centre of belly and under tail-coverts with only black shaft-lines ; axillaries as flanks, under wing-coverts with large black centres and lowest series with dark brown centres and bars and greyish edgings and tips, sometimes tinged rufous ; tail-feathers chestnut, extreme tips and bases of inner webs pale buff to whitish, outer pair narrowly barred black and with a good deal of black at tip and on outer web, penultimate pair with less black at tip and on outer web, next pair with only a little black at tip of outer web and bars usually confined to inner web, next pair usually with very incomplete bars on basal portion only and central pair with only spots, which lengthen to short bars at base under the tail-coverts ; outer primaries with long tips and outer webs black, inner webs white with some blackish mottling, inner primaries with outer webs greyish-brown often tinged rufous and inner webs narrowly barred black ; outer secondaries brown-black, paler on inner webs with inconspicuous bars, inner secondaries brown tinged rufous, white at base of inner webs and barred across both webs ; wing-coverts much as rest of upper-parts but with wider chestnut edgings, lesser coverts with black restricted to broad streaks. N.B.—Bases of body-feathers and under-down white. There is considerable individual variation in depth of chestnut, but in worn plumage this is always paler. This plumage is acquired by complete moult but the period cannot be defined as the only moulting adult examples examined were dated Oct. (2) and Feb. (2).

Nestling.—At first rather thickly covered with *down* (A) with silky hair-like tips especially long on crown which has a crested appearance ; and some short tufts of *down* (B). Crown and nape creamy to buffish-white, blackish in front of and over eye, rest of upper-parts pinkish-brown, whitish basally, under-parts creamy-white. In one example examined *down* (C) was commencing to grow and appeared to be of a more rufous-buff colour.

Juvenile.—Feathers of crown and nape shorter and less pointed than in adult, rufous-brown with long whitish or buff tips ; feathers of mantle with small pale buff tips not so noticeable as on crown ; upper-breast and flanks with narrower black streaks than in adult and tips of feathers whitish or buff ; rest of under-parts unstreaked pale buff, feathers with chestnut edges ; wing-coverts and inner secondaries with paler buff tips than in adult ; rest of wing-feathers as adult ; tail-feathers duller and with considerably more blackish both at tips and bases, black bars wider and a wide subterminal one on all feathers but usually not complete on central pair.

First winter and summer.—The juvenile plumage commences to moult in October and new feathers are much as adult but those of crown and nape are more rufous-edged and not so white. Moult is very gradual and apparently does not involve any wing-coverts nor tail- or wing-feathers and usually a good many body-feathers are not moulted. Material is wanting to show exactly when adult plumage is acquired.

Measurements and structure.—♂ wing 480-500 mm., tail : centre 220-250, outer 300-345 (depth of fork 60-110), tarsus 58-64, bill from cere 27-30 (7 measured). ♀ wing 480-515, tail : centre 220-260, outer 310-365. Primaries : 1st between 6th and 7th, 4th longest, 3rd as long or 5-15 mm. shorter, 2nd 45-65 shorter, 5th 10-30 shorter, 6th 90-110 shorter ; 2nd to 5th emarginated outer webs, 1st to 4th abruptly emarginated and attenuated inner webs, 5th not so clearly. Outer secondaries about equal 10th primary, inner ones becoming longer and longest equal to 7th primary, tips rounded. Tail deeply forked, 12 feathers, tips rounded. About half front of tarsus feathered. Claws curved and very sharp, that of middle toe with prominent inner edge. Bill rather broad at base, upper mandible much compressed, curved and sharply pointed at tip which projects, cutting edge with a slight curved projection, under mandible short, shallow and with rounded tip. Nostrils elliptical and just reached by tips of bristle-like loral feathers.

Soft parts.—Bill black tip, yellow at base and cere ; skin round eye and legs and feet yellow ; iris amber-yellow.

CHARACTERS AND ALLIED FORMS.—*M. m. fasciicauda* (Cape Verde Is.) is darker and has a rather shorter, darker, strongly barred tail including central feathers, and is somewhat intermediate between this species and Black Kite.

FIELD-CHARACTERS.—Exterminated in its former haunts in our woodlands, is now hardly known in British Isles outside mountainous country of central Wales, where it nests in oak-groves on lower slopes and ranges hills for food. Like the Buzzard, the Kite will sail for hours in wide circles high above hill-

The Kite (*Milvus m. milvus*), as viewed from below.
(From a sketch by F. C. R. Jourdain.)

sides, but appearance is very different, long pointed wings and especially long deeply-cleft tail by which it guides its course proclaim it at once, even if distance be too great to distinguish characteristic white patch on dark under side of wing. At rest, greyish-white head and rusty-red upper-parts are diagnostic. A silent bird as a rule; the shrill mewing "wheeeou-wheeeou-wheeeou" is pitched higher and iterated more rapidly although less loud and much less frequent than Buzzard's long drawn cry.

BREEDING-HABITS.—In Welsh hills usual nesting-place is in fork of oak in a rather open wood on hillside, but in Scotland most nests appear to have been in Scotch pines. *Nest*.—Placed close to main stem, not out on branch, composed of sticks solidified with turf, etc., and lined with lumps of wool, and a miscellaneous collection of rubbish, rags, cord, remains of various animals, etc.; with a flattish cup. *Eggs*.—Two or three as a rule; only one in case of old birds and very rarely four have been recorded. Colour white, sometimes unmarked but generally spotted and blotched with varying shades of reddish to purplish-brown. Frequently also brown hair-lines are met with. Average size of 27 British eggs, 57.3×44.94 . Max.: 61.3×46.3 and 60.3×49 . Min.: 54×43.1 and 59.7×42.4 mm. *Breeding-season*.—Usually about mid-April in Wales about a fortnight earlier than Buzzard. *Incubation*.—Apparently chiefly by female. Period about a month. Single brooded.

FOOD.—Almost anything which can be killed on, or picked up from ground; mammals (rabbits, leverets, moles, squirrels, rats, mice, etc.); birds (especially chickens, ducklings, young Grouse and Lapwings), occasionally old Grouse, Golden Plover, Partridge, Pigeon, young Curlew, and various species of duck; frogs, snakes, blind-worms, earthworms and beetles, as well as carrion of all kinds.

DISTRIBUTION.—*Great Britain*.—Resident. Formerly abundant, now confined to Wales, where only five birds known in 1905, but

since 1910 about twenty or more. Nested Devon 1913 and seen same year in Somerset, Derby, and probably Bucks., and in 1917 in Perthshire but only a rare migrant elsewhere than in breeding haunts. Recorded occurrences in Ireland cannot be substantiated (R. J. Ussher, *List of Irish Birds*, p. 28).

DISTRIBUTION.—*Abroad*.—From south Sweden throughout Europe, east to Russia; north-west Africa and western Canary Islands. North European birds are migratory, but do not seem to cross the Sahara. Replaced by allied subspecies in Cape Verde Islands.

MILVUS MIGRANS*

264. *Milvus migrans migrans* (Bodd.)—THE BLACK KITE.

FALCO MIGRANS Boddaert, Tables Planches Enl., No. 472, p. 28 (1783—Based on Daubenton's pl. 472, several countries of Europe mentioned, typical locality: France (Hartert 1914)).

Milvus korschun korschun (Gm.) Hand-List 1912, p. 119.

Milvus ater, Seebohm, Hist. Brit. B., I, p. 80.

Milvus migrans (Boddaert), Yarrell, I, p. 97; Saunders, p. 337.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Crown and nape brownish-white, often with a rufous tinge, closely streaked black, feathers narrow and rather pointed; rest of upper-parts very dark brown, usually uniform but sometimes with tips of some feathers dark rufous especially on upper mantle and upper tail-coverts when freshly moulted; basal portions of scapulars barred; feathers of lores with black bristle-like tips and white tufts at base; ear-coverts, sides of neck, chin and throat white or whitish-brown streaked brown-black; breast varying greyish-brown to rufous-brown, feathers rather pointed and with wide mesial brown-black streaks, which are outlined with pale brown; rest of under-parts more rufous-brown with narrow black shaft-streaks, amount of rufous varying individually but brightest on lower belly, tibia and under tail-coverts (occasionally these parts nearly as bright as in *M. milvus*); axillaries and under wing-coverts as in *M. milvus* but edgings not so bright rufous; tail-feathers brown, sometimes with a rufous tinge, barred black-brown; outer primaries with long black tips, proximal portions brown, inner webs mottled pale brown to greyish-white, sometimes purer white at extreme base, inner primaries dark brown with faint blackish bars on inner webs; secondaries with blackish tips tinged purplish, inner webs brown barred blackish, innermost feathers paler and sometimes with basal part of inner webs white or whitish; greater wing-coverts much as secondaries; median and lesser coverts dark brown with blackish shafts and pale brown or rufous edgings varying individually but usually rufous. This plumage is acquired

* The name *korschun* has for many years been adopted for the Black Kite, but the description does not refer to a Kite, but apparently to a young Marsh-Harrier.—E.H.

by complete moult beginning in May and extending to autumn but no winter adults have been available for examination.

Nestling.—Down when very young indistinguishable from that of *M. milvus*. Later there grows very thickly all over the body a shorter, coarser down (c) without long silky hair-like tips, grey on upper-parts, rufous-buff on under-parts but pale grey on crown and throat. Here and there especially on belly down (c) replaces a short down (B) as in Peregrine (see p. 108).

Juvenile.—Upper-parts very dark brown, feathers with black shafts and rufous-buff to whitish tips; longer and paler (usually whitish) on crown, nape and lesser wing-coverts; under-parts paler brown, feathers with yellowish-buff wedge-shaped tips often continued in a buff central streak varying individually but widest and most prominent on upper-breast; tail- and wing-feathers as adult but tipped buff and basal portions of inner webs whitish or white.

First winter.—The juvenile plumage commences to moult in December, new feathers sometimes like adult but usually more rufous on nape and breast. Moult seems confined to body and not all body-feathers are moulted apparently. *First summer*.—A complete moult commences in April after which bird appears to become indistinguishable from adult.

Measurements and structure.—♂ wing 417-452 mm., tail: central feathers 200-235, outermost 230-260 (depth of fork 20-40), tarsus 53-60, bill from cere 24-27 (12 measured). ♀ wing 430-465. Primaries: 1st equal to or slightly longer or shorter than 7th, 4th longest, 3rd as long or 5-20 mm. shorter, 2nd 30-50 shorter, 5th 5-20 shorter, 6th 50-80 shorter; 2nd to 5th emarginated outer webs and 6th very slightly, 1st to 5th abruptly emarginated and attenuated inner webs. Rest of structure as *Milvus milvus*.

Soft parts.—Bill horn-black; base of lower mandible, cere, legs and feet orange; claws black; iris greyish.

CHARACTERS AND ALLIED FORMS.—*M. m. aegyptius* (Egypt) has darker crown, rather more deeply forked tail and adult has yellow bill; *M. m. govinda* (India) has darker crown and under-parts, and whiter bases of primaries than in *M. m. migrans* but black bill. Black Kite is easily distinguished from Kite by smaller size, much less deeply forked tail and darker colour.

FIELD-CHARACTERS.—Recognizable at once by shape of tail as a Kite, but cleft not nearly so deep as in Red Kite. It is also slightly smaller and has a dingier appearance, though varying individually, some being very dark. Viewed from below lacks whitish patch on primaries. Flight easy and gliding, in habits sociable, often being met with in large flocks and breeding almost in colonies. A much noisier bird than Red Kite, with a peculiar "whinnying" note, frequently uttered during breeding-season. Fond of hawking over lakes, large rivers and estuaries, being an expert surface fisher. (F.C.R.J.)

BREEDING-HABITS.—Shows strong tendency to sociable breeding, many nests being placed at no great distance apart. *Nest.*—A careless structure, generally built up from a last year's nest and varying greatly in size in consequence, usually in a tree, and freely lined with rags, dung, paper and other rubbish. *Eggs.*—Usually 2, but sometimes 3, and occasionally 1 only; white with a few spots, blotches and streaks or hair-lines of sepia or red-brown. Average of 100 eggs, 52.9×43.3 . Max.: 61×42.3 and 55.7×46.1 . Min.: 47×39.8 and 53.5×39.5 mm. *Breeding-season.*—Last week April and first ten days May in south Europe; rather later in central Europe. *Incubation.*—Appears to be chiefly by female, male keeping watch not far away. Period not exactly known. Single brooded.

FOOD.—Largely fish where rivers or lakes are at hand, but also carrion and garbage, small mammals, such as moles, voles and shrews, chickens and small birds, lizards, snakes, frogs, toads and newts. Insects are also freely taken, such as coleoptera, neuroptera, odonata, and orthoptera, as well as earthworms, crustacea and mollusca.

DISTRIBUTION.—*Great Britain.*—Two. Adult male Alnwick (Northumberland), May 11, 1866 (Hancock, *Ibis*, 1867, p. 253). Male Aberdeen, April 16, or 18, 1901 (G. Sim, *Ann. Scot. Nat. Hist.*, 1901, p. 133).

DISTRIBUTION.—*Abroad.*—South and central Europe, north-west Africa, and west Asia. European birds are migratory and winter in tropical Africa. Replaced by other forms in tropical and north-east Africa and various parts of Asia.

[NOTE.—The BLACK-WINGED KITE, *Elanus caeruleus* (Desfontaines), is said to have been shot in co. Meath about 1845 (Saunders, p. 338, see also *Zoologist*, 1875, p. 4455.)]

[NOTE.—Several specimens of the AMERICAN SWALLOW-TAILED KITE, *Elanoides forficatus* (L.), which inhabits North and South America, have been recorded as taken in Great Britain, but the claims for the admission of this species are in our opinion insufficient (cf. Saunders, p. 338).]

Genus HALIÆTUS Sav.

HALIÆTUS Savigny, Descr. Egypte, Zool., Syst. Ois., pp. 68, 85 (1809—Monotype: *H. nisus* Sav. = *albicilla*).

Enormous birds with very broad wings, in which the primaries are comparatively little longer than secondaries. Bill very large and thick, upper mandible first straight, strongly curved near tip, resembling gigantic bill of Kite. Nostrils free, oval or rounded. 3rd to 5th primaries forming tip of wing. Tail short, half as long as wing or less, cuneiform to nearly straight. Tarsus short, about as long as middle toe, one-eighth to one half feathered, rest bare. Nestling with long down, chiefly on head, reminding one of those of *Milvus*. Eggs as a rule unspotted. Almost cosmopolitan, but absent from S. America.

HALIÆTUS ALBICILLA

265. *Haliæetus albicilla* (L.) — THE WHITE-TAILED EAGLE.

FALCO ALBICILLA Linnaeus, Syst. Nat., ed. x, i, p. 89 (1758—"Habitat in Europa, America." The latter erroneous. Restricted typical locality: Sweden).

Haliæetus albicilla (Linnaeus), Yarrell, I, p. 25; Saunders, p. 329.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Feathers of crown, nape and sides of neck lance-shaped, bases brown more or less mottled pale brown, shafts dark brown, tips brownish-white or yellowish-white (paler when worn than when fresh); rest of upper-parts darker brown with a purplish gloss when fresh, feathers of mantle having paler tips, which become whitish when worn, scapulars darker and more glossy; shorter upper tail-coverts dark brown as rump but sometimes slightly mottled with white at tips, long upper tail-coverts white with bases dark brown somewhat mottled with white and tips same with variable amount of brown and mottling; feathers of lores bristle-like with short tufts at base creamy-white; chin, throat and upper-breast much as crown and nape, but feathers not so elongated and usually with wider dark brown shaft-streaks; rest of under-parts, axillaries and under wing-coverts as upper-parts, but with scarcely any purple gloss and feathers with narrow pale brown tips; tail white, concealed bases of feathers brown with some white mottling, tips sometimes with some brown specks; primaries brown washed grey with whitish shafts, tips blackish with brown shafts, secondaries same but basal portions not so grey and tips not so dark; wing-coverts as upper-parts. This plumage is acquired by complete moult which seems of a gradual nature. Insufficient moulting birds have been available to state a period, but moulting examples dated June, Dec., Jan. and Feb. have been examined.

Nestling.—At first *down* (A) creamy-buff to buffish-grey rather darker and greyer under and behind eyes, on wings and rump and whiter on chin and throat, fairly long with hair-like tips, covering bird fairly well but not thickly and with bare patch on each side of belly, back of tarsus and distal half of front bare. Some very short whitish tufts of *down* (B). Later a much coarser, more woolly and longer *down* (C) growing very thickly replaces *down* (B) (exactly as in Peregrine, see p. 108). *Down* (C) crown, under-parts and sides of back dark greyish-buff, upper-parts and wings paler, whitish at base of down.

Juvenile.—Feathers of crown dark chocolate-brown towards bases, edges pale reddish-brown, bases white; feathers of nape same but with small pale brown tips and more white and reddish-brown basally; feathers of mantle and scapulars with much more pale reddish-brown, only shafts and distal central part of feather being dark chocolate-brown; rump same but paler and with smaller

dark tips ; longer scapulars more uniform dark brown with purplish tinge often mottled pale or whitish-brown ; longer upper tail-coverts, more or less mottled with brownish-white or pale brown ; feathers of lores bristle-like, black with short white tips at base ; under parts much as upper-parts but often with more white especially on breast where paler reddish-brown portion of feather is often replaced by white more or less washed pale brown ; tibia and tarsus more uniform dark brown ; tail-feathers with outer webs and tips of inner webs black-brown slightly mottled whitish-brown, rest of inner webs whitish-brown mottled black-brown ; wing-feathers as in adults but proximal portions not so grey and shafts browner, inner secondaries more or less mottled whitish-brown on distal portions and innermost feathers pale brown with dark tips ; wing-coverts much as upper-parts.

First winter.—Like juvenile.

First summer.—A complete moult appears to take place beginning Feb., new plumage appears to be like juvenile but tail-feathers are slightly less mottled dark brown especially on inner webs.

Second summer.—Crown and nape intermediate between juvenile and adult not so dark as former but not with brownish-white tips of adults ; upper-parts much as adult but bases of feathers white ; upper tail-coverts with a considerable amount of white mottling ; under-parts as adult but with still more white on basal part of feathers than in upper-parts ; tail much as juvenile, but with rather more white ; new wing-feathers grey-washed as in adult but inner secondaries mottled brownish-white.

Third summer.—Insufficient moulting birds are available to determine exact sequence of plumage and birds which are very much like adults but have feathers of breast somewhat like juvenile, feathers of crown not so white-tipped as adult and tail-feathers (especially outer two or three pairs) with some black-brown at tips, are probably in their third or fourth summer.

Measurements and structure.—♂ wing 57-65 cm. (measured with tape, see vol. 1, p. *XIII), tail 22.5-28 cm., tarsus 90-110 mm., bill from cere 48-55 (14 measured). ♀ wing 61-68.5 cm. (one Greenland 72), bill 50-62.5 mm. Primaries : 1st between 7th and 8th, 3rd and 4th longest, 5th sometimes as long, sometimes 5-10 mm. shorter, 2nd and 6th 15-30 shorter ; 2nd to 7th emarginated outer webs, 1st to 5th abruptly (and 6th much less so) emarginated and attenuated on inner webs. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest about equal to 7th primary, tips rounded. Tail rounded, two central pairs about equal and longest, rest graduated, 12 feathers, tips rounded. Tarsus feathered half-way down. Claws much compressed, strong and curved, that of middle toe broadly grooved on inner side. Upper mandible very large and deep, compressed, curved and tip projecting beyond under mandible, which has

rounded tip and is straight and shallow. Nostrils oblong and very sparsely covered by bristle-like feathers of lores. (*See fig., p. 131*).

Soft parts.—Bill and cere pale yellow (in juvenile bill horn-colour, cere greenish); legs and feet yellow, claws blackish; iris yellow (in juvenile brown).

CHARACTERS AND ALLIED FORMS.—No subspecies determined. Large size (great bulk) enormous bill, graduated tail and scutellated tarsus distinguish White-tailed Eagle from other British birds.

FIELD-CHARACTERS.—At rest a heavy, lumpish-looking bird, lacking alertness of Golden Eagle. Will sit almost motionless for hours on ground or perched near water's edge looking more like a brown stump than a bird. In flight enormous breadth of wing and large size are very conspicuous, and in adult uniform brown colouring with light coloured, almost white, head and transparent looking white tail are characteristic. Note a querulous chatter, insignificant for so large a bird. Flight powerful but deliberate. (F.C.R.J.)

BREEDING-HABITS.—In British Isles almost all nests seem to have been placed on ledges of cliffs, usually by sea, or exceptionally on rocky ground on islands. Abroad not uncommon in some districts to find nests on high trees or among high reeds or on sandbanks in estuaries. *Nest.*—A bulky edifice of large sticks, heather-twigs, turf, etc., with bits of seaweed, moss, driftwood, grass and wool at times in lining. *Eggs.*—Normally 2, but 1 only in case of old birds, while 3 have been recorded rarely. Colour white, smooth in grain, often nest-stained, but rarely showing any trace of true markings. 100 eggs average 73.9×57.8 . Max.: 84.4×60.7 and 82.2×63.5 . Min.: 66×54 and 68×53 mm. *Breeding-season.*—About April 10-22 in Scotland, but in S.E. Europe as early as February. *Incubation.*—By both sexes, but chiefly by female; period 35 days (Faber). Single brooded.

FOOD.—Fish (salt and fresh water), carrion, rabbits, sea-birds, poultry and lambs are most frequently recorded. Stranded as well as fresh fish are eaten; hares occasionally taken; also wild duck of various species and many kinds of sea-bird (Guillemot, Puffin, Kittiwake and other Gulls), Coot, Sandpipers. Remains of hedgehog also found in nest by writer.

DISTRIBUTION.—*British Isles.*—Apparently extinct as breeding species. Pair bred Shetland until 1908, when male apparently killed and hen (white bird) brooded on nest each year until 1918 when disappeared. Nowhere known now in Ireland. Rare migrant to most maritime counties and rare vagrant inland, such visitors being usually immature.

DISTRIBUTION.—*Abroad.*—Northern and eastern parts of Europe to eastern Mediterranean (formerly Lower Egypt and Red Sea) Persia, Mesopotamia and northern Asia to Kamtschatka, also

Greenland. In winter vagrant and occurring (especially young birds) in many parts of Europe, to N. Africa, Canaries, N.W. India, Sind, China.

Genus PERNIS Cuv.

PERNIS Cuvier, Règne Animal, 1, p. 322 (1817—Monotype: *P. apivorus*).

Differs from other *Accipitres* by lores and fore-head being covered with small scale-like feathers without any bristles whatever. Cere nearly as long as rest of bill. Nostrils in obliquely placed slit. Wings long, generally 3rd and 4th primaries about equal and longest. Tarsus short and strong, nearly or quite half covered with feathers, entirely scutellated. Europe and Asia to Malayan Archipelago, in winter Africa. Eggs with yellowish shell, as a rule entirely covered with brown-red.

PERNIS APIVORUS

266. *Pernis apivorus apivorus* (L.)—THE HONEY-BUZZARD.

FALCO APIVORUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).

Pernis apivorus (Linnæus), Yarrell, 1, p. 121; Saunders, p. 339.

The Honey-Buzzard (*Pernis a. apivorus*).

DESCRIPTION.—*Adult male and female. Winter and summer.*—Upper-parts dark brown, bases of feathers white, in some examples entirely concealed but in most showing very considerably on whole crown and nape, feathers of which have oval-shaped tip of dark brown usually edged pale brown and rest of feather white; scapulars and upper tail-coverts often showing some white, bases being barred brown and white, upper tail-coverts when fresh with greyish tips; lores and round eyes and sometimes extending on to fore-head and moustachial region and rarely on to chin more or less grey or tinged grey (grey usually more marked in males); under-parts very

variable in distribution of white and brown, whitest examples have only a few dark brown shaft-streaks chiefly on upper-breast and broad subterminal spots chiefly on flanks and under tail-coverts, other "white" examples have larger and more numerous spots and streaks, most usual variety has narrowly streaked throat and broad brown subterminal bars on feathers of rest of under-parts with dark shaft-streaks on breast, still darker examples have brown throat with dark brown shaft-streaks and rest of under-parts with white mostly obscured by broad dark brown bars or tips, while in some white is almost entirely obscured and whole under-parts are dark chocolate-brown with black shaft-streaks; tail-feathers brown, narrowly tipped white or brownish-white, with broad black-brown subterminal band and two or three less broad bands on proximal half, brown interspaces with more or less distinct narrow, closely set, wavy, dark brown bars more conspicuous on distal half of feathers, bases of feathers with more or less white: appearance of tail from underneath grey with broad brown bands; wing-feathers brown narrowly tipped white and basal portions of inner webs white, wide subterminal blackish-brown band and widely spaced similar, but narrower, bands on remaining portion of feathers (outer primaries with long black-brown tips and with white more extensive on inner webs); primary- and greater coverts as wing-feathers; median and lesser coverts as mantle. N.B.—Variations are individual and not connected with sex, age or season. This plumage is acquired by complete moult commencing in July (perhaps June) sometimes complete by September, often not until Dec. and even March or April.

Nestling.—At first *down* (A) long on crown and neck and fairly long on upper-parts with silky hair-like tips, shorter on under-parts. Crown and neck cream-coloured, rest of upper-parts pale buffish-grey, under-parts white. Very short tufts here and there of *down* (B). Later *down* (C) (replacing *down* (B) as in Peregrine, see p. 108), coarser, more woolly, thick but not very long and white.

Juvenile.—Upper-parts like adult but feathers of crown and hind-neck with pale buff or creamy-white tips sometimes very small, sometimes so large as to make crown mostly creamy-white (rarely crown entirely white); some feathers of mantle and scapulars sometimes with white tips; under-parts varying: paler examples cream to white, feathers with brown to blackish shaft-streaks and more or less brown centres giving a somewhat streaked appearance, and not barred as in adult except on lower flanks and belly where there are large brown spots or incomplete bars: dark examples almost uniform brown on under-parts, feathers with blackish shafts, lower flanks, vent and under tail-coverts indistinctly barred creamy-buff; wing- and tail-feathers with longer white tips than in adult; wing-coverts often with white or pale buff tips, but as often these are not present.

First winter.—Like juvenile.

First summer.—The juvenile plumage is completely moulted from May or June onwards and bird then becomes like adult.

Measurements and structure.—♂ wing 375–425 mm., tail 210–260, tarsus 53–60, bill from cere 21–23 (12 measured). ♀ wing 395–425. Primaries: 1st equal to or a little shorter or longer than 7th, 3rd longest, 4th often as long, sometimes 5–10 mm. shorter, 2nd 15–30 shorter, 5th 10–25 shorter, 6th 40–65 shorter; 2nd to 5th, and 6th less distinctly, emarginated outer webs and 1st to 5th inner webs. Tail slightly rounded laterally, 12 feathers, tips rounded. About half tarsus feathered in front. Toes and claws long and slender, latter very sharply pointed but not very much curved. Bill rather broad at base and cere long, upper mandible curved, tip slender and sharply pointed, lower mandible shallow, rounded and point rounded. Nostrils bare, slit-like and oblique. Lores and round eyes compactly covered with short, rounded feathers. No bristles or bristle-like feathers.

Soft parts.—Bill black, base of lower mandible grey; cere upper-part blackish, lower yellow; legs and feet and iris yellow, iris in any case in some juveniles dark smoke-brown.

CHARACTERS AND ALLIED FORMS.—*P. a. orientalis* (East Siberia) is stated to be larger. Lores covered with rounded feathers (not bristles) distinguishes Honey-Buzzard at a glance from other Accipitres.

FIELD-CHARACTERS.—In habits beech forests and mixed woods in hills and plains where it may be flushed from ground when at work on wasp nests. Often mistaken for Common Buzzard, but distinguishable from latter by longer tail. Note quite different from Common Buzzard's, a short, shrill whistle, often repeated. (E.H.)

BREEDING-HABITS. — A forest-haunting species, especially partial to beech-woods. *Nest.*—

Generally built up on foundation of old nest of some kind, usually in fork from main stem, and composed of sticks and twigs, while cup is lined with fresh leafy twigs of beech, renewed from time to time as incubation proceeds. *Eggs.*—Normally 2, occasionally 1 only and rarely 3, very handsome, white ground being almost hidden by deep, rich purplish-red or red-brown, often very deep in colour, and smeared here and there. Average of 100 eggs, 50.8×41.1 . Max.: 60×41 and 53.6×44 . Min.: 46.5×40.1 and 47.3×37.7 mm. *Breeding-season.*—Late, eggs

The Honey-Buzzard (*P. apivorus*) in flight.
(From a diagrammatic sketch by H. M. Wallis.)

not being laid till June or end of May at earliest. *Incubation*.—By both sexes in turn, but period not known. Single brooded.

FOOD.—During summer when species visits us, main food consists of wasps and their larvæ, wild bees and other insects (coleoptera, especially cockchafers, lepidopterous larvæ, orthoptera, odonata, larvæ of diptera, pupæ of ants, honey, etc.). Other food occasionally taken includes small mammals, small birds, frogs, lizards, snails and birds' eggs.

DISTRIBUTION.—*British Isles*.—Uncommon passage-migrant (May-June and Sept.-Oct.). Occurs somewhere in Great Britain almost every year, and occasionally in eastern half of Ireland, most frequently in autumn. Formerly rare summer-resident in England, especially in New Forest, now only very occasionally nests, most recent cases being Hereford, 1895, Durham, 1897, possibly 1898, 1899, and probably elsewhere unrecorded. Has bred as far north as east Ross.

DISTRIBUTION.—*Abroad*.—Breeds in north and middle Europe, north to mid-Scandinavia and Finland, south to Cantabrian Mountains, north Italy and the Dobrogea, eastwards to west Siberia, winters in tropical Africa and parts of India. Casual Canaries. Replaced by allied races in east Siberia and parts of tropical Asia.

Genus PANDION Sav.

PANDION Savigny, Deser. Egypte, Zool., Syst. Ois., i, pp. 69, 95 (1809—Monotype: *Pandion fluvialis* = *P. halietus*).

Differs in many ways from all other hawks. Outer toe reversible *as in Owls*, feathers without aftershaft. Plumage hard and close, feathers of lower part of tibia, unlike most other hawks, not elongated. Nostrils narrow, oblique, free. Wings long pointed, 3rd primary longest, 2nd very little shorter, 4th slightly more so. Tail barely half length of wing. Tarsus short, strong, longer than middle toe without claw, entirely reticulated, without scutes. Toes and claws very powerful, toes with sharp, prickly scales beneath. Eggs richly and beautifully marked. One species divided in three subspecies.

PANDION HALIÆTUS

267. *Pandion haliaëtus haliaëtus* (L.)—THE OSPREY.

FALCO HALIÆTUS Linnæus, Syst. Nat., ed. x, i, p. 91 (1758—Europe. Restricted typical locality: Sweden).

Pandion haliaëtus (Linnæus), Yarrell, i, p. 30; Saunders, p. 359.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Middle and fore-part of crown black-brown, feathers with creamy-white edgings, middle of back of crown and middle of nape buff, feathers with dark brown shaft-streaks of varying width, sides of

The Osprey (*P. h. haliaetus*). Middle toe, showing spine-like scales.

back of crown and sides of nape creamy-white with scarcely any streaks (feathers of back of crown and nape pointed and somewhat elongated); rest of upper-parts dark brown with purplish gloss, feathers with very narrow whitish or buffish tips; feathers of lores bristle-like, black with short whitish tufts at base; ear-coverts black-brown extending in a broad line down sides of neck; chin and upper-throat white more or less finely streaked black-brown; lower-throat and upper-breast pale brown sometimes tinged rusty forming broad pectoral band; rest of under-parts white to creamy-white usually with a very few small rusty-brown or rusty-buff spots here and there; axillaries and inner under wing-coverts white with varying amount of rusty-buff markings and brown spots, outer under wing-coverts brown with whitish tips and lower feathers barred white or cream; tail-feathers dark brown narrowly tipped buffish-white, shafts yellowish-brown, inner webs (except of central pair) broadly barred pale brown at tip and white for rest of length, and outer webs often with faintly marked pale brown bars; outer primaries: tips and outer webs blackish, inner webs white mottled brown; inner primaries and secondaries dark brown glossed purple, barred white on basal portions of inner webs, amount of white decreasing on inner secondaries; primary-coverts blacker than rest of wing-coverts which are like upper-parts. N.B.—Whitish tips to feathers of upper-parts soon wear off, crown and nape become whiter and less buff and brown of upper-parts much paler by wear and fading and purple gloss is lost. This plumage is acquired by complete moult apparently of a very gradual nature and I have examined moulting birds taken in every month of the year.

Nestling.—No very young nestling seen. Birds partially

feathered are very thickly covered with down which appears to be same as *down* (c) in Peregrine (see p. 108), very little *down* (A) is to be seen and this seems short and cream-coloured. In these older nestlings upper-parts are dark smoke-brown with a line of white down back from nape to tail and bases of rest of down white, under-parts whitish, but tips of down smoke-brown, giving a slightly speckled appearance.

Juvenile.—Like adults but crown and nape usually more streaked, all feathers of upper-parts and wing-coverts as well as primaries, secondaries and tail with broad white or buffish-white tips, brown pectoral band narrower than in adults and more mixed with white, tail-feathers with much longer white tips than in adult, central pair often with more or less obsolete pale brown bars and rest with much more well-defined bars on outer webs, these being on outerfeathers often whitish-brown, bars on inner webs well defined.

First winter and summer.—White tips of feathers of juvenile plumage soon become much worn down and not obvious. Juvenile body-plumage sometimes commences to moult in October but usually later, moult seems very gradual as in adults, and wings and tail do not moult until spring and moult is usually not complete until autumn (i.e. when bird is about one and a half years old). When this moult is complete bird so far as I can see is like adult.

Measurements and structure.—♂ wing 450–495 (one 510) mm., tail 185–220, tarsus 58–69, bill from cere 30–35 (12 measured). ♀ wing 470–510. Primaries: 1st equal to or 5–10 mm. longer or shorter than 5th, 3rd longest, 2nd 5–10 mm. shorter or sometimes as long, 4th 10–15 shorter, 5th 55–70 shorter; 2nd to 5th emarginated outer webs (emarginated portions very slightly serrated), 1st–4th abruptly emarginated and attenuated on inner webs. Outer secondaries shorter than 10th primary, inner ones becoming longer and longest about equal 7th primary, tips rather sharply rounded. Tail square, 12 feathers, tips rounded. Tarsus feathered in front a little below tarsal joint. Scales on back of tarsus and on sides of and under toes very rough and forming short spines. Claws long, curved, rather slender and very sharp, that of middle toe flattened on inner side. Bill rather broad at base, upper mandible curved and tapering to sharp point projecting much beyond lower mandible which is short, shallow and with rounded tip. Nostrils oblong and bare. Short bristles round eyelids.

Soft parts.—Bill black, base bluish; cere pale greyish-blue; legs and feet greenish-white; iris yellow.

CHARACTERS AND ALLIED FORMS.—*P. h. cristatus* (Australia, etc.) has whiter head; *P. h. carolinensis* (N. and S. America) has very little brown on breast and is smaller. White on head and under-parts and general structure easily distinguish Osprey.

FIELD-CHARACTERS.—Unmistakable, looking in distance deep brown with white under side and head, and has very long wings. Often seen flying over lakes (also rivers and sea), sometimes circling,

not rarely hovering, pouncing down with legs outstretched upon fish. Usual call-note high-pitched "kai-kai-kai," on and near nest a piercing "ki-ki-ki-ki-ki-ki-ich-ich-ich." (E.H.)

BREEDING-HABITS.—In Scotland most nesting-sites were on islets or rocks in lochs, sometimes only a few feet above water; in two cases on ruined castles, and at times in trees on islands. Abroad nests may also be met with on ledges of cliffs, sometimes at great heights. *Nest.*—Often very bulky, having been added to for many years; built of sticks, twigs, heather-stems, sea-weed and drift-wood, with grass, a feather or two and finer materials in cup. *Eggs.*—2 or 3, occasionally 4, extremely handsome, being boldly spotted and blotched with deep chocolate or red-brown and ashy shell-marks on white ground. Average of 100, 61.59×46.3 . Max.: 69×46 and 68.4×50.3 . Min.: 50.4×41.3 and 55.2×40.2 mm. *Breeding-season.*—About last fortnight of April in south Europe, exceptionally at end of March; in north Europe much later (latter half May and early June). *Incubation.*—Period about 4 weeks, said to be by female alone but St. John says male incubates at times. Single brooded.

FOOD.—Almost entirely fish, varying according to locality. Sea-trout, trout, bream, perch, roach, sole and carp recorded from British waters. On migration, when pressed by hunger, has been known to take chickens, while beetles have been found in stomach.

DISTRIBUTION.—*British Isles.*—Rare passage-migrant. Formerly summer-resident in several places in Highlands, but now apparently extinct as breeding species. Loch Arkaig was deserted in 1911 and Loch an Eilein in 1903. In England fairly regular but rare passage-migrant (Sept.-Oct. and March-April), occurring in most years on some part or other of coasts or on inland waters; migrants also recorded occasionally in Scotland (only once O. Hebrides and very rarely Orkneys), Wales, and Ireland.

DISTRIBUTION.—*Abroad.*—Europe from Lapland to Spain, Mediterranean and Atlantic islands, south to Cape Verdes, north-west and north-east Africa to south Arabia, north Asia south to India and Ceylon, in winter in tropical Africa. Accidental Færoes. Replaced by closely-allied forms in North America, on the Papuan islands and Australia.

Genus GYPS Sav.

GYPS Savigny, Descr. Egypte, Zool., Syst. Ois., I, pp. 71, 95 (1809—Monotype: *Gyps vulgaris* = *fulvus*).

Head and long neck without feathers, more or less covered with short woolly down, a well-marked ruff at base of neck. Bill very high, cere shorter than tip. Nostrils a perpendicular or oblique slit. Tail rounded, 14 rectrices. Four species, S. Europe, Africa and Asia. Eggs white.

GYPS FULVUS

268. *Gyps fulvus fulvus* (Hablizl)—THE GRIFFON-VULTURE.

VULTUR FULVUS Hablizl, Neue Nordische Beytraege, iv, p. 58 (1783—Mts. of Gilan, N. Persia).

Gyps fulvus (J. F. Gmelin), Yarrell, i, p. 1; Saunders, p. 311.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Head and throat creamy-white, covered with longish fine bristle-like feathers and back of neck with short down; at base of back of neck a ruff of creamy-white feathers of very loose structure having long rami and very short or no radii; mantle varying pale yellow-brown or sandy-brown to dark brown with varying amount of grey tinge; scapulars same but longer feathers only tipped and edged pale and rest of feathers black-brown; feathers of rump slightly darker than mantle and with pale shaft-streaks and small pale tips; upper tail-coverts as mantle with dark brown basal portions; from base of throat and covering whole crop-region feathers are very short and narrow and lie so flat and close that this patch appears like hair, colour buffish-brown to dark brown or dark reddish-brown with fine paler streaks, this patch encircled by white under-down; rest of under-parts including axillaries and under wing-coverts varying pinkish sandy-brown to darker rufous-brown (often with a slight greyish tinge) feathers usually with narrow paler shaft-streaks, lower series of under wing-coverts dull white with a pair of large oval dark brown spots; tail black; primaries black, basal unemarginated portions edged greyish-brown, secondaries browner black and outer webs grey-brown; primary-coverts as secondaries; greater coverts black-brown, fringed and tipped pale sandy-brown; lesser and median coverts like mantle. Thick white under-down of woolly appearance. This plumage is acquired by complete moult apparently commencing in April and most active in May and June but period seems variable.

Nestling.—At first down on head and neck very short and white, replaced by longer white down when *down* (A) on rest of body is being replaced by feathers. Not determined whether first down on head and neck is *down* (A) or *down* (B). Rest of upper-parts longer, *down* (A) pale grey with buffish tinge on wings and tail, under-parts paler grey, middle of breast and belly and patches at sides of base of neck bare. Later whole body thickly covered with rather longer and much coarser and woolly, creamy-white *down* (c). A very few tufts here and there of short *down* (B) are to be found on tips of *down* (c).

Juvenile.—Like adult but crown covered with short down not long and bristle-like; feathers of ruff very long, narrow and pointed (lanceolate) with short rami and not loosely constructed as in adult and with pinkish-brown edges and wide sandy-coloured shaft-stripes; upper-parts darker and more pinkish than in adult (not so sandy) and feathers with narrow pale shaft-streaks especially

noticeable on wing-coverts; under-parts more pinkish than in adult and with more conspicuous pale shaft-streaks.

First winter and summer.—The juvenile plumage is completely moulted apparently when bird is about a year old but as birds examined have been found moulting at all times of year period is uncertain. New plumage appears to be exactly as juvenile, but darker on upper-parts.

Subsequent plumages.—Owing to the similarity of the plumages it is difficult to trace sequence with certainty but at second moult down on crown becomes more bristle-like though not so long as in adult. Rest of plumage apparently as before. At what appears to be third moult crown is covered with bristle-like down as in adult, much of ruff is as adult but there are interspersed a certain number of long pointed feathers as in young but with longer rami and more loosely constructed and creamy-white with brownish edges; rest of plumage as adult. Probably at next moult (i.e. when bird is about four years old) it becomes like adult.

Measurements and structure.—♂ wing 70-76 cm. (one juv. 65) (measured with tape, see vol. 1, p. *XIII), tail 280-325 mm., tarsus 105-125, bill from cere 52-55 (14 measured). ♀ wing 70-76 cm. Primaries: 3rd, 4th and 5th about equal and longest but varying up to 10 mm. and 5th usually shortest, 2nd sometimes as long but usually 10-20 shorter, 6th 20-40 shorter, 1st 70-90 shorter; 2nd to 7th emarginated on outer and 1st to 6th on inner webs. Tail nearly square, 14 feathers, tips rather square. About one-third of front of tarsus covered with woolly down. Middle toe much longer than others, claws not greatly curved and not sharp. Bill, upper mandible very high and much compressed with short, decurved, pointed tip, under mandible shallow and rounded with rounded tip. Nostrils bare, and slit-like, placed nearly perpendicularly.

Soft parts.—Bill horn-colour, tip and cere darker and more slate-colour; legs and feet grey; iris brown to golden-brown.

CHARACTERS AND ALLIED FORMS.—*G. f. fulvescens* (India) is paler. Down covered head and neck, ruff and very large size distinguish Griffon-Vulture from other British birds.

FIELD-CHARACTERS.—Usually to be seen soaring with motionless wings in wide circles, either in company or singly, and often at great heights. Rectangular shape of wings, retracted head and short square-cut tail, projecting only slightly from line of under-surface of wings, together with light

The Griffon-Vulture (*G. fulvus*), as viewed from below.

(From a diagrammatic sketch by H. M. Wallis.)

sandy-brown colouring and large size, are sufficient to identify with certainty. Seen through binoculars or at close quarters primaries will be found to be widely spread, with tips curving upward from air pressure. Absolutely silent on the wing, it is often noisy on the breeding ledges, emitting weird grunts and lowing notes. A hissing noise is also occasionally heard at times of excitement, as when young are endangered. (F.C.R.J.)

BREEDING-HABITS.—Sociable in habits, generally breeding in colonies in caves or ledges of cliffs, but occasionally builds a large stick-nest in tree. *Nest.*—When placed on ledge often of scantiest description, being little more than a few bits of palmetto, or grass and twigs, but large stick built nests in trees perhaps originally built by other species of Raptor. *Egg.*—One only, though it is said that two have been found. Probably in most of such cases eggs have been collected by native boys from ledges where two birds were breeding. Colour white, but in rare cases light or dark red spots are met with. Average of 60 Spanish eggs, 92×70.1 . Max. : 101.2×73.8 and 94×75 . Min. : 81.5×65 and 85×64.5 mm. *Breeding-season.*—From end Jan. to March, but a few fresh eggs generally in early April—possibly second layings. *Incubation-period.*—Said to be about 50 days ; male not known to take part. Single brooded.

FOOD.—Mainly carrion ; chiefly dead bodies of larger mammals in any stage of decay.

DISTRIBUTION.—*Ireland.*—One, a young bird caught alive near Cork Harbour, spring, 1843. One seen near Southampton Water.

DISTRIBUTION.—*Abroad.*—South Europe, north to Pyrenees and Transylvania, and north Africa, extending into the Sahara and apparently right across the desert to Sudan and north Abyssinia, east to west Asia. Accidental in France, Holland, Denmark, Baltic Provinces, Germany, etc. Replaced by different subspecies in parts of India and Africa, but the supposed west European form (*G. fulvus occidentalis* Schleg.) is not separable.

Genus NEOPHRON Sav.

NEOPHRON Savigny, Descr. Egypte, Zool., Syst. Ois., I, pp. 68, 75 (1809—Monotype: *N. percnopterus*).

Fore-head to middle of crown, sides of head and throat without feathers, but with a few bristles, neck surrounded by a full ruff of hackles, extending up to hinder part of crown. On crop a large bare patch, under which a bunch of down. Bill slender, cere as long as tip, nostrils elongate and horizontal. Wings long and pointed, 3rd primary longest. Tail wedge-shaped, 14 rectrices. Outer and middle toes united at base by membrane. Eggs beautifully marked with red-brown. One species, two or three subspecies. S. Europe, Africa, western Asia to India

NEOPHRON PERCNOPTERUS

269. *Neophron percnopterus percnopterus* (L.) — THE EGYPTIAN VULTURE.

VULTUR PERCNOPTERUS (evident misprint for *Percnopterus*) Linnaeus, Syst. Nat., ed. x, i, p. 87 (1758—Egypt).

Neophron percnopterus (Linnaeus), Yarrell, i, p. 6; Saunders, p. 313.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Chin, throat and crown to back of crown and ear, and a patch in middle of upper-breast bare yellow skin with a few short white plumules on chin, throat and fore-part of head, but back of crown more thickly covered with plumules and short degenerate feathers; nape and extending round sides of base of neck dark cream to pinkish-buff, feathers elongated, very narrow and pointed (lanceolate) forming a sort of ruff; whole of rest of body-feathers, upper and under wing-coverts and tail-feathers white tinged cream which is darkest and richest on mantle, scapulars and upper-breast where sometimes with strong pinkish-buff tinge; primaries black, outer webs and inner portions of inner webs brownish-grey except at tips, outer webs of inner primaries narrowly edged paler grey, secondaries with distal halves of outer webs pale grey and basal part, tips and inner webs brownish or black, innermost feathers with both webs grey; primary-coverts black; innermost greater coverts brown-black; all rest of coverts as body. This plumage is acquired by complete moult from May to Dec. or Jan.

Nestling.—(Not examined.)

Juvenile.—Fore-head, lores, round eyes, cheeks and chin bare skin with some short tufts of black plumules especially on chin, throat and top of crown much more thickly covered than in adult with short creamy plumules, interspersed with short black feathers; feathers of neck-ruff shorter than in adult and brown-black tipped buff; upper-mantle brown-black tipped buff; lower-mantle and scapulars browner and with longer buff tips which often entirely conceal brown; back, rump and upper tail-coverts mostly buff, bases of feathers being pale brown; whole under-parts black-brown, feathers with buff tips of varying length but under tail-coverts as upper tail-coverts buff with pale brown bases; tail-feathers greyish-brown with long buff tips; wing-feathers much as in adult but outer webs of inner primaries and secondaries more grey-brown and not so pale grey, and innermost feathers with buff tips; primary-coverts black; greater and lesser coverts black-brown with shortish buff tips and median coverts with much longer buff tips.

First winter.—Like juvenile. *First summer and second winter.*—The juvenile body-plumage sometimes commences to moult in March but wings and tail not until later. New plumage like juvenile but upper- and under-parts and wing-coverts brown-black with faint greyish tinge and feathers with only very small buff tips, here and there on under-parts a dull white feather and on

wing-coverts a few with pale greyish inner webs or tips; outer webs of new inner primaries and secondaries paler grey than in juvenile and tail-feathers grey-brown washed grey and with only short buff tips.

Second summer and third winter.—A few feathers of ruff greyish-white or partially grey; upper-parts and under-parts pale grey-brown, feathers with creamy or whitish tips, scapulars especially with considerable amount of grey wash, some greyish-white feathers here and there on upper-parts, but more of these on under-parts and wing-coverts; tail paler grey-brown and more washed grey than in first summer.

Third summer and fourth winter.—Mostly dull brownish-white with a certain amount of pale brown especially at bases of feathers and on scapulars and inner webs of tail-feathers, and shafts usually darker brown; greater wing-coverts mostly pale brown.

Fourth summer and fifth winter.—Like adult but grey-brown on inner greater wing-coverts; long scapulars sometimes pale brownish-grey with dark shafts; a few other feathers here and there with some greyish-brown on shafts or webs. After this plumage is moulted i.e. in fifth summer (five years old) bird appears to become adult but sequence described above owing to small number of moulting specimens available must be considered as only approximate.

Measurements and structure.—♂ wing 470-520 mm., tail 220-260, tarsus 75-88, bill from cere 31-34 (14 measured). ♀ wing 460-510. Primaries; 2nd to 4th about equal and longest but one of them often 5-15 mm. longer than others, 1st 50-70 shorter, 5th 15-30 shorter, 6th 70-80 shorter; 2nd to 6th emarginated outer and 1st to 5th inner webs. Tail much rounded, wedge-shaped, 14 feathers, tips rounded. About a quarter of tarsus feathered in front. Middle toe much longer than others, claws strong, curved and fairly sharp. Bill slender (cere thickened at base), upper mandible curved and pointed, lower shorter and rounded. Nostrils bare, oval, horizontal.

Soft parts.—Bill dark brownish-horn, tip black; cere, bare skin on head and breast yellow; legs and feet greyish-white to pale flesh or pale yellow; iris brown to reddish-brown or dark orange.

CHARACTERS AND ALLIED FORMS.—*N. p. ginginianus* (India) has rather smaller bill, legs and feet and yellow bill. Bare head, ruff, wedge-shaped tail and black and white colour distinguish species.

The Egyptian Vulture (*N. percnopterus*).
Appearance of adult in flight; Left-hand figure from below; Right-hand figure from above.
(From a diagrammatic sketch by H. M. Wallis.)

FIELD-CHARACTERS.—Not usually sociable like Griffon, but generally met with singly or in pairs, soaring with rigid wings. Has characteristic outline of Vultures, rectangular, with retracted head and widely spread primaries, but may be at once distinguished from Griffon by wedge-shaped tail, smaller size, and in adult, by bold black and white colouring. At great distances there is a strong likeness to White Stork, but with glasses long neck, extended in flight and legs carried beyond the tail, readily distinguish Stork. Juvenile birds may be identified by shape of tail. A silent species on the wing. (F.C.R.J.)

BREEDING-HABITS.—Usually breeds in caves or on ledges in low cliffs, occasionally at considerable heights and has been known to nest in trees, and buildings, but rarely. *Nest*.—Very variable in size, as same site may be occupied for many years, and when room is sufficient, nest may become very bulky. Composed of all kinds of rubbish, bones, palmetto, twigs, rags, dung, hair, etc. *Eggs*.—Usually 2, sometimes 1 only, while 3 are said to have occurred. Colour dirty white, sometimes quite covered with wash of varying shades of deep rich brown-red, sometimes so dark as to be deep purplish-red and at times fading to light yellowish-red with much of the ground-colour visible. Others are spotted and blotched with purplish-red and ashy shell-marks. Average of 100 eggs, 66.1×50 . Max. : 76.4×51.7 and 68.1×56.1 . Min. : 58.2×50 and 64×43 mm. *Breeding-season*.—From late March to about April 25. *Incubation-period*.—Not ascertained : apparently chiefly by female. Single brooded.

FOOD.—Carrion, garbage and dead animals of all kinds. In nests may be found remains of smaller mammals, such as dogs, foxes, cats, rabbits, hedgehogs, all evidently found dead ; also tortoises, lizards, snakes, frogs, toads, fish and crustaceans (*Apos*). Decaying fruit (figs) and excrement also devoured.

DISTRIBUTION.—*England*.—Two obtained and one stated seen. Immature bird shot (another said to have been in company but this disputed, see J. H. Gurney, *Zool.*, 1876, p. 5000) near Kilve, Bridgwater Bay (Somerset), Oct., 1825. Immature bird obtained Peldon (Essex), Sept. 28, 1868 (*ut supra*).

DISTRIBUTION.—*Abroad*.—Mediterranean countries to Sahara, north to S. France and Mt. Salève in Switzerland and the Bukowina, east to Turkestan and north-west India. Also in Canaries, Cape Verdes, and east and south Africa. Casual north of its breeding range. Replaced in India (except in north-west) by *N. percnopterus ginginianus*.

ORDER GRESSORES.

Consists of Storks, Herons, Ibises and Spoonbills, apart from tropical forms. Palate desmognathous. Sternum without spina

interna. Basi-ptyergoid processes absent. Tarsi long, toes more or less, at least at base, connected; hind-toe always present. 11 to 12 primaries, wings full and long. Oil-gland feathered. Young helpless. Four families.

Key to families of Order GRESSORES.

1 {	Patches of powder-down on breast and sides of rump	Ardeidæ
	No patches of powder-down	2
2 {	Bill straight, claws blunt	Ciconiidæ
	Bill curved, claws pointed	Plegadidæ

FAMILY CICONIIDÆ.

The Storks. Sternum behind with two incisions. No patches of powder-down. Bill in Palæarctic forms, long, strong, straight or slightly turned upwards, cuneiform. Holorhine. Claws blunt, not pectinated. Tarsus reticulated. Over 20 species in both hemispheres.

Genus CICONIA L.

CICONIA Brisson, Orn., I, p. 48 (1760—Type by tautonymy "*ciconia*," i.e. *Ciconia ciconia*, cf. vol. v, p. 361).

Bill straight, nostrils a short horizontal slit. Part of lores and chin bare. Lower feathers of neck elongated. Tail slightly rounded, lower tail-coverts ordinary. One moult.

CICONIA CICONIA

270. *Ciconia ciconia ciconia* (L.)—THE WHITE STORK.

ARDEA CICONIA Linnaeus, Syst. Nat., ed. x, i, p. 142 (1758—Restricted typical locality: Sweden).

Ciconia alba Bechstein, Yarrell, iv, p. 219; Saunders, p. 387.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole plumage white except long scapulars, greater wing-coverts, primary-coverts, primaries and secondaries which are jet-black, extreme base of outer webs of primaries tinged grey, outer webs of secondaries especially outer feathers and when fresh washed considerable amount of grey. Feathers of head and neck narrow and those of upper-breast very long and narrow. This plumage is acquired by complete moult, but insufficient material is available to determine period; birds examined in moult dated July, Sept., Jan. and Feb.

Nestling.—Down at first, short, white and sparse. When bird is about a week old this is replaced by longer white down, which also grows closely all over body where first down was absent.

Juvenile.—Like adult but long scapulars and greater wing-coverts tinged brown especially at tips; inner median wing-coverts

brown-black as greater ; two or three short scapulars with brown-black to grey centres.

First winter.—Like juvenile but moult sometimes commences Dec., period uncertain owing to want of material, but moult is complete and sometimes does not begin before May. After this moult bird appears to become like adult.

Measurements and structure.—♂ wing 53-63 cm. (measured with tape, see vol. 1, p. *XIII), tail 215-240 mm., tarsus 195-240, bill from feathers 150-190 (9 measured). ♀ wing 53-59 cm., bill 140-170 mm. Primaries : 4th longest, 3rd and 5th usually as long but sometimes 5-10 mm. shorter, 2nd occasionally as long, usually 10-30 shorter, 1st 50-90 shorter, 6th 15-60 shorter, 7th 95-135 shorter ; 2nd to 6th emarginated on outer webs near base. Tail slightly rounded, nearly square, 12 feathers, tips rounded. Bill straight gradually tapering to point. Nostrils small and slit-like. Skin between lower mandibles and on sides of chin bare. No rictal or nasal bristles. Toes webbed at base and "soles" fleshy and spreading. Claws convex, rounded, nail-like.

Soft parts.—Bill, legs and feet red ; bare skin between lower mandibles black but on each side of chin and round eyes red ; iris brown. Juvenile : Bill brownish-red with blackish tip ; round eye dusky ; legs and feet brownish-red. Nestling (one week old) : bill black-horn, tip brown ; bare skin on chin black ; feet whitish-flesh, tarsus same marked blackish ; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*C. c. asiatica* (Turkestan) is stated to have a larger red bill ; *C. c. boyciana* (Ussuri, Japan) has a much deeper and larger black bill and considerably more grey on outer webs of secondaries. Large size, with black only on wings and scapulars, long red legs and bill distinguish Stork from other British birds.

FIELD-CHARACTERS.—White plumage with black wing-feathers and scapulars, long neck and long red bill and legs, make it easy of identification. Flight heavy and flapping with legs and neck outstretched, also soars with rigid wings. Haunts marshy and open country. On migration flies in large flocks. In breeding season frequently clattering with their bills, sometimes in flight, but especially on arrival at nest when they throw back their heads along their backs and clatter the bill very rapidly producing loud "cup-cup-cup-cup. . ." Apparently they have no vocal note except a hiss. (H.F.W.)

BREEDING-HABITS.—Where protected will breed generally in towns and villages, but also nests in trees at distance from houses. *Nest*.—Bulky, resorted to year after year, sometimes alone, at other times several close together on roofs of huts, houses, chimneys, towers, ruins, barns, wheels or baskets on poles erected for purpose ; built of sticks solidified with clumps of grass and earth, lined grass, etc. *Eggs*.—Usually 4, but occasionally 3 or 5, very rarely 6-7, creamy-

white, with rather glossy surface and deeply pitted. Average of 103 eggs, 73.2×51.8 . Max. : 81.5×46.5 and 71.7×55.7 . Min. : 65.6×49.6 and 81.5×46.5 . *Breeding-season*.—In Mediterranean region, from end March and early April, but in central Europe about end April or early May. *Incubation*.—By both sexes, but far greater part by hen (Rohweder) ; period probably averages 30 days, but 28 to 38 days on record. Single brooded, but has attempted to breed in autumn.

FOOD.—Frogs and tadpoles in great numbers, also newts, lizards, blindworms, snakes, fish of various kinds, worms and leeches ; also insects chiefly coleoptera (especially water-beetles and cock-chafers), orthoptera (mole-crickets, locusts, grasshoppers, etc.), odonata, etc. Mollusca are occasionally taken, also young of many species of birds which breed on ground, and at times small mammals, such as mice or moles, young rabbits or very small hares. In Africa, on migration, locusts largely eaten.

DISTRIBUTION.—*British Isles*.—Vagrant. Over thirty East Anglia and several others in various parts of southern half of England, but very rarely in west, a few Scotland, and three or four Ireland. Most in spring.

DISTRIBUTION.—*Abroad*.—Europe from Sweden to Spain (but absent from France except in north-east) and north-west Africa (Marocco, Algeria, Tunisia) and west Africa (Gold Coast, according to Boyd Alexander), Asia Minor and Palestine, west and central Asia. Migrating southwards in winter to central and south Africa (said to have bred, but confirmation necessary), and in India to Ceylon (said to have bred, but confirmation required). Casual Madeira and occasional Canaries. Replaced by allied race in east Asia.

CICONIA NIGRA

271. *Ciconia nigra* (L.)—THE BLACK STORK.

ARDEA NIGRA Linnaeus, Syst. Nat., ed. x, i, p. 142 (1758—North Europe).

Ciconia nigra (Linnaeus), Yarrell, iv, p. 225 ; Saunders, p. 389.

DESCRIPTION.—*Adult male and female*. *Winter and summer*.—Upper-breast, belly, under tail-coverts and axillaries white ; rest of plumage black, glossed on sides of head and base of neck red-purple, on top of head, rest of neck, mantle and lesser wing-coverts purple and green, rest of upper-parts same but gloss less rich ; upper tail-coverts and tail more brownish-black ; feathers of neck and lower-throat longish but not so narrow as in White Stork. This plumage is acquired by complete moult in May and June and one example moulting body Nov., but material insufficient to determine extent of period.

Nestling.—(Not examined.)

Juvenile.—As adult but head, neck, throat and upper-breast

brown, tips of feathers pale buffish-brown; upper-parts, wing-coverts and secondaries brown-black with much less green and purple gloss than in adult and wing-coverts, scapulars and upper tail-coverts with slight pale tips.

First winter and summer.—Becomes like adult apparently after first moult, but material is insufficient to say exactly when this takes place but apparently between Feb. and Sept. in year following hatching.

Measurements and structure.—♂ and ♀ wing 52-60 cm. (measured with tape), tail 190-240 mm., tarsus 180-200, bill from feathers 160-190 (9 measured, material insufficient for separate measurements of sexes). Primaries: 3rd, 4th and 5th longest, 1st 60-85 mm. shorter, 2nd 10-20 shorter, 6th 20-50 shorter, 7th 80-130 shorter; 2nd to 6th emarginated at base on outer webs. Rest of structure as in White Stork.

Soft parts.—Bill, bare skin on lores and round eye bright dark crimson, paler at tip of bill; legs and feet bright scarlet; iris brown.

CHARACTERS.—No subspecies. Glossy "black" head, throat, neck and upper-parts and tail distinguish it from White Stork.

BREEDING-HABITS.—Much more retiring in habits than White Stork, generally breeds in forests, but also recorded as nesting in cave in steep river-bank, and on face of cliff. Never in colonies, but always singly. *Nest.*—Old nest of previous year or an alternative site. Built of sticks, earth and grass, flattened in shape, and in my experience lined with big lumps of soft green moss, though other observers have recorded grass, dung, hair, feathers, etc., in lining. *Eggs.*—Normally 4, but 3 and 5 also met with; white, often somewhat rounded in shape and looking deep greenish when held against light instead of yellowish as in White Stork. Average of 84 eggs, 65.3×48.7 . Max.: 74.3×47.5 and 69.4×51.7 . Min.: 61×48 and 60.3×45.2 mm. *Breeding-season.*—Usually in last fortnight of April or first week of May. *Incubation.*—Probably male takes some part, though Naumann says by female alone and gives period as about 28 days. More evidence desirable. Single brooded.

Food.—Chiefly fish, including perch, rudd, roach, loach, small eels and stickleback, and frogs and tadpoles. Also less frequently crabs, lizards, snakes, worms, leeches, insects and their larvæ, including coleoptera, orthoptera, odonata, etc. Occasionally also according to Naumann, small mammals (shrews, mice and moles) and young birds from nests on ground.

DISTRIBUTION.—*England.*—Very rare vagrant. Nineteen recorded; Scilly Isles (2), Devon (1 and others seen), Somerset (1), Dorset (2), Kent (4), Middlesex (1), Oxon. (1), Essex (1), Suffolk (1), Norfolk (2), Yorks. (2), Durham (1).

DISTRIBUTION.—*Abroad.*—Breeds in Germany, Austria, Hungary, south Sweden, Denmark, east Europe, Russia and temperate Asia.

Probably also Spain. Reported to have bred South Africa (but probably error). Winters in Africa, India and China. Casual Madeira and Japan.

FAMILY PLEGADIDÆ.*

The Ibises and Spoonbills. Sternum behind with four incisions. No patches of powder-down. Bill long and thin, sickle-shaped, or flat, at tip spoon-like. Claws pointed. Schizorhine. Over 30 forms in hot and temperate regions of both hemispheres.

Genus PLATALEA L.

PLATALEA Linnæus, Syst. Nat., ed. x, i, p. 139 (1758—Type by subsequent designation, of Gray 1840, *Platalea leucorodia*).

At once recognizable by thin, flattened bill, which at tip is dilated in form of a spoon. Nostrils oblong, near together. Chin, lores, orbits, part of fore-head bare. Tibia half bare. Second primary longest, third little shorter. Four species in south Europe, Africa, Asia to Australia.

PLATALEA LEUCORODIA

272. *Platalea leucorodia leucorodia* L.—THE SPOONBILL.

PLATALEA LEUCORODIA Linnæus, Syst. Nat., ed. x, i, p. 139 (1758—Europa. Restricted typical locality: S. Sweden).

Platalea leucorodia Linnæus, Yarrell, iv, p. 237; Saunders, p. 393.

DESCRIPTION.—*Adult male and female.* *Summer.*—Whole plumage white except round base of neck where feathers are yellowish-buff or tipped yellowish-buff, patch of these feathers varying in extent and intensity of colour; at back of crown crest of long, narrow, pointed feathers with their webs decurved and rami detached with very short radii on basal part of feathers, white tinged yellowish-buff (length of crest-feathers 100-120 mm. slightly longer in ♂ than ♀). This plumage is acquired by complete moult Jan.-March. *Winter.*—Another complete moult appears to take place in late summer or early autumn, but very few moulting autumn birds are available for examination. Plumage as summer but no long crest-feathers and feathers at base of neck white.

Nestling.—At first covered rather sparsely with silky-tipped down dull white. Later when feathers begin to sprout they push out this down and about same time a very short and more compact creamy-white down grows very thickly all over body, and this may be under-down of feathered stage. Chin, centre of throat and round eyes bare at all stages as in adult.

Juvenile.—Like adult winter but primaries and primary-

* Objection has been raised to the name *Ibididæ*, because the genus *Ibis* does not now occur in this family. Therefore the family may be called *Plegadidæ*.—E.H.

coverts with brownish-black shafts and tips, varying in amount but most marked on outer primaries, secondaries with black shafts; most body-feathers and wing-coverts with basal half of shafts black, but tips usually white.

First summer.—The juvenile plumage commences to moult Jan. but is often not finished by May, moult is complete and new plumage is like juvenile but with less black at tips of outer primaries and primary-coverts and secondaries and rest of plumage with no black on shafts.

Second summer.—Insufficient material is available to trace sequences exactly but some birds with crests and otherwise as adults have distal part of shafts of primaries brown and tips of outer primaries with brown-black marks and these appear to be birds two years old.

Measurements and structure.—♂ wing 375–395 mm., tail 110–120, tarsus 140–150, bill from feathers 205–230 (5 measured). ♀ wing 350–370, bill 175–190 (8 measured). Primaries: 2nd longest, 3rd as long or 5 mm. shorter, 1st 10–15 shorter, 4th 8–10 shorter, 5th 30–40 shorter, 6th 60–70 shorter; 2nd to 4th emarginated outer and 1st to 3rd inner webs. Tail square, 12 feathers, tips rounded. Under tail-coverts about three-fourths as long as tail-feathers. Bill very long, nearly straight, very thin and flat, nearly as broad as head at base, gradually narrowing towards middle and broadening to a flat, spoon-like shape at tip, extreme tip of upper mandible decurved, along each side of upper mandible a narrow groove and another down centre of lower mandible, angle of which is very long and narrow. Surface of upper mandible especially at base and sides and of under mandible corrugated in adult but much smoother in young. Nostrils narrow, elliptical, on each side of centre line of bill. Skin of loreal region, round eyes, chin and down centre of throat narrowing to a V-shape, bare. Lower half of tibia bare. 2nd, 3rd and 4th toes connected at base with webs, claws short and stout.

Soft parts.—Bill black, tip yellow; bare skin on fore-part of lores black, but rest and round eyes, chin and throat yellow; legs and feet black; iris red.

The Spoonbill (*Platalea l. leucorodia*.) Bill of adult from above.

CHARACTERS AND ALLIED FORMS.—*P. l. major* (Egypt, Syria eastwards) is larger. Shape of bill and bare skin extending down centre of throat distinguish species.

FIELD-CHARACTERS.—Large size, white colouring, with black spatulate beak and black feet distinguish this species readily. In flight head is not retracted as in Great White Heron. Usually seen flying in file in small parties. At close quarters crested feathers of crown and orange-tawny patch on crop of adult visible. Flight slow and regular. No call except a low grunting note, only audible at very close quarters. (F.C.R.J.)

BREEDING-HABITS.—Sociable, nesting in colonies in dense reed-beds, or at times on bare islets and on tamarisk bushes in marshy ground. *Nest*.—Often quite close together, large, roughly built of dead reed-stalks, drifted vegetation from shore and in some cases dead tamarisk branches and sticks. Some nests are built up quite 2 ft. above water-level. *Eggs*.—Usually 4, sometimes 3 only, or occasionally 5 and even 6, dull white, rather scantily spotted with a few smears or blotches of rusty-brown. Average of 88 eggs, 67×45.4 . Max.: 74.6×44.9 and 64.5×49.2 . Min.: 58.2×47 and 67.5×41 mm. *Breeding-season*.—Eggs laid towards end April or early in May. *Incubation*.—Little definite on record, but I believe both sexes take part. Single-brooded.

FOOD.—Apparently largely vegetable matter, probably marsh-grasses and water-weeds, but also small fish, mollusca, small frogs, newts, leeches, worms and insects and their larvæ, coleoptera, especially water-beetles, odonata, neuroptera, trichoptera, etc. Saunders also records crustacea.

DISTRIBUTION.—*British Isles*.—Passage-migrant in Norfolk and Kent, vagrant elsewhere. A few visit Norfolk annually April to June (once March 31) and Aug. to Oct. (occasionally July and once Nov. 21), and Kent every spring. To south coast England (especially Hants and Devon where almost annual) and to Pembroke and Cardigan (Dovey) fairly frequent vagrant, usually in autumn, but also at other times. Inland on west coast (except where mentioned), and north of Yorks. (where recorded about nine times) very rare. Stragglers as far as Inner and Outer Hebrides, Orkneys and Shetlands. In Ireland some thirty-seven recorded from maritime counties, chiefly in south. Formerly bred East Anglia, Sussex, Middlesex, Pembroke, and elsewhere.

DISTRIBUTION.—*Abroad*.—Very seldom visiting Scandinavia and north Russia, but south of 56° north lat. breeding locally in suitable localities (still nesting in Holland, but apparently no longer in France), south in Spain, Hungary, Dalmatia, basin of Lower Danube and south Russia; apparently also resident in parts of north and east Africa, west and central Asia and India; casual in Atlantic Isles. In winter in tropical Africa and India. Represented by allied form in Asia, westwards to Syria and Egypt.

Genus PLEGADIS Kaup.*

PLEGADIS Kaup, Skizz. Entw. Gesch. und Natürl. Syst. Eur. Thierw., p. 82 (1829—Monotype: *P. falcinellus*).

Feathers of head and neck in adult narrow. Bill long, sickle-shaped, nostrils like slits. Tibia half bare. Tarsus in front with large scutes, behind reticulated. Old World, America.

PLEGADIS FALCINELLUS

273. *Plegadis falcinellus falcinellus* (L.)—THE GLOSSY IBIS.

TANTALUS FALCINELLUS Linnæus, Syst. Nat., ed. xii, i, p. 241 (1766—"Habitat in Austria, Italia.").

Plegadis falcinellus (Linnæus), Yarrell, iv, p. 231; Saunders, p. 391.

Egatheus falcinellus falcinellus (L.) Hand-List, p. 122 (1912).

DESCRIPTION.—*Adult male and female. Winter.*—Whole head, neck and throat brown-black, each feather narrowly edged white, giving streaked appearance, especially on chin and cheeks where there is more white (feathers of head and neck rather narrow with rounded tips); mantle, scapulars, back, tail, wing-coverts and inner secondaries very dark glossy purple and green; primaries, primary-coverts, axillaries and under wing-coverts glossed purer

The Glossy Ibis (*Plegadis f. falcinellus*) adult winter.

green; outer secondaries more bronze-green; lesser wing-coverts dark brown-red, feathers more or less tipped glossy green and purple and some wholly so; under-parts brown-black sometimes with slight purplish gloss and usually with some brown-red; under tail-coverts blacker and more glossed blue and purple; tibia sometimes inclined to be rufous. This plumage is acquired by complete moult June to Nov. *Summer.*—A moult, in some cases certainly complete and probably usually so, takes place Jan. to May. New plumage—crown glossed red-purple, more greenish on fore-part; chin and cheeks blackish, slightly glossed purple; neck, upper-mantle, shorter scapulars, and basal portions of some longer ones,

* For explanation of use of *Plegadis* in place of *Egatheus*, see *Auk*, 1913, pp. 92-5 and *Brit. B.*, ix, p. 6.

lesser wing-coverts, throat and under-parts rich, deep brown-red ; (feathers of head, neck and throat longer, narrower and more pointed than in winter) ; rest of upper-parts and wing-coverts, wings, tail and axillaries, under wing-coverts and under tail-coverts as winter but purple and green gloss more brilliant.

Nestling.—Down dull black, usually with white patch on back of crown and some white bands on throat. Down of very loose structure, not very long and covering bird very sparsely. Bill with three dark bands—at base, in middle and at tip—loral region bare as in adult.

Juvenile.—Much like adult winter but head and neck browner and with white streaking less distinct and sometimes confined to head, throat occasionally with some white bands as usually in nestling ; upper-parts and wing-coverts considerably duller than in adult and much more green and bronze-green with little purple ; under-parts browner, not so blackish, and with little or no gloss and no brown-red ; under tail-coverts blacker, with a little green gloss ; all wing-coverts glossed green.

First winter.—The juvenile body-plumage, but apparently not wings and tail, is moulted Aug.-Sept., and bird then becomes much more like adult winter, except that there is no brown-red on under-parts and wing-coverts are as in juvenile.

First summer.—A complete moult takes place in spring as in adult, after which bird appears to resemble adult.

Measurements and structure.—♂ wing 270–295 mm., tail 95–105, tarsus 85–110, bill from feathers 115–142 (12 measured). ♀ wing 250–275, bill 100–135. Primaries : 2nd longest, 3rd usually as long, sometimes 5 mm. shorter, 1st occasionally as long, usually 3–10 shorter, 4th 10–20 shorter, 5th 25–35 shorter, 6th 45–55 shorter, 7th 60–85 shorter ; 2nd to 4th emarginated on outer and 1st and 2nd on inner webs. Tail square, 12 feathers, tips slightly rounded. Bill slender, decurved, much compressed, tip rather flattened and rounded, upper mandible ridged and lower grooved. Nostrils very small and slit-like. Skin of loral region and just above and below eye bare as well as that between lower mandible. No rictal or nasal bristles. About half tibia bare. Toes long and slender, “soles” fleshy and spreading, 3rd and 4th webbed at base. Claws long, blunt and fairly straight, that of middle toe somewhat flattened with two or three pectinations on its inner edge.

Soft parts.—Bill dark grey-brown ; legs and feet paler brown ; iris dark brown ; loral skin purplish-black.

CHARACTERS AND ALLIED FORMS.—*P. f. peregrinus* (Java, Australia) is slightly smaller. Long, curved bill, bare lores and tibia, and rich dark coloration are distinctive.

FIELD-CHARACTERS.—Curved bill gives appearance of Curlew and combined with dark colouring, which looks almost black at a distance, make bird readily recognizable. Sociable in habits, generally

met with in parties feeding in marshes and breeding in colonies with other species. Flies in compact flocks. (F.C.R.J.)

BREEDING-HABITS.—Usually nests in colonies together with other marsh-breeding birds. *Nest.*—Built low down among salallows and reeds or on tamarisk bushes, of sticks and twigs or reeds. *Eggs.*—3-4 as a rule, occasionally 5 and rarely 6, very deep blue in colour. Average size of 75 eggs, 52.1×36.9 . Max. : 57.8×38 and 57.5×43 . Min. : 47×34 and 50×33.5 mm. *Breeding-season.*—Usually about 2nd week May onward. *Incubation.*—Period given as 21-22 days. Probably single-brooded.

FOOD.—Mainly fresh water mollusca (*Planorbis*, *Ampullaria*, *Limnæa*), also *Mytilus*, etc.; insects and their larvæ (especially coleoptera, larvæ of diptera, orthoptera, neuroptera and odonata). Also apparently small amphibia and their larval forms, worms and probably small fish. Small crustacea (shrimps) also taken and some vegetable matter.

DISTRIBUTION.—*British Isles.*—Autumn-visitor, very rare in spring. Occurs almost every autumn (Aug.-Nov.) somewhere, but most frequently on south, south-west or east (as far north as Yorks.) coasts of England, often in small parties. Very rare inland and north of Cardigan Bay on west side and north of Yorks. on east side. In *Scotland* some twenty-five recorded besides flock of about twenty Orkneys, Sept. 1907. In *Ireland* over forty recorded in autumn and more than half from south maritime counties.

DISTRIBUTION.—*Abroad.*—Occasional visitor to Iceland, Færoes, Scandinavia, Denmark, and Baltic provinces, but nesting in valley of Danube, in south Russia, and in west Europe only in the Camargue, Andalusia, formerly Sicily, east to central Asia and India, in Africa and the south-eastern United States of America. Northern birds are migratory, wintering in tropical and southern Africa, and tropical Asia. Casual Madeira. Replaced by a closely-allied form in America from south Oregon, Arizona, Texas, and Florida to Chile and Patagonia.

FAMILY ARDEIDÆ.

The Herons. Sternum with two incisions. Holorhine. Bill straight (sometimes slightly curved), with more or less distinct "tooth" before tip, tip of upper mandible frequently serrated. Lores bare. Nostrils narrow and longitudinal. Tarsus in front with large scutes, very rarely reticulated. Short web between outer and middle toes. Middle claw on inside more or less obviously pectinated. Neck about the middle with "kink," caused by unequal length of vertebræ, especially great length of 6th vertebra; neck in flight, frequently also when sitting, S-shaped. On sides of rump and on breast patches of powder-down, which produce a greasy powder. Body small, appearing much larger through great amount of soft feathers. About 100 species in all countries.

Key to genera of Family ARDEIDÆ.

1	{ Rectrices 12	3	
	{ Rectrices 10	2	
2	{ Much smaller, wing under 200 mm.		<i>Ixobrychus</i> , p. 215
	{ Much larger, wing over 200 mm.		<i>Botaurus</i> , p. 218
3	{ Plumage entirely or largely white, tail white	4	
	{ Plumage not entirely or largely white, tail not white	5	
4	{ Bill longer, over 75, tarsus over 85 mm.		<i>Egretta</i> , p. 204
	{ Bill shorter, under 75, tarsus under 85 mm.		<i>Ardeola</i> , p. 208
5	{ Front of tarsus with transverse scutes		<i>Ardea</i> , p. 198
	{ Front of tarsus reticulated		<i>Nycticorax</i> , p. 212

Genus ARDEA L.

ARDEA Linnæus, Syst. Nat., ed. x, i, p. 141 (1758—Type by subsequent designation, Gray, 1840, *A. cinerea*).

Large Herons of different colours, but never entirely white. Bill strong, straightly pointed. Occiput with a few long narrow feathers or a crest without latter. Scapulars elongated, but not forming a long train of filamentous ornamental plumes, not reaching tip of wing. 11 species in all parts of world.

ARDEA CINEREA

274. *Ardea cinerea cinerea* L.—THE COMMON HERON.

ARDEA CINEREA Linnæus, Syst. Nat., ed. x, i, p. 143 (1758—Europe. Restricted typical locality: Sweden).

Ardea cinerea Linnæus, Yarell, iv, p. 162; Saunders, p. 367.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Fore-head and centre of crown white, sides and back of crown glossy black (feathers, forming a crest, down middle of crown, long, lanceolate, with long, loose rami, two black feathers at back of crown very long (varying 80–210 mm. when fully grown, in ♀ usually shorter than in ♂), narrow and of closer structure than rest); back and sides of neck pale buffish-grey, often with mauvish tinge; upper-parts blue-grey, feathers of lower-mantle and especially upper scapulars with much elongated ashy tips (basal portion of these feathers normal, but distal portions with very long rami separated or united in groups of two or three, and those on distal part of shaft lying parallel and closely united to it, forming much elongated, pointed, lanceolate tip, lower scapulars normal, obtusely pointed feathers); cheeks and chin white; feathers forming more or less spotted line down middle of throat with distal halves of inner webs black and outer webs white; feathers of lower-throat and upper-breast pale buffish-grey, with some short, broad, black streaks and tips white (these feathers in structure as upper scapulars but with still more elongated, lanceolate tips); sides of breast and belly glossy-black, centre white, with some feathers with one web black and other white; under tail-coverts white; flanks, axillaries and under wing-coverts blue-grey, along side of wing from carpal joint to base of primaries white; tibia white, tinged buff; tail

blue-grey; wing-feathers, bastard-wing and primary-coverts glossy blue-black with blue-grey "bloom" on outer webs (underside of wings dark blue-grey); innermost secondaries blue-grey; wing-coverts blue-grey, paler and more ashy on outer feathers, uppermost line of lesser coverts slightly speckled white and blackish. This plumage is acquired by complete moult July to Nov. I have not found European adults moulting remiges and rectrices after Nov., but many show considerable moult of body-feathers Dec. and Jan., and especially crest-feathers Feb. to April. This seems to indicate a second partial spring moult, but from specimens examined there is no definite proof, though longest crest-feathers are usually absent in winter or have just started to grow and often not yet fully grown April.

Nestling.—Down of whole crown dark brownish-grey at base with very long white bristle-like tips without rami, giving very conspicuous crested appearance, down of rest of upper-parts normal but long, dark greyish-brown in middle and pale grey on sides, of under-parts dull white. Lores, round eyes, chin and throat and back of neck bare, and down rather sparse on sides of back and centre of belly, otherwise covering bird very well. This down is all replaced by feathers of juvenile, and at the same time down grows in "powder" down patches.

Common Heron (*Ardea c. cinerea*). Head of nestling in down.

Juvenile.—Fore-head and sides of crown dark grey, back of crown dull black (feathers of crest elongated and narrow but not nearly so long or pointed as in adults and without the two very long feathers); sides and back of neck brownish-grey; upper-parts brownish-grey (feathers of normal structure, not as in adult); chin white and feathers down middle of throat part white and part black as in adult, but black tinged brown; feathers of lower-throat and upper-breast and down centre of breast white with broad brown-black stripe on inner webs (glossy-black sides of adult wanting, and feathers of lower-throat slightly long and of loose structure, but not with greatly elongated narrow tips as in adult); flanks, and under wing-coverts and tail-feathers brownish-grey; under tail-coverts not so pure white as in adult; wing-feathers like adult but with less "bloom"; some blackish spots on white at carpal joint and a buff tinge on uppermost lesser coverts, otherwise wing-coverts brownish-grey, brownish tinge being especially marked on tips of feathers, and greater and median coverts often with whitish tips.

First winter and summer.—Much like juvenile but fore-head and sides of crown, neck, upper-parts and flanks more blue-grey, not so brownish; chin and cheeks purer white; crest-feathers longer and more pointed than in juvenile; black down middle of throat, not brownish; belly whiter, sides of breast and belly as juvenile not black as in adult (feathers of mantle and upper scapulars not elongated at tip as in adult, but with rami separated and slightly elongated). The juvenile body-plumage is moulted Sept.-Dec. (sometimes not until Feb.), but not wings, tail or wing-coverts.

Second winter and summer.—Much like adult, but fore-head grey with some very pale grey or whitish feathers, fewer feathers of scapulars and mantle with elongated ashy tips than in adult. This plumage is acquired by complete moult which appears to commence sometimes in May (earlier than in adult), but usually not until June or July. At next moult (i.e. when bird is 2 years old) it appears to become as adult.

Measurements and structure.—♂ wing 430-470 mm., tail 155-175, tarsus 135-165, bill from feathers 100-125 (12 measured). ♀ wing 425-460, bill 100-125. Primaries: 2nd, 3rd and 4th longest, but 2nd often 5 mm. shorter, 1st 5-20 shorter, 5th 10-25 shorter, 6th 40-55 shorter, 7th 65-85 shorter; 2nd to 4th (5th slightly) emarginated outer webs, and 1st and 2nd (3rd slightly) inner webs. Tail square, 12 feathers, tips rounded, under tail-coverts nearly as long as tail-feathers. Bill strong, straight, compressed, pointed, upper mandible ridged, towards tip cutting edges slightly serrated and at tip a small notch. Nostrils long and slit-like. Skin of loreal region and just above and below eye bare. Basal half of back of neck bare of feathers, but hidden by feathers of sides of neck. No rictal or nasal bristles. About one-third of tibia bare. Toes long and slender, "soles" fleshy and spreading, 3rd and 4th webbed at base. Claws fairly strong, sharp and curved, that of middle toe flattened and pectinated on its inner side. On middle breast and belly large patch and each side of lower-back near insertion of legs small patch of "powder" down, white shortish down, with very fine and closely set barbs, much matted together and lying close to skin, very friable and greasy to the touch.

The Common Heron. Middle toe and claw of adult to show pectinations.

Soft parts.—Bill, upper mandible brown (blackish-horn in juv.) lower yellow to yellowish-brown; lores yellowish, round eyes greenish; legs and feet dull brown; iris yellow.

CHARACTERS AND ALLIED FORMS.—*A. c. jouyi* (east Siberia, Japan, China) adult is usually white on neck and paler (often whitish) on wing-coverts. Large size and grey colour distinguish Common from other British Herons.

FIELD-CHARACTERS.—Gregarious in nesting-season and more or

less sociable at all times, its haunts are restricted only by nature of its food ; is equally at home on broad waters of tidal estuary, low-land river or mountain tarn. Size and coloration—pale grey with white cheeks and fore-neck and black primaries—are as conspicuous as is its gaunt figure, whether bird is wading in shallow water with deliberate paces and neck outstretched or standing erect and motionless, the neck sunk between the shoulders, on dead branch of tree, edge of pool, sandbank, or pile of rocks near tide-line. Equally unmistakable on wing : flight achieved by laboured beats of large rounded wings, head drawn back between shoulders and long legs trailing behind. Call, a loud, harsh “frank ;” hunger-cry of nestlings a chattering “tehuk, tehuk, tehuk,” like Black-bird’s alarm-note.

BREEDING-HABITS.—Nests generally in colonies, in British Isles usually in trees, but exceptionally on ground or among reeds, and more frequently on low bushes or on face of cliffs. *Nest.*—Bulky and flat, built of large sticks and branches and lined with twigs when in tree, but in reed-beds of dead reeds. Dead grass also found at times in lining. *Eggs.*—Usually 4 to 5, but instances of 6 and even 7 on record, dull light blue-green, frequently splashed with whitewash and sometimes stained with blood. Average size of 101 eggs, 60.2×43 . Max. : 68.4×43.7 and 61.5×49.7 . Min. : 55.4×42.2 and 59.6×40 mm. *Breeding-season.*—Begins February, but many birds do not lay till March. *Incubation.*—By both sexes, but chiefly by hen ; period usually 26 days, but ranging from 25–28 days. From very late breeding records it seems probably sometimes double-brooded.

FOOD.—Very varied ; mainly fish, but often small mammals and amphibia. Mammalia include water-vole (many), brown rat, field-mice, shrew, water-shrew, mole, and once bat ! Birds : Blackbird, Waterhen, young Coot, Water-Rail, Dunlin, Snipe, young Terns, Ducklings and once Swallow. Also frogs (many) and spawn and newts. Fish of many species (trout, eel, perch, pike (up to 18 in.), dace, roach, stone loach, miller’s-thumb, sticklebacks, lamperns, etc.). Also mollusca (fresh-water mussels, whelks and snails). Insects : coleoptera (*Dytiscus*, *Geotrupes*, *Aphodius*, *Coccinella*, *Sitones*, *Agabus*, etc.), diptera (*Chironomus*, *Ceratopogon*, *Empis*, *Bibionidae*, etc.), neuroptera (*Phryganeidae* and larvæ, *Sericostoma*, *Limnophilus*, *Corixa*, etc.), hymenoptera (*Ichneumon*, *Allantus*, *Formica*, etc.). Crustacea include crabs, prawns, shrimps. Also earthworms and some vegetable matter recorded.

DISTRIBUTION.—*British Isles.*—Resident. Generally distributed, breeding north to Orkneys (not Shetlands) and a few Outer Hebrides.

MIGRATIONS.—*British Isles.*—Residents to some extent vagrant, autumn to spring, visiting all coasts and outlying islands, so evidence of true migration difficult to obtain. Double passage, northern and western Isles of Scotland, latter half March to end

April and mid-July to end October. Irish records suggest continuation of these movements by E. coast Ireland. Very few records of immigration E. coast and emigration S. coast England, September.

DISTRIBUTION.—*Abroad.*—Greater part of Europe and Asia south of 60° north lat. (occasional straggler to Greenland, Iceland and Færoes), also parts of tropical India, Africa, south to Cape and Orange River Colonies. In cold climates migratory. Casual Madeira and Ascension. Replaced by allied forms in east Asia and in Madagascar.

ARDEA PURPUREA

275. *Ardea purpurea purpurea* L.—THE PURPLE HERON.

ARDEA PURPUREA Linnæus, Syst. Nat., ed. xii, i, p. 236 (1766—"Habitat in Oriente").

Ardea purpurea Linnæus, Yarrell, iv, p. 172; Saunders, p. 369.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Fore-head, crown and line down back of neck glossy-black (feathers of crest as in Common Heron but shorter—longest 140 mm.); sides of head and neck chestnut-buff, with narrow, somewhat broken, lines of black (formed by feathers partially black and buff) from gape to back of nape and down each side of neck for whole length; mantle dark oily-brown, but sometimes paler and greyer, feathers of lower mantle with elongated and greyer or pale grey tips with grouped rami as in Common Heron; upper scapulars same structure but larger and tips mostly pinkish-chestnut; lower scapulars normal and colour as mantle; back, rump and upper tail-coverts as mantle but usually rather greyer; chin and cheeks white; centre of throat rather paler than sides of neck, lower half with feathers half black and half buff; feathers of lower-throat and upper-breast with grey bases and rest buffish-white with black edgings and some chestnut giving somewhat variegated appearance to these elongated, pointed feathers; breast deep chestnut with some partially black feathers, belly with more black; under tail-coverts black with white bases; tibia chestnut-buff; flanks and axillaries brownish-grey; lowest series of under wing-coverts same but rest chestnut; tail-feathers as rump; primaries and primary-coverts black with more or less grey tinge, secondaries greyer; greater coverts with outer webs brownish-grey and inner webs darker; median and lesser coverts brownish-grey usually with chestnut tinge on edges of feathers, uppermost series of lesser coverts edged chestnut, and feathers at point of wing entirely chestnut. This plumage is acquired by complete moult June to Nov. (occasionally later, one Feb.). A spring moult confined to body-feathers appears to take place in April, but only two of a number of March and April birds examined were in moult.

Nestling.—Down of whole crown dark brown at base with long, white bristle-like tips without rami, giving conspicuous crested appearance as in Common Heron but down shorter and less plentiful,

rest of down normal but long, that of upper-parts blackish-brown, of under-parts white. Sides of head, round eyes, chin, throat and whole of neck nearly to base bare as also is centre of breast and belly, sides of back and middle of mantle—down much sparser than in Common Heron and darker on upper-parts.

Juvenile.—Fore-head and fore-part of crown black, rest of crown and back of neck pale chestnut (feathers of crest elongated and narrow but not nearly so long or pointed as in adult and no very long feathers); whole mantle and all scapulars and wing-coverts dark brown broadly edged and tipped rufous-buff; back, rump and upper tail-coverts uniform dark grey-brown; cheeks, chin and middle of upper-throat white; rest of throat with feathers half brown-black and half buff; feathers of breast same but dark portions browner; belly, tibia and under tail-coverts pale buff with few brown markings; flanks and axillaries dark grey-brown; under wing-coverts brown-grey, broadly tipped buff to rufous-buff; tail, primary-coverts and primaries brown-black, secondaries same but innermost edged rufous as wing-coverts.

First winter and summer.—Much like juvenile but feathers of crest rather longer and more pointed and darker chestnut; feathers of mantle and especially upper scapulars with rufous tips elongated and separated but not nearly so much as in adult; feathers of upper-breast rather longer and more pointed than in juvenile. The juvenibody-plumage, varying number of wing-coverts and innermost secondaries are moulted Nov.—April but not wing- or tail-feathers.

Second winter and summer.—Much like adult but some chestnut feathers mixed with black on back of neck; crest feathers shorter; elongated feathers of mantle more rufous-buff and less pinkish; elongated feathers of upper-breast not so finely pointed; breast and belly not quite so dark; lesser and median wing-coverts broadly edged rufous. This plumage is acquired by complete moult commencing sometimes May, but often not complete until Nov.

Measurements and structure.—♂ wing 330–380 mm., tail 105–132, tarsus 115–130, bill from feathers 115–135 (12 measured). ♀ wing 290–355, bill 105–125. Primaries: 2nd, 3rd and 4th longest but 4th often 5 mm. shorter, 1st usually 5–10 shorter, occasionally as long, 5th 5–25 shorter, 6th 25–40 shorter, 7th 45–60 shorter; 2nd–4th emarginated outer and 1st–3rd inner webs. Rest of structure as Common Heron.

Soft parts.—Bill brownish-yellow, yellower on lower mandible and tip and shading to greenish at base and lores; legs and feet dark brown in front, yellowish behind and on bare part of tibia (juv. greener); iris pale yellow.

CHARACTERS AND ALLIED FORMS.—*A. p. manillensis* (India, China) has elongated feathers of mantle and scapulars paler grey and of upper-breast whiter. Smaller size, rufous-buff neck, darker upper-parts and chestnut under-parts distinguish adult from Common Heron and rufous neck and edgings to feathers juvenile.

FIELD-CHARACTERS.—In general appearance much like Common Heron but slighter and smaller and at a little distance decidedly darker, distinctive coloration being observable on nearer view. Much more secretive than Common Heron and frequenting usually reed-grown or thickly grown marshes or shallow lakes. Note seldom uttered, much like Common Heron's but less loud. (H.F.W.)

BREEDING-HABITS.—Breeds in reed-beds, cane-brakes, willow-swamps and marshes, usually in colonies of varying size. *Nest.*—Usually built of dead reed-stems, carelessly arranged and standing two or three feet out of the water, occasionally when resting on willows or salallows (once on tamarisk bushes) rather higher, sometimes even 10 or 12 feet up. *Eggs.*—3–5 as a rule, exceptionally 6, greenish-blue, frequently splashed with whitewash, rather smaller and in a series slightly deeper in tint than Common Herons'. Average of 100 eggs 56.2×40.8 . Max. : 61.1×43.1 and 57×44.7 . Min. : 50.2×39.5 and 51.5×38 mm. *Breeding-season.*—Occasionally early April in Spain, but often not till May, and in Central Europe usually early May. *Incubation.*—No details available as to share of sexes or period. Almost certainly single-brooded, but clutches found sometimes very late in season.

FOOD.—Mainly fish, amphibia and small mammals. Mice have been found in stomach ; Saunders says eels are favourite prey, but pike also taken $11\frac{1}{2}$ in. long and many other species. Also frogs and tadpoles, worms, aquatic insects, especially water-beetles and their larvæ.

DISTRIBUTION.—*British Isles.*—Rare vagrant. Over fifty, chiefly east coast England south of Wash, more rarely south coast, and very rarely elsewhere. In Scotland only few occurrences (one East Lothian, Oct., 1872 ; one Caithness, Sept., 1907 ; one stated obtained about 1872 is in Aberdeen Univ. Mus. ; one seen Berwickshire, April, 1917). In Ireland only one (Monaghan, prior to 1834).

DISTRIBUTION.—*Abroad.*—Breeds locally from Holland, France, Hungary, south Russia to north Africa ; more or less migratory in Europe, but resident and winter-visitor in many parts of tropical and south Africa, extending eastwards to Persian Gulf and west central Asia. Casual Madeira and Canaries. Replaced by another form in India, China, and Malayan Archipelago.

Genus EGRETTE Forst.

EGRETTE Forster, Synopt. Cat. Brit. B., p. 59 (1817—Monotype : *E. garzetta*).

Plumage entirely white, in two tropical forms dichromatic (as in *Demiegretta sacra*), i.e. either white or slate-grey. Bill slenderer than in *Ardea*. On back elongated feathers with hair-like thin ends and decomposed webs, this nuptial "train" reaching beyond tips of wings. About a dozen species in all parts of world.

EGRETTA ALBA

276. *Egretta alba alba* (L.)—THE GREAT WHITE HERON.

ARDEA ALBA Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Europe. Restricted typical locality: Sweden).

Ardea alba Linnæus, Yarrell, iv, p. 177; Saunders, p. 371.

DESCRIPTION.—*Adult male and female.* *Summer.*—Whole plumage white. Feathers of crown slightly elongated and loose but no very long crest-feathers; feathers of upper-breast and base of neck long and with separated rami on tips and edges; upper scapulars enormously elongated (320–450 mm. long) with very long, loose rami placed widely apart and drooping from shaft. This plumage is acquired by complete moult from Dec. to May. *Winter.*—A complete moult appears to take place from Aug.–Nov. New plumage like summer, but scapulars are more or less normal with separated rami on tips and edges but not greatly elongated as in summer nor with very long and widely separated rami.

Nestling.—Down white, long with silky hair-like tips, that of crown rather stiffer (but finer and less bristle-like than in Common Heron) giving very conspicuous crested appearance, rest of down shorter, especially on neck and under-parts. Lores, round eyes, whole of chin and upper half of throat, most of back of neck, centre of upper-breast bare.

Juvenile.—Whole plumage white as in adult but feathers of crown and upper-breast shorter and scapulars normal.

First winter.—As adult winter but tips of scapulars with slightly less long and less separated rami. The juvenile body-plumage is moulted Aug.–Nov. but not wing- or tail-feathers. *First summer.*—A female (May) is like winter adult and may possibly be first summer if not an adult which has missed spring moult.

Measurements and structure.—♂ wing 410–465 mm., tail 140–185, tarsus 170–215, bill from feathers 110–135 (12 measured). ♀ wing 400–450, bill 110–132. Primaries: 2nd and 3rd usually longest, 4th as long or 10 mm. shorter, 1st usually 10–15 shorter, 5th 20–30 shorter, 6th 40–60 shorter, 7th 70–90 shorter; 2nd to 4th emarginated outer and 1st to 3rd inner webs. Rest of structure as in Common Heron but tip of upper mandible not so sharply pointed and notch more distinct.

Soft parts.—Bill black, base orange (ad. summer), yellow (ad. winter and juv.); legs and feet black-brown, sides yellowish, toes greenish-black; iris yellow.

CHARACTER AND ALLIED FORMS.—Other forms occur outside Palæarctic region. Large size, pure white colour, absence of long crest-plumes in winter, yellow bill distinguish it from other British Herons.

BREEDING-HABITS.—Nests in colonies in dense reed-beds. *Nest.*—Built of dead stems of reeds in water three or four feet deep. Considerably larger than that of Purple Heron, standing three feet above

water. *Eggs*.—Usually 4, sometimes 3 only (while 5 are said to occur), paler blue than those of Purple or Grey Heron, larger and often pointed in shape. Average of 80 eggs 60.3×42.4 . Max. : 68.4×44.7 and 61×45.6 . Min. : 53.9×42.5 and 61.3×40 mm. *Breeding-season*.—Occasionally as early as beginning of April but generally during last fortnight of month. *Incubation*.—Share of sexes and period not accurately known. Probably single-brooded, but incubated clutches have been found late in June.

Food.—Mainly small fish, frogs and tadpoles. Also fresh-water mollusca, worms, small mammals (mice, etc.), young birds and insects, especially coleoptera, orthoptera.

DISTRIBUTION.—*Great Britain*.—Very rare vagrant. About seven authentic—three Yorks., one Cambs., one Notts., one East Lothian, one Perth. (cf. Saunders, p. 371, and *Brit. B.*, 1, p. 347).

DISTRIBUTION.—*Abroad*.—Breeds (formerly in great numbers) in parts of south-east Europe, in plains of Danube and north to south Russia, at least once (1863) in Silesia. Seems also to breed eastwards as far as east Asia. Northern birds are migrants. Casual Canaries. Replaced by allied subspecies in tropical Asia to Australia, tropical Africa, New Zealand and America.

EGRETTE GARZETTA

277. *Egretta garzetta garzetta* (L.)—THE LITTLE EGRET.

ARDEA GARZETTA Linnaeus, *Syst. Nat.*, ed. xii, i, p. 237 (1766—"Habitat in Oriente." Ex Brisson, who says "juxta maris littora versatur"!)
Ardea garzetta Linnaeus, Yarrell, iv, p. 182; Saunders, p. 373.

DESCRIPTION.—*Adult male and female*. *Summer*.—Whole plumage white. Two very long crest-feathers (when fully grown 140–160 mm.), very narrow and pointed, of very close structure, rami being long and lying close to shaft; on upper-breast a number of similar feathers but their basal portions with the rami separated and spread not close to shaft; upper scapulars and in middle of mantle between scapulars large tuft of very long feathers (about 200 mm.) with very long, loose rami placed widely apart and drooping from shaft (the "egret" or "osprey" plumes of milliners). This plumage is acquired by a complete moult from Jan. to April. *Winter*.—A complete moult takes place June to Nov. (occasionally May and Dec.). New plumage like summer but without long crest plumes and with fewer and rather shorter loose, drooping plumes on scapulars and mantle.

The Little Egret (*Egretta g. garzetta*). Tip of a scapular plume, adult, summer.

Nesting.—(Not examined.)

Juvenile.—Whole plumage white as in adult but with no special plumes, feathers of back of crown and upper-breast being rather long and rather loosely constructed but otherwise normal.

First winter.—Like juvenile but feathers of upper-breast longer and some with narrow closely set tips but very much shorter than in adult; feathers of scapulars and mantle rather long and rami separated at tips but not greatly elongated nor placed widely apart as in adult. The juvenile body-plumage is moulted Aug.–Nov., but not wing- or tail-feathers. *First summer*.—After spring moult appears to become like adult, but some birds without crest plumes but otherwise like adult summer may possibly be first summer.

Measurements and structure.—♂ wing 260–295 mm., tail 90–110, tarsus 100–110, bill from feathers 85–92 (12 measured). ♀ wing 240–270, bill 78–90. Primaries: 2nd and 3rd longest, 1st and 4th sometimes as long but usually 5–10 mm. shorter, 5th 10–25 shorter, 6th 25–35 shorter, 7th 40–55 shorter; 2nd to 4th slightly emarginated outer and 1st and 2nd inner webs. Rest of structure as in Common Heron but tip of upper mandible not so sharply pointed and notch more distinct.

Soft parts.—Bill and lores black, base of lower mandible and round eyes greenish-grey; legs black, toes and extreme base of tarsus yellow; iris yellow.

CHARACTERS AND ALLIED FORMS.—*E. g. nigripes* (Australasia) is similar but with black toes. Pure white plumage, black bill and small size distinguish it from other British Herons.

FIELD-CHARACTERS.—At distance Little Egrets do not look whiter than Buff-backed Herons. Both species are small and cannot be confused with Spoonbill or Great White Heron at any distance. With binoculars black of bill and tarsi of Little Egret are characters to be looked for, and can be seen at considerable distances. Usually met with in flocks. Flies with head retracted; wings rounded and flight slow. (F.C.R.J.)

BREEDING-HABITS.—Breeds in colonies, often in company with other species such as Buff-backed and Night-Herons, Squacco, Glossy Ibis, etc. *Nest*.—Sometimes on top of tamarisk bushes, and at other times on branches of trees, flimsily built of tamarisk and other twigs at varying height from ground. *Eggs*.—Normally 4, occasionally 3 and rarely 5, light greenish-blue, devoid of gloss. Average of 100, 46.6×33.8 . Max.: 55×34.2 and 47.5×36.8 . Min.: 42×33.5 and 48×31.1 mm. *Breeding-season*.—From early May onward in south Spain. *Incubation*.—Share of sexes not known; period given as 17–18 days by Baldamus, but probably under-estimated, as Wunderlich gives 23 days. Single-brooded.

FOOD.—Small fish, frogs, lizards, worms, crustacea, fresh-water mollusca and aquatic insects.

DISTRIBUTION.—*England*.—Very rare vagrant. Several recorded,

but Saunders admitted only one—Countess Weir, Exe (Devon), June 3, 1870—as thoroughly authentic. Others recorded from Sussex, Northants. (two), and Yorks. may be genuine.

DISTRIBUTION.—*Abroad.*—South Europe, Africa, and southern and central Asia generally. In Africa it appears to breed as well as winter, most European Egrets being migrants. A straggler in central and western Europe and Atlantic Isles. Replaced by closely-allied race in Malayan Archipelago, and Moluccas to Australia.

Genus ARDEOLA Boie.

ARDEOLA Boie, Isis, 1822, I, p. 559 (Monotype : *A. ralloides*).

Smaller birds than *Ardea* and *Egretta*, though *E. garzetta* not very much larger, tarsus shorter, scutate in front. Wings entirely or chiefly white, otherwise much white in plumage. 5 species, one in at least 2 subspecies, southern Europe, Africa and Asia.

ARDEOLA IBIS

278. *Ardeola ibis ibis* (L.)—THE BUFF-BACKED HERON.

ARDEA IBIS Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Egypt).

Ardea bubulcus Audouin, Yarrell, iv, p. 187 ; Saunders, p. 375.

The Buff-backed Heron (*Ardeola i. ibis*). Adult, summer.

DESCRIPTION.—*Adult male. Summer.*—Whole plumage white, except for long tufts on crown, lower-throat and centre of mantle which are pinkish-buff to deep orange-buff (these feathers very long with enormously elongated and separated rami, lying almost parallel to shaft). This plumage is acquired by complete moult March–May. *Winter.*—A full moult again takes place July–Nov. (sometimes Dec.), after which bird is as in summer but feathers of crown are paler and not so long, while those of lower-throat and centre of mantle are mostly white with slight creamy-buff tinge, slightly elongated and separated at tips but quite unlike greatly elongated feathers of summer.

Adult female. Summer.—As adult male. *Winter.*—As adult male winter but feathers of centre of mantle and lower-throat shorter, white and almost normal in structure.

Nestling.—(Not examined.)

Juvenile.—Like adult winter female but white on crown and feathers normal as well as on centre of mantle and lower-throat.

First winter. Male and female.—Like adult winter female. The juvenile body-feathers and wing-coverts are moulted Sept.–Dec. (occasionally Jan.) but not wing- or tail-feathers. *First summer*.—After complete moult becomes as adult but moult is often rather later.

Measurements and structure.—♂ wing 233–253 mm., tail 70–90, tarsus 70–85, bill from feathers 52–60 (12 measured). ♀ wing 233–247, bill 52–58. Primaries: 2nd and 3rd longest, 1st and 4th as long or 5 mm. shorter, 5th 10–20 shorter, 6th 25–45 shorter; 2nd to 4th emarginated outer and 1st and 2nd slightly inner webs. Rest of structure as in Common Heron.

Soft parts.—Bill and bare loreal region yellow, tinged pink; legs and feet dull yellow (ad.), dark greenish-brown (juv. and 1st winter); iris bright yellow.

CHARACTERS AND ALLIED FORMS.—*A. i. coromanda* (India, S. China, S. Japan) in summer has feathers of crown golden-buff rather than pinkish and similar feathers on chin and throat, more of tibia bare than in typical form. White plumage, yellow not black bill and uniform buff tufts of feathers distinguish this species from other British Herons.

FIELD-CHARACTERS.—Can hardly be confused with anything but Squacco Heron and in distance with Little Egret, with which it associates at times. Although at close quarters in breeding-season yellowish-tawny plumes readily distinguish Buff-backed Heron and Squacco from Little Egret, this is not noticeable at distance, when best character for distinction is difference in colour of bill and feet, which are black in Egret while in Buff-backed they look yellowish, and Squacco has dark beak with yellowish feet. Very sociable in habits, resting and feeding in company and associating with cattle in fields. (F.C.R.J.)

BREEDING-HABITS.—Very sociable, nesting in colonies, sometimes of considerable size and at times together with other species, such as Little Egret, Glossy Ibis, etc. *Nest*.—Usually on bushes or trees, often on tamarisks, generally not high up, and occasionally on ground on rocky islets. Flimsily constructed of twigs and any material available. *Eggs*.—Normally 4, rarely 5, rather more rounded or elliptical than Little Egret's and paler in colour, though at times hardly distinguishable. Average of 41 Spanish eggs 45.6×34.3 . Max.: 49.3×36 . Min.: 41.2×33 and 43×32.7 mm. *Breeding-season*.—Varies to some extent but begins early in May in S. Spain, though at times fresh eggs can be obtained a month later. *Incubation*.—No reliable data. Single-brooded.

FOOD.—Feeds largely on parasites from cattle, especially ticks (*Acari*) and insects, coleoptera, orthoptera (locusts, grasshoppers, etc.), caterpillars. Also lizards, frogs and mice recorded.

DISTRIBUTION.—*England*.—Immature female near Kingsbridge (Devon), end Oct., 1805 (*ut supra*). Male, Breydon Marshes (Norfolk), Oct. 23, 1917 (F. W. Smalley, *Brit. B.*, xi, p. 146). [One recorded Martock (Somerset), Jan. 28, 1909, evidence insufficient. *Zool.*, 1915, p. 318; *Brit. B.*, x, p. 70.]

DISTRIBUTION.—*Abroad*.—S. Spain and S. Portugal and Africa, in Asia eastwards at least as far as Persia, but represented by *A. ibis coromanda* in Far East, India, and Malayan Archipelago to the Moluccas. Casual Madeira and Canaries.

ARDEOLA RALLOIDES

279. *Ardeola ralloides* (Scop.)—THE SQUACCO HERON.

ARDEA RALLOIDES Scopoli, *Annus 1 Historico-Natur.*, p. 88 (1769—Carniola).

Ardea ralloides Scopoli, Yarrell, iv, p. 191; Saunders, p. 377.

The Squacco Heron (*Ardeola ralloides*). Adult, summer.

DESCRIPTION.—*Adult male and female. Winter*.—Whole crown, back and sides of neck pale yellow-buff, feathers with brown-black stripes along each side, those on sides of neck browner and less broad than those on crown and back of neck, feathers of crown narrow and elongated, and those of back of crown and nape greatly elongated, narrow and pointed and whiter not so buff, forming long crest; mantle, scapulars and innermost secondaries pink-brown, some outer scapulars golden-buff (tips of feathers of upper-mantle with separated rami and feathers of lower-mantle and scapulars long with much elongated and separated rami, but not so much so as in Buff-backed Heron); back and rump white; chin and centre of throat white; sides of throat and long feathers of lower-throat golden-buff striped black-brown; rest of under-parts white; tail- and wing-feathers, except brownish innermost secondaries, white; wing-coverts white, tinged more or less golden-buff. This plumage is acquired by full moult June-Dec. *Summer*.—Feathers of body and wing-coverts moult Jan.-May and varying number of brown inner secondaries but not rest of wings or tail. New plumage like winter but feathers of throat, sides and base of neck and long

feathers of lower-throat and upper-breast golden-buff unstriped ; mantle much pinker, less brown ; scapulars golden-buff, and renewed innermost secondaries more buff and less brown ; crest-feathers still longer than in winter.

Nestling.—(Not examined.)

Juvenile.—No long crest-feathers and scapulars not with elongated separated rami ; crown black-brown, feathers with yellowish-white shaft-streaks and edges at base ; neck and sides of head and throat pale yellow-cream with narrow dark brown stripes ; mantle rather more earth-brown than winter adult, scapulars same with yellowish centres at tips of feathers ; back, rump and upper tail-coverts and under-parts white with tinge of yellow-buff on tibia ; tail and wing-feathers white, mottled brown at tips and along outer webs of primaries, which also have brown shafts, innermost secondaries brown ; primary-coverts more or less mottled brown and shafts brown at base ; wing-coverts pale yellow-cream with pale mottled-brown stripes along edges chiefly of outer feathers.

First winter.—No very long crest-feathers, and rami of scapulars only a little elongated and separated ; crown, neck and throat much like adult but stripes not so blackish and buff paler and more creamy ; mantle and scapulars more rusty-brown, not so earth-coloured as juvenile nor so pinkish as adult, and scapulars usually with narrow yellow-buff central streaks at tip. The juvenile body-plumage is moulted July-Dec., but not wing- or tail-feathers nor wing-coverts.

First summer.—A body-moult takes place as in adult, after which bird is much like adult summer, except for primaries, which still have brown shafts and some brown mottling at tips, though this mostly wears off wing-coverts and tail-feathers.

Measurements and structure.—♂ wing 200–230 mm., tail 70–80, tarsus 55–65, bill from feathers 60–70 (12 measured). ♀ wing 200–225, bill 60–67. Primaries : 2nd longest, 3rd usually as long but sometimes 5 mm. shorter, 1st usually 5 mm. shorter but sometimes as long, 4th 2–7 shorter, 5th 10–15 shorter, 6th 18–28 shorter ; 2nd to 4th slightly emarginated outer webs. Rest of structure as in Common Heron.

Soft parts.—Bill, upper mandible blackish-horn, basal half of cutting edge yellowish-green, lower mandible yellowish-green with cutting edge at tip blackish-horn ; bare loreal region yellow-green ; legs and feet yellow-green ; iris lemon-yellow.

CHARACTERS.—No subspecies. Dark upper-parts and striped crown and crest, shorter wing and tarsus and longer bill distinguishes it from Buff-backed Heron.

BREEDING-HABITS.—Generally met with in breeding colonies of other species, but usually in smaller numbers. *Nest*.—Usually flimsy structure of twigs placed on tamarisk bushes, but sometimes also among sedges and water-vegetation, and also on branches of trees over water. *Eggs*.—Much smaller than those of allied species ;

pale blue, 4-5 in number. Average size of 75 eggs 38.4×28.5 . Max. : 41.6×31.5 . Min. : 35×28.2 and 36.2×27 mm. *Breeding-season*.—Later than Little Egret and Buff-backed Heron ; rarely earlier than second week of May in S. Spain and more often in June. *Incubation*.—No reliable details. Single-brooded.

FOOD.—Almost omnivorous ; small mammals (shrew found in crop) ; fish, generally small, insects (coleoptera, orthoptera, etc.), crustacea (small crabs), mollusca, frogs and worms.

DISTRIBUTION.—*British Isles*.—Rare vagrant. About seventy. *England*.—Scilly Isles, Cornwall (over 20), Devon, Somerset, Dorset, Wilts., Hants., Isle of Wight, Sussex, Surrey, Kent, Suffolk, Norfolk, Lincs., Northumberland, Cumberland, Notts., Salop. *Wales*.—Denbigh, Montgomery, and Brecon. *Scotland*.—Three and one seen. *Ireland*.—Ten (chiefly south coast).

DISTRIBUTION.—*Abroad*.—Breeds south Spain, Danube valley, and south Russia to Caspian Sea, Persia, Transcaspia, also whole Africa. Casual in other parts of Mediterranean countries, central Europe and Atlantic Isles.

Genus NYCTICORAX Forst.

NYCTICORAX Forster, Synopt. Cat. Brit. B., p. 59 (1817—Monotype : *N. infaustus* = *nycticorax*).

Bill not longer than head, bulky, strong and broad, upper mandible curved, lower straight, as long as tarsus or shorter. Tarsus in front reticulated. Only small portion of tibia bare. Neck short and thick, head crested and with several long white tape-like feathers. Habits nocturnal. Number of tropical forms, one Palearctic.

NYCTICORAX NYCTICORAX

280. *Nycticorax nycticorax nycticorax* (L.)—THE NIGHT-HERON.

ARDEA NYCTICORAX Linnæus, Syst. Nat., ed. x, i, p. 142 (1758—S. Europe).

Nycticorax griseus (Linnæus), Yarrell, iv, p. 195 ; Saunders, p. 379.

The Night-Heron. (*Nycticorax n. nycticorax*). Juvenile.

DESCRIPTION.—*Adult male and female.* *Winter.*—Narrow line on fore-head, above lores and eyes white; whole crown, mantle and upper scapulars black glossed dark green, feathers of crown and mantle (and upper-breast) long and of rather loose structure, rami at tips being separated, bases of feathers brownish-grey; on nape three very long (♂ 130–205, ♀ 130–170 mm.) extremely narrow and pointed white feathers of very close structure, rami being long but lying close to shaft; ear-coverts, sides and back of neck, back and upper tail-coverts and wing-coverts ash-grey; sides of throat, sides of breast, flanks, axillaries and under wing-coverts very pale ash-grey, sometimes almost pure white; chin, middle of throat and rest of under-parts white; tail- and wing-feathers rather darker grey than wing-coverts. This plumage is acquired by complete moult Aug.–Nov. *Summer.*—Another complete moult takes place Jan.–March or April (occasionally not quite finished May) after which plumage is like that of winter but black is glossed dark blue rather than green.

Nestling.—Down of whole crown pale buff-brown at base with long white bristle-like tips without rami, giving conspicuous crested appearance. Rest of down sparse with long silky tips, upper-parts pale buffish-brown with paler buffish tips, under-parts creamy-white. Lores, round eyes, chin, centre of throat, base of back of neck, middle and sides of belly bare. This down is entirely replaced by feathers of juvenile plumage.

Juvenile.—Crown black-brown, finely streaked buffish-white, each feather having fine shaft-streak; neck and mantle same but with wider and buffer streaks; scapulars with wide buffish-white V-shaped tips; back and rump pale brown, feathers with white central streaks; upper tail-coverts brown with buffish-white shaft-streaks and tips; cheeks, sides of neck, sides of breast, flanks, axillaries and under wing-coverts brown to black-brown, feathers with wide pale buff to white central streaks; chin and centre of throat white with few brown marks; centre of breast and belly white, feathers with narrow and somewhat irregular brown edgings; vent and under tail-coverts white; tail-feathers grey-brown narrowly tipped buffish-white; wing-feathers and primary-coverts dark brown tipped white; greater coverts same but tips longer and more wedge-shaped; median-coverts as greater but tips more buff and shafts pale; lesser coverts with smaller and darker buff tips.

First winter.—Crown and neck much like juvenile but streaks more rufous-buff, not so pale and conspicuous; mantle and scapulars dark brown with an oil-green tinge and slight edgings of rufous (feathers with slightly separated tips); back and rump brown-grey, upper tail-coverts same but with greyish-white tips; breast and centre of belly white, feathers with buffish and sometimes brownish edgings, sides and flanks pale grey-brown, feathers with buff tips and centres; usually some new innermost secondaries and greater coverts grey-brown. The juvenile body-plumage is moulted Aug.–Dec., but some feathers often remain unmoulted until

spring, except for a few innermost secondaries and greater coverts, wing-feathers and coverts are not moulted nor tail.

First summer.—A complete moult takes place Feb.-April, after which bird becomes much like adult winter, but crown, mantle and scapulars are glossed duller green, grey of rest of plumage is considerably tinged brown, innermost secondaries have dark greenish tinge, inner lesser wing-coverts brown with small buff tips, long white crest-plumes shorter than is usual in adults. After next autumn moult apparently becomes like adult.

Measurements and structure.—♂ wing 265-300 mm., tail 95-110, tarsus 65-75, bill from feathers 65-80 (12 measured). ♀ wing 270-285, bill 66-75. Primaries: 2nd and 3rd longest, 4th sometimes as long but usually 2-5 mm. shorter, 1st 2-10 shorter, 5th 15-20 shorter, 6th 25-30 shorter, 7th 40-50 shorter; 2nd to 4th emarginated outer and 1st and 2nd inner webs. Bill comparatively short, deep and compressed, distal third of upper mandible curved and tapering to rather blunt point with notch on cutting edge, lower mandible slightly shorter and with finer point. Rest of structure as in Common Heron.

Soft parts.—Bill green-black, line along cutting edge of upper and of lower mandible green-grey; lores and round eyes greenish; legs and feet pale yellow with faint greyish tinge in front (juvenile green-yellow); iris crimson (juvenile brown).

CHARACTERS AND ALLIED FORMS.—*N. n. naevius* (N. and S. America) is larger. Stout bill and general black and grey colouring and long white crest-plumes of adult, and brown streaked and spotted with buff of juvenile distinguish species.

FIELD-CHARACTERS.—Shy and secretive, abroad mainly from dusk to dawn. In flight very short and broad appearance distinctive; very broad wings, head retracted as in other Herons and thus in adult black of crown and mantle are joined and give appearance above of broad black central line surrounded with grey. Note harsh croak. (H.F.W.)

BREEDING-HABITS.—Usually breeds in colonies with other Herons, sometimes nesting on tamarisk bushes or in sedge and reed-beds, on pollarded willows or among branches of high trees. *Nest.*—Varies according to site, but usually small and flat, built of dry twigs, sometimes reeds, rushes, etc. *Eggs.*—Usually 4—sometimes 5, rather pale blue, unmarked. Average of 100 eggs 49.5×35.3 . Max.: 56.5×34.7 and 51×38 . Min.: 43.7×35 and 48.7×31 mm. *Breeding-season.*—From early May in S. Spain; usually May in Roumania and apparently about end of May in central Europe. *Incubation.*—Chiefly at any rate by female. Period given by Wunderlich as 21 days. Single-brooded.

FOOD.—Small fish (eels, etc.), frogs, mollusca (snails), crustaceans, worms and insects chiefly found in marshes (water-beetles, etc.), mice also recorded.

DISTRIBUTION.—*British Isles.*—Vagrant. *England.*—Many south and east coasts as far north as Yorks., a good many inland, but few west and rare north. Chiefly spring and autumn, but occasionally winter and summer. *Scotland.*—Four in south, one Aberdeen, several Argyll, one O. Hebrides. *Ireland.*—Twenty-five, of which only one is from Connaught.

DISTRIBUTION.—*Abroad.*—South and central Europe as well as nearly whole of Africa and greater part of Asia as far south as the Sunda Islands. Migratory in northern parts of its breeding range. Casual Atlantic Isles. Represented by closely-allied forms in America.

Genus IXOBRYCHUS Billb.

IXOBRYCHUS Billberg, Syn. Faun. Scandin., I, 2, p. 166 (1828—Type by subsequent determination, of Stone, 1907, *I. minutus*).

Smallest Palæarctic Herons, body scarcely as large as Turtle-Dove. Bill very much pointed, both mandibles finely serrated before tip. Culmen nearly quite straight, nostrils slit-like, but short. Long neck bare on back, though overgrown by long neck-feathers. Tarsus in front scutate, scutes towards toes sometimes divided into small scales. Differs from former genera and agrees with *Botaurus* in having only 10 tail-feathers, *Ardea*, etc., having 12. No ornamental "train." Sexes differently coloured. Chiefly crepuscular and nocturnal. About a dozen species, but only one in Europe.

IXOBRYCHUS MINUTUS

281. *Ixobrychus minutus minutus* (L.)—THE LITTLE BITTERN

ARDEA MINUTA Linnæus, Syst. Nat., ed. XII, i, p. 240 (1766—Helvetia, Aleppo. Restricted typical locality: Switzerland).

Ardetta minuta (Linnæus), Yarrell, iv, p. 200; Saunders, p. 381.

DESCRIPTION.—*Adult male. Winter and summer.*—Whole crown,

The Little Bittern. (*Ixobrychus minutus*). Wing of adult male.

nape, mantle, scapulars, back, rump and upper tail-coverts black glossed green (feathers of crown and neck rather long and tips of

loose structure); line over eye, ear-coverts and feathers on sides of neck covering bare back of neck buffish-grey; sides of chin white or whitish, down centre of chin, throat and centre of breast creamy-buff to warm buff, bases of feathers white (feathers of lower-throat elongated); on each side of upper-breast patch of black-brown, feathers margined buff; flanks and sides buff, feathers with some fine brown shaft-streaks; centre of belly, under tail-coverts pale

buff to white tinged buff ; axillaries and under wing-coverts white, usually tinged buff ; tail and innermost secondaries black glossed green, and rest of wing-feathers and primary-coverts black, glossed green on outer webs (1st primary very narrowly edged buff to whitish) ; innermost wing-coverts black glossed green, forming a line down inner edge of wing, rest of greater coverts white tinged buffish-grey and of median and lesser pale buff to deeper buff with a small brownish patch on outer lesser coverts at point of wing. This plumage is acquired by complete moult commencing June.

Adult female.—Crown and nape as male but not so glossy and margined by very narrow line of rufous ; feathers of sides of neck covering back of neck brown-buff with chestnut tips ; mantle and scapulars dark chocolate-brown to reddish-chocolate, feathers margined pale buff giving somewhat streaked appearance ; back and rump more uniform dark chocolate ; upper tail-coverts black ; under-parts much as male but more streaked, chin and throat showing more white with long brown-buff stripes and some brown shaft-streaks, flanks and sides of breast with much wider and more numerous dark brown streaks ; tail as male but not so glossy ; wing-feathers more brown-black and innermost secondaries and wing-coverts chocolate-brown, rest of wing-coverts darker and browner-buff than in male and brown patch on point of wing more prominent and usually dark reddish-chocolate.

Nestling.—Down rather short with silky tips, covering bird rather more closely than in Bittern, but lores, round eyes and back of neck bare, upper-parts and sides warm reddish-buff, chin, down centre of throat and breast and belly whitish.

Juvenile. Male and female.—Much like adult female but feathers of crown duller and edged and tipped rufous ; feathers covering back of neck more chestnut with narrow buff tips ; mantle and scapulars more broadly edged and also tipped buff ; back, rump and upper tail-coverts also tipped buff ; ear-coverts, centre of chin and whole throat strongly streaked dark buff and brown ; tail-feathers, wing-feathers and primary-coverts very narrowly tipped pale brown ; greater coverts buff faintly mottled brown and with more or less brown on inner webs (especially on inner feathers) ; median and lesser wing-coverts dark brown broadly edged and tipped buff.

First winter. Male.—Like adult but sides of head and neck not so grey, under-parts usually darker and more streaked, wing-feathers browner, wing-coverts darker and usually with some unmoulted, juvenile outer coverts and one or two rufous-brown innermost secondaries. The juvenile body-plumage, and apparently wing-coverts and innermost secondaries are moulted in first autumn but insufficient moulting material is available. *Female*.—Like adult but under-parts more streaked and wing-coverts with brown shaft-streaks.

Measurements and structure.—♂ wing 142–155 mm., tail 45–52, tarsus 42–47, bill from feathers 45–52 (12 measured). ♀ wing 137–

150 (one 157), bill 45–52. Primaries : 1st and 2nd longest, 3rd 2–4 mm. shorter, 4th 5–10 shorter, 5th 10–15 shorter, 6th 15–22 shorter, 7th 22–30 shorter. Rest of structure as in Bittern.

Soft parts.—Bill yellow, tinged green, ridge of upper mandible dark brown ; lores yellow ; legs and feet grass-green, back of tarsus and soles yellowish ; iris brilliant chrome-yellow.

CHARACTERS AND ALLIED FORMS.—Other forms occur outside Palæarctic region. Small size, dark crown and upper-parts and pale wing-coverts distinguish it from other British Bitterns and Herons.

FIELD-CHARACTERS.—Usually very secretive, haunting thickly grown reed-beds, etc., and difficult to flush and may even be caught with the hand. Black and buff of adult male makes it conspicuous at times even when motionless in stick-like attitude, but browner female much more difficult to see. Climbs up and down reeds and boughs with rapidity and utmost facility. Also sometimes roosts in trees and is not easily disturbed. A call note in flight is a low-toned “quer,” short and sudden, which is sometimes prefaced by a higher pitched and also short “quee.” Breeding note “plunk.” Flight not heavy. (H.F.W.)

BREEDING-HABITS.—Haunts reed-beds, wooded swamps, banks of rivers, etc. *Nest*.—Roughly built of sedges and reed-stems, sometimes in growing or dead reeds, a foot or two above water, occasionally in heaps of dead sedge, or among branches of trees even at considerable height or on pollarded willow. *Eggs*.—Usually 4 or 5 to 6, exceptionally 7 to 10 on record and even 12, white but sometimes with blood-stains, surface dull. Average of 100 eggs, 35.2×26 . Max. : 38.5×26.6 and 34×27.6 . Min. : 32.2×24.7 and 33×23.5 mm. *Breeding-season*.—Towards end May and early June in central Europe, but in S. Spain from early May onward. *Incubation*.—By both sexes (Burdet), period some days less than 16–17 usually credited (Hocke). Single-brooded.

FOOD.—Fish, chiefly small but occasionally also of considerable size, frogs and newts, fresh-water mollusca and insects (water-beetles, *Notonecta*, etc.). Said to rob nests of Reed-Warbler in Germany.

DISTRIBUTION.—*British Isles*.—Vagrant, chiefly spring and summer, few autumn, rarely winter. *England and Wales*.—Recorded nearly every county, most frequently south and east counties, rarer Wales and west, and north of Yorks. Probably bred Norfolk within last fifty years. *Scotland*.—Rare, but has occurred as far north as Orkneys and Shetlands, though not O. Hebrides. *Ireland*.—About thirty, chiefly south and east and only one Connaught.

DISTRIBUTION.—*Abroad*.—Central and south Europe, south of about 60° north lat., and N. Africa, east to central Asia, south to Himalayas, Kashmir, North-west Provinces of India and Sind ; in winter

in whole of Africa, and (not common) parts of India. Casual Færoes and Atlantic Isles. Represented by distinct subspecies in Africa, Madagascar and Australia.

Genus BOTAURUS Steph.

BOTAURUS Stephens, Shaw's Gen. Zool. xi, 2, p. 592 (1819—Type by subsequent determination, of Gray, 1840, *B. stellaris*).

Plumage very soft and rich, especially on head and sides of neck very long and broad, plumage beautifully streaked and barred with brown, black and yellowish. Bill much shorter than tarsus, pointed, strong at base, laterally compressed, finely serrated before tip. Claws long and very little curved, middle toe with claw much longer than tarsus, which is scutate in front. Ten rectrices. Sexes alike. One species in several subspecies in Old World, two other species in America.

BOTAURUS STELLARIS

282. *Botaurus stellaris stellaris* (L.)—THE BITTERN.

ARDEA STELLARIS Linnæus, Syst. Nat., ed. x, i, p. 144 (1758—Europe. Restricted typical locality: Sweden).

Botaurus stellaris (Linnæus), Yarrell, iv, p. 206; Saunders, p. 383.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Crown black, feathers on back of crown with narrow and those on nape with wide, tips of yellow-buff, narrowly barred black; neck

The Bittern (*Botaurus s. stellaris*).

yellow- to tawny-buff, feathers irregularly barred black (feathers of crown and neck rather long and of loose structure); mantle, scapulars and back much same but with more black, most of centres of feathers as well as thick irregular bars and spots being black, edges and indentations between black bars yellow-buff to tawny- and rufous-buff; upper tail-coverts yellow-buff irregularly marked brown-black; line over eye and ear-coverts yellow-buff sometimes faintly barred brown-black; sides of neck rather more tawny and finely

barred black; from gape a moustachial stripe brown-black, feathers tipped tawny-buff with black bars; chin and throat pale buff, feathers down centre with long stripes of variegated rufous-brown (feathers of lower-throat much elongated); rest of under-parts pale yellow-buff with broad black stripes which on sides of belly are usually more rufous-brown and on centre of belly and under tail-coverts fewer and fine; buff of flanks and axillaries with rather more rufous tinge and barred dark brown; under wing-coverts lightly and irregularly marked dark brown; tail-feathers rufous-buff heavily marked in centre and vermiculated on edges with black; wing-feathers pale rufous, tipped, irregularly but broadly barred, spotted and vermiculated with black, inner secondaries with outer edges yellow-buff; primary-coverts mostly black with irregular rufous bars; rest of wing-coverts much as upper-parts but with rather less black and more buff. This plumage is acquired by complete moult Aug.-Jan.

Nestling.—Down long with silky tips, rather scanty on upper-parts and very scanty on under-parts; lores, round eyes, back of neck and sides of body bare. Upper-parts varying light chestnut-red to duller reddish-chocolate, chin and throat whitish to whitish-buff, rest of under-parts rufous-buff. Down is entirely composed of pre-pennæ.

Juvenile.—Very much like adult but moustachial stripe less well marked, feathers being usually not black but finely barred rufous and black-brown, rufous-brown stripes on chin and throat less well marked and those on breast browner, not so black, and finer, buff of whole plumage paler especially on under-parts and wing-coverts.

First winter.—Like adult and not to be distinguished with certainty, but moustachial stripe not quite so prominent and wing-coverts paler. The juvenile body-plumage is moulted July to Jan. but apparently not wing-coverts, wing- or tail-feathers.

Measurements and structure.—♂ wing 320–350 mm., tail 95–115, tarsus 90–100, bill from feathers 69–75 (12 measured). ♀ wing 300–350, bill 65–75. Primaries: 1st, 2nd and 3rd about equal and longest, 4th sometimes as long but usually 2–10 mm. shorter, 5th 10–25 shorter, 6th 25–45 shorter, 7th 40–60 shorter; webs not emarginated but tips of outer feathers attenuated. Tail square, 10 soft feathers, tips rounded. Under tail-coverts about as long as tail-feathers. Back of neck bare of feathers for its whole length but hidden by feathers of sides of neck. Not more than a quarter of tibia bare. Rest of structure as in Common Heron.

Soft parts.—Bill greenish-yellow, ridge of upper mandible brown at base, black-brown at tip; lores and round eyes green to “livid blue”; legs and feet pale green, yellowish at tarsal joint and back of tarsus, soles yellow; iris yellow. (Nestling, bill, legs and feet blue-green. E. L. Turner.)

CHARACTERS AND ALLIED FORMS.—*B. s. capensis* (S. Africa) is con-

siderably darker on upper-parts. Size, variegated buff and black plumage and barred wing-feathers distinguish Bittern from other British Bitterns and Herons.

FIELD-CHARACTERS.—Skulks in dense reed-beds or rank vegetation of swamps and fens and is seldom abroad in daytime except when there are young to be fed. Plumage, golden-buff barred and mottled with black, assimilates closely in colour to its surroundings, whether bird crouches with head resting on shoulders and bill pointing upwards or stands stiffly erect with body much attenuated and bill vertical. In flight, which is slow and owl-like, rounded wings, brown colour, retracted head (neck extended until bird is well on the wing) and trailing grass-green legs are unmistakable. Call-note a hoarse, croaking “aark, aark” (Turner); love-call of male a deep far-reaching bellow; nestlings utter a cackling hunger-cry.

BREEDING-HABITS.—Haunts dense reed-beds and swamps. *Nest*.—Usually in reed-bed among stems of dead reeds, but has been met with on tussock in open water, incubating bird in full sight. Built of bits of reed-stalks and small for size of bird, only a few inches above water-level. *Eggs*.—4–6, olive-brown, sometimes with fine brown speckles, chiefly at large end. Average of 66 eggs, 52.6×38.5 . Max.: 58.2×37.1 and 54×41 . Min.: 47.5×35.7 and 51.6×35.5 mm. *Breeding-season*.—Variable; eggs found end March onward till late May in England and April to June in central Europe. *Incubation*.—According to Naumann by female only. Period 25 days from laying of 1st egg to hatching of 1st chick. (E. L. Turner.) No proof of second brood.

FOOD.—Varied, including small mammals (water-vole, shrew and mouse); fish up to considerable size (eels up to 15 in., pike, dace, roach, trout and bull-head), frogs, newts, crustacea (small crabs and shrimps), insects (esp. water-beetles, *Notonecta* and diptera). Also remains of sea-weed, water-weed and grass.

DISTRIBUTION.—*British Isles*.—Winter-visitor chiefly, but often also in summer. Breeds regularly Norfolk. Used to breed regularly in many places England, Wales, south Scotland, and Ireland, and in Norfolk even down to 1868, while in 1886 a young one with down still upon it was found there; in 1911 it was proved to have bred again in Norfolk (E. L. Turner, *Brit. B.*, v, pp. 90–97), and has since bred there in gradually increasing numbers (at least 12 pairs 1920). To Scotland irregular visitor, but has occurred most parts (mainland and islands), as also in Ireland.

DISTRIBUTION.—*Abroad*.—Temperate portions of Palæarctic region east to Japan generally, in Europe north to Scandinavia, south to N.W. Africa; migrating to Africa, Mediterranean countries and India. Replaced by closely-allied subspecies in tropical Africa, Madagascar and Australia.

283. *Botaurus lentiginosus* (Mont.)—THE AMERICAN BITTERN.

ARDEA LENTIGINOSA Montagu, Orn. Dict., Suppl. (under Freckled Heron), text and plate (1813—Piddletown in Dorsetshire).

Botaurus lentiginosus (Montagu), Yarrell, iv, p. 213; Saunders, p. 385.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole crown chestnut-brown, centres of feathers black; feathers covering hind-neck olive, edged and slightly freckled yellow-buff, those at base of neck with rufous-brown tips; on sides of upper neck a line or patch of blue-black more pronounced and longer in male than female; mantle and scapulars dark chestnut-brown finely and closely barred and freckled black and varying amount of buff, feathers of upper-mantle broadly edged buff; back, rump and upper tail-coverts as mantle, but still more finely freckled and uniform grey-brown bases of feathers showing a good deal on rump; very short moustachial stripe chestnut-brown; cheeks and ear-coverts golden-buff; chin white to creamy-white with rufous line down centre; whole throat with broad stripes of rufous finely freckled and with a fine black outline, feathers edged pale buff to whitish (feathers of lower-throat much elongated); breast and belly same but stripes less rufous and not definitely outlined black; centre of belly and under tail-coverts almost uniform pale buff; axillaries finely barred and freckled brown; under wing-coverts mostly buff with some brown frecklings; tail-feathers dark brown to rufous-brown, edges more or less freckled paler or more rufous-brown; outer five primaries brown-black with very small buffish tips, rest of primaries and outer secondaries same but with tips rufous to buff finely freckled black; innermost secondaries like scapulars; primary-coverts like inner primaries; wing-coverts much as upper-parts but paler and more buff and more finely and closely freckled brown. This plumage is acquired by complete moult July–Nov.

Nestling.—(Not examined.)

Juvenile.—Like adults but with sides of neck not so olive and without black patches.

First winter.—Like adults. The juvenile body-plumage but not wing- or tail-feathers nor wing-coverts is moulted Aug.–Nov.

Measurements and structure.—♂ wing 270 (one 250)–305 mm., tail 80–100, tarsus 86–97, bill from feathers 68–80 (one 86) (14 measured). ♀ wing 245–270, bill 68–75. Primaries: 2nd and 3rd longest, 1st and 4th 5–10 mm. shorter (rarely as long), 5th 15–25 shorter, 6th 25–40 shorter, 7th 40–55 shorter; webs not emarginated, but tips of outer two feathers attenuated. Rest of structure as Bittern.

Soft parts.—Bill yellowish-green, ridge of upper mandible brown at base, black-brown at tip; lores and round eyes yellowish; legs and feet yellowish-green; iris yellow.

CHARACTERS.—No subspecies. At once distinguished from Bittern by its unbarred wing-feathers, browner crown, black patch on side

of neck, less black and buff, browner and finely freckled upper-parts.

BREEDING-HABITS.—Breeds in marshes, among rank vegetation. *Nest.*—Flat, usually of broken canes and reeds. *Eggs.*—4–6, rarely 7, like European species but smaller. Average of 30 eggs, 49.7×37.5 . Max.: 54.5×36.3 and 48×39.2 . Min.: 47.5×38.7 and 49×35.3 mm. *Breeding-season.*—Usually May. *Incubation.*—No details. Single-brooded.

FOOD.—Probably as varied as that of European species; includes small mammals (mice, etc.), snakes, frogs, lizards, crustaceans (crawfish, etc.), fish, insects, etc.

DISTRIBUTION.—*British Isles.*—Very rare vagrant. *England and Wales.*—About eighteen: Scilly Isles (1), Cornwall (2), Devon (2), Dorset (1), Hants. (2), Sussex (3), Kent (2), Yorks. (2), Lancs. (1), Anglesey (1), and Pembroke (1). *Scotland.*—Seven: Dumfries. (2), Ayr., Argyll., Aberdeen, Elgin, Caithness. *Ireland.*—Fifteen: Munster (6), Leinster (6), Ulster (3).

DISTRIBUTION.—*Abroad.*—N. America, in winter to Guatemala and W. Indies. Accidental Greenland, Iceland, Channel Isles, Canaries and Azores.

[NOTE.—A specimen of the GREEN HERON, *Butorides virescens virescens* (L.), inhabiting eastern North America and wintering from West Indies southwards, is said to have been shot in Cornwall, Oct., 1889 (Saunders, p. 386).]

ORDER PHÆNICOPTERI.

The Flamingos, also called *Odontoglossæ*. At once recognized by enormously long and slender legs and remarkable bill, abruptly bent in middle and both mandibles with fine transverse lamellæ like Ducks'. Tarsus broadly scutate, tibia mostly bare, front toes connected with complete incised webs. Hind-toe very small or absent. Palate desmognathous as in *Gressores*. Slit-like nostrils pervious. Tongue very thick, fleshy. Lores bare. Body-plumage close and hard, with much under-down as in *Anseres*, with aftershafts. Rectrices 12–16. Very gregarious. Four species, one in several subspecies, Old and New World. Eggs white, chalky, unspotted.

FAMILY PHÆNICOPTERIDÆ.

Sole family of Order. Characters those of Order.

Genus PHÆNICOPTERUS L.

PHÆNICOPTERUS Linnaeus, Syst. Nat., ed. x, i, p. 139 (1758—Monotype: *P. ruber*).

If restricted to contain only *Ph. ruber* with its subspecies *Ph. ruber antiquorum* and *chilensis* characterized by broad upper mandible which closes on lamellæ of lower one (in *Phæniconaias*

and *Phœnicoparrus* upper mandible is enclosed between rami of lower one, though I should unite the three genera), chin bare, and a small hind-toe present.

PHŒNICOPTERUS RUBER *

284. *Phœnicopterus ruber antiquorum* Temm.—THE FLAMINGO.

PHŒNICOPTERUS ANTIQUORUM Temminck, Man. d'Orn. 2nd ed. II, p. 587 (1820—Europe).

Phœnicopterus roseus Pallas, Yarrell, IV, p. 244; Saunders, p. 395; Hand-List, p. 126 (1912).

DESCRIPTION.—*Adult male and female. Winter.*—Whole body-plumage white with more or less pink tinge, stronger when newly moulted than when worn but varying individually; lower scapulars pale pink; axillaries and under wing-coverts rose-pink usually bright, lowest series of under wing-coverts black; tail-feathers pale pink but inner webs often white; primaries and secondaries black but innermost secondaries as primary-coverts rose-pink; rest of wing-coverts bright rose-pink varying somewhat in intensity. This plumage is acquired by complete moult July–Nov. or Dec. *Summer.*—A moult involving body-feathers and occasionally some inner greater and median wing-coverts, but not rest of wing-coverts, nor wing- or tail-feathers, takes place Jan.–May. Coloration as winter.

Nestling.—Down white, tinged pale grey on upper-parts, short, rather “woolly” and closely covering whole bird but loreal region bare. This down is entirely replaced not by feathers but by a darker grey down which appears to be under-down of juvenile plumage. Bill not bent but tip flattened and depressed.

Juvenile.—Head and neck grey-brown, feathers tipped white giving a somewhat speckled appearance; mantle and scapulars brown, feathers edged white and shafts dark brown; back and rump white, feathers with dark brown shafts widening to wedge-shaped tips; upper tail-coverts white; under-parts white, varying number of feathers especially on sides and flanks with fine brown shaft-streaks; axillaries rose-pink varying in depth, tips of shafts brown and tips of feathers edged brown; under wing-coverts white to rose-pink with brown shafts and often brown wedge-shaped tips, lowest series brown edged hoary; tail-feathers white, sometimes edged brown and sometimes tinged pink; wing-feathers black-brown, inner webs edged brownish-white and of inner secondaries edged white; primary-coverts white to pale pink with long brown tips and brown shafts; greater coverts white (outer ones sometimes tinged pink) with dark brown shafts and tips; median brown with dark brown shaft-streaks and white bases, but amount of white varies and sometimes brown is confined to tips of feathers; lesser as median but paler and less brown (often confined to median streak) and often tinged pink.

* For explanation of change of name, see B.O.U. List, p. 385 (1915), and *Brit. B.*, IX, p. 6.

First winter and summer.—New body-plumage white, otherwise as juvenile. The juvenile body-plumage is moulted Sept.–March but not wing-coverts, wing- or tail-feathers and frequently only part of body-plumage.

Second winter and summer.—Like adult but body-plumage without pink, wing-coverts paler pink and many lesser coverts with fine brown shaft-streaks, usually also upper series of under wing-coverts and axillaries tipped brown or with tips of shafts brown, tips of primary-coverts brown and inner webs of inner secondaries white.

Third winter and summer.—Some birds like adults but with primary-coverts white tipped brown, white edgings to inner webs of inner secondaries and occasionally with a few fine brown shaft-streaks on lesser wing-coverts may be third winter birds.

Measurements and structure.—♂ wing 36–44.5 cm., tail 125–157 mm., tarsus 24–36.5 cm., bill from feathers 120–135 mm. (12 measured). ♀ wing 35.5–42.5 cm. Primaries: 1st and 2nd longest, 3rd as long or 10 mm. shorter, 4th 25–40 shorter, 5th 50–65 shorter, 6th 75–90 shorter; 2nd and 3rd emarginated outer and 1st and 2nd inner webs. Tail doubly emarginated, central and outer feathers being slightly longer than rest, 14 feathers, tips rounded. Under tail-coverts about as long as tail. Bill bent in middle and decurved, upper mandible distal to bend flat, broad, very shallow, with nail-like tip, lower mandible deeper, much grooved at tip, cutting edges with lamellæ fine and close on lower, more tooth-like and separated on upper mandible. Nostrils slit-like. Skin of loreal region and round eyes bare. Neck very long and slender. About three fourths of tibia bare. Toes webbed for about two-thirds their length, claws flat, rounded, nail-like, hind-toe very small, elevated and free.

Soft parts.—Bill, tip black, rest, lores and round eyes pink (juv. lead-colour); legs and feet deep pink (juv. lead-colour to pale brown); iris lemon-yellow (juv. brown).

CHARACTERS AND ALLIED FORMS.—*Ph. r. ruber* and *chilensis* inhabit parts of America. Very long neck and legs, bent bill, pinkish-white body and pink and black wings easily distinguish species.

BREEDING-HABITS.—Haunts large lagoons, where water is shallow and often saline. *Nest.*—A conical heap of mud, made by the birds and raised a few inches above water-level as a rule, with a shallow depression in middle and about 15 in. across, in shallow water, not more than a foot or two deep. *Eggs.*—Two, white with soft chalky covering, readily stained and scratched. Average of 100 eggs, 88.8×54.5 . Max.: 103.5×56.5 and 93.7×60.1 . Min.: 77×48.4 and 94.5×47.7 mm. *Breeding-season.*—About last week May as a rule. *Incubation.*—Said to be by female only (*cf. Ooth. Woll.*, II, 489), but in American form both sexes undoubtedly take part. Period said to be 30–32 days, but no reliable data available. Single-brooded.

FOOD.—Small crustacean (*Artemia salina*) in Camargue (W. E. Clarke); grasses and water-plants growing beneath surface in Spain (A. Chapman); only vegetable matter in stomach (Salvin); univalve mollusca (*Cerithia*) (R. Wagner); bivalve mollusca (Radde).

DISTRIBUTION.—*England and Wales*.—Very rare vagrant. Obtained some fifteen times, but some were certainly escaped birds, and most recorded in recent years are open to that suspicion.

DISTRIBUTION.—*Abroad*.—From basin of Mediterranean (Spain, south France) to west Siberia, Lake Baikal and Persian Gulf, Africa and India to Ceylon, but apparently not breeding in tropics, excepting on Cape Verde Islands, a group inhabited by a number of other Palæarctic forms, Casual Canaries.

ORDER ANSERES.

Containing the Ducks, Swans and Geese, also *Mergus*. Also

called *Anseriformes*. Bill is sufficient to distinguish them from all other European birds; it is covered by thin skin, has at tip a horny plate shaped like a finger-nail and termed a "nail"; edges of mandibles with rows of fine lamellæ. Skull desmognathous, holorhine. Basi-ptyergoid process much in front. Syrinx in most species (except *Oidemia*) widening into a horny sac ("drum"), which differs in the various species. Tarsus in *Cygnus* and *Anser* entirely reticulated but in Ducks with a row of scutes along front. Toes always 4, hind-toe higher than front toes, which are connected by full webs. Primaries 11, first reduced, small, stiff. Aftershafts rudimentary or absent. Under feathers a rich covering of down. Eggs unspotted.

Popular division into Ducks, Geese and Swans cannot be maintained and therefore only one family accepted.

Tarsus of A. The Grey Lag-Goose, B. The Mallard, to illustrate reticulated tarsus of Swans and Geese and partially scutellated tarsus of Ducks.

FAMILY ANATIDÆ.

Characters see under Order *Anseres*.*Key to genera of Family ANATIDÆ.*

1	{	Bill more or less wide and depressed and with lamellæ not directed backwards	2	
	{	Bill narrow, compressed rather than depressed, without lamellæ, but with sharp teeth, directed backwards		<i>Mergus</i>
2	{	Lores bare		<i>Cygnus</i>
	{	Lores feathered	3	
3	{	Hind-toe broadly lobed, outer toe almost like inner	9	
	{	Hind-toe narrowly lobed, outer toe (and especially claw) weaker than middle toe	4	
4	{	No metallic or striking colours on wing	5	
	{	With metallic or otherwise striking colours on wing	6	
5	{	Bill entirely black		<i>Branta</i>
	{	Bill never entirely black		<i>Anser</i>
6	{	Upper mandible strongly concave, "nail" recurved over lower mandible, forming a hook		<i>Tadorna</i>
	{	Upper mandible only slightly concave, nail not recurved	7	
7	{	Lesser upper wing-coverts white or buff		<i>Casarca</i>
	{	Lesser upper wing-coverts not white or buff	8	
8	{	Upper mandible widened in front like spoon, lamellæ very fine and long		<i>Spatula</i>
	{	Upper mandible not perceptibly widened in front, lamellæ shorter and coarser		<i>Anas</i>
9	{	Inner primaries partly white or whitish	10	
	{	Inner primaries brown or blackish	11	
10	{	Bill uniform red or reddish, teeth of upper mandible prominent		<i>Netta</i>
	{	Bill not uniform reddish, teeth of upper mandible not prominent		<i>Nyroca</i>
11	{	Feathering on sides of upper mandible protruding in a point to under nostril		<i>Somateria</i>
	{	Feathering on sides of upper mandible not protruding in point to under nostril	12	
12	{	Plumage black or brown, never barred or sharply spotted		<i>Oidemia</i>
	{	Plumage not black, if brown partially barred or sharply spotted	13	
13	{	Feathering at base of upper mandible forming almost straight line, scarcely interrupted by angle at base of culmen, edge of upper mandible much curved		<i>Clangula</i>
	{	Line of feathering at base of upper mandible sharply interrupted by angle at base of culmen, edge of upper mandible almost straight or slightly curved	14	
14	{	Nail of bill small, occupying less than half width of tip of bill		<i>Bucephala</i>
	{	Nail of bill wide, occupying whole tip or at least more than half width of bill at tip	15	
15	{	Length of bill under 30 mm.		<i>Histrionicus</i>
	{	Length of bill over 30 mm.		<i>Polysticta</i>

Genus *CYGNUS* Bechst.

CYGNUS Bechstein, Orn. Taschenb. Deutschl. II, p. 404 (1803—Monotype : *C. olor*).

Remarkable for its white colour and long neck, which surpasses body in length or equals it. Tarsus rather short, reticulated. Lores in adult bare. Nail not occupying entire tip of upper mandible. Tail short, rounded to almost cuneiform. Hind-toe not lobed. Sexes alike, young brownish-grey or greyish-brown. 6 species of which 3 Palearctic, 1 Neotropical, 2 Nearctic.

Key to species of genus CYGNUS.

1 {	Tail graduated, lateral feather more than 7 cm. shorter than middle	<i>C. olor</i> , p. 231
	Tail rounded, lateral feather less than 7 cm. shorter than middle 2	
2 {	Yellow on bill reaching to nostrils	<i>C. cygnus</i> , p. 227
	Yellow not approaching nostrils by at least 1 cm.	

NOTE.—The whole of the DESCRIPTIONS and paragraphs on CHARACTERS in all the SWANS, GEESE and DUCKS are by Miss A. C. Jackson (now Mrs. R. Meinertzhagen).*

*CYGNUS CYGNUS*285. *Cygnus cygnus* (L.)—THE WHOOPER SWAN.

ANAS CYGNUS Linnæus, Syst. Nat., ed. x, i, p. 122 (1758—Europe. Restricted typical locality : Sweden).

Cygnus musicus Bechstein, Yarrell, iv, p. 308 ; Saunders, p. 413.

DESCRIPTION (Plate 5).—*Adult male and female. Winter and summer.*—Entire plumage white ; in some feathers of head, neck and under-parts mostly with rusty stain on edgings. No material in moult examined.

Nestling.—Down on head, neck and upper-parts pale greyish-white, slightly darker on crown and nape ; under-parts white ; loreal down extending on to bill nearly reaching posterior end of nostril. In three specimens examined loreal extends further forward than frontal down and that on intercrural space is produced to a point.

Juvenile.—Crown dark ash-brown, feathers narrowly tipped whitish ; rest of head, neck and upper-parts (except lower scapulars,

* I wish here to acknowledge my great indebtedness to Mr. E. Lehn Schiöler of Copenhagen for his kindness in having allowed me to examine at will his magnificent series of Swans, Geese and Ducks and for the great assistance he gave me. Although I had been given every facility to examine the collections in the British Museum and Lord Rothschild's Museum at Tring, for which I am most grateful, yet without Mr. Schiöler's material many descriptions would have been incomplete and some plumages undescribed. I am also very grateful to Dr. F. M. Chapman, Dr. J. Dwight and the American Museum of Natural History for very kindly sending material from America for my examination.—A.C.J.

back and rump), sides of body and flanks ash-brown, paler on neck, sides of body and flanks ; lower scapulars, back and rump white, feathers tipped or suffused pale ash-brown ; narrow line above eye and broad patch below eye white ; chin, throat and fore-neck ash-white ; rest of under-parts white, feathers of breast, belly, vent and under tail-coverts faintly edged light buff ; tail-feathers ash-brown shading to white towards base of inner web ; primaries and their coverts and secondaries more or less shaded pale ash-brown towards tip ; innermost secondaries ash-brown with white bases ; wing-coverts whitish more or less shaded pale ash-brown towards tip, innermost median and greater coverts ash-brown.

First winter and summer.—New ash-brown feathers, some tipped or edged white at side, others whitish with grey central streaks are acquired on crown, and a few new white feathers may be acquired on mantle, scapulars, sides of body and flanks, otherwise plumage apparently as in juvenile, but very little winter material examined and none in spring and summer.

Second winter and summer.—As adult.

Measurements and structure.—♂ wing 580–628 mm. (one 577 mm.) (measured with tape, see vol. i, p. *XIII), tail 161–180, tarsus 112–120, middle toe with claw 143–159, bill from feathers 101–112 (9 measured). ♀ wing 562–595, middle toe with claw 137–155, bill from feathers 94–103 (8 measured). Primaries : 1st narrow, pointed and little more than half longest primary-covert, 3rd and 4th about equal and longest, 2nd 10–27 mm. shorter, 5th 12–18 shorter, 6th 56–72 shorter ; 2nd emarginated inner web, 3rd and 4th both webs, 5th outer web. Innermost secondaries when wing closed extend considerably beyond longest primary. Tail short, rounded, 20 stiffish feathers. Bill rather longer than head, straight, higher than broad at base, gradually depressed, edges parallel, culmen (not including concave depression) descending and almost straight to nail then decurved, ridge broad and flat at base, upper mandible with one vertical row of lamellæ, under mandible with an external and internal row ; nail large and occupying almost entire tip of bill. Lores naked ; upper mandible with a lateral extension on either side to anterior corner of eye ; in nestling, loreal down extends on to bill, and in juvenile, lores and concave depression on culmen sparsely feathered. Nostrils situated rather nearer tip than base of bill. Neck long. Trachea entering carina sterni.

Soft parts.—Bill (ad.) anterior part black, including ridge of culmen below concave depression, basal part and lores yellow, yellow extending forward laterally to below middle of nares, but sometimes hardly to middle and sometimes beyond, nares black ; (sometimes a blackish line or band at base of culmen bordering fore-head and extending almost from eye to eye) ; intercrural space yellow ; bill (juv.) flesh-coloured basally, dusky terminally ; legs and feet (ad.) black, (juv.) greyish ; iris brown.

CHARACTERS.—No subspecies. Distinguished from other British Swans by large size and colouring of bill.

BREEDING-HABITS.—Breeds on islands in lakes, or drier patches in swamps. *Nest*.—Large heap of mosses and marsh-plants partly solidified with earth and with depression in middle. Remains of old nests visible for years after they have ceased to be used. *Eggs*.—4–6, rarely 7, yellowish-white when first laid, but soon becoming nest-stained. Average of 75 eggs, 112.8×72.6 . Max.: 126.3×71.3 and 114×77.4 . Min.: 105.2×72 and 117×68.1 mm. *Breeding-season*.—Usually late May or early June in Iceland; exceptionally early May. *Incubation*.—By female alone. Period 40 days (Faber); in captivity 31 and 42 days. Single-brooded.

FOOD.—Chiefly vegetable; grass, clover and roots and stems of water-weeds. In summer also fresh-water mollusca, worms and aquatic insects.

DISTRIBUTION.—*British Isles*.—Winter-visitor (Oct.–Nov. to March–April, occasionally May and June). More frequent Scotland than England, rare Ireland. More abundant severe weather. Used to breed Orkneys. Reported to have bred west Perth. 1919 and probably 1918 (E. H. Place, *Field*, Ap. 17, 1920) and two adults summer 1919 visited Loch Trieg (W. E. Clarke, *Scot. Nat.*, 1919, p. 196, 1920, p. 68). Pinioned birds have bred since 1910 Shetland (*cf. Ann. Scot. N.H.*, 1910, p. 245).

DISTRIBUTION.—*Abroad*.—Iceland, north Europe and north Asia, migrating southwards to central and south Europe, rarely N. Africa, central Asia, Persia, China, and occasionally Japan. Occasional in Greenland.

CYGNUS BEWICKII

286. *Cygnus bewickii bewickii* Yarr.—BEWICK'S SWAN.

CYGNUS BEWICKII Yarrell, Trans. Linn. Soc. London, xvi, ii, p. 453 (1830—England).

Cygnus bewickii Yarrell, Yarrell, iv, p. 315; Saunders, p. 415.

DESCRIPTION (Plate 5).—*Adult male and female*. *Winter and summer*.—Entire plumage white, feathers of head and under-parts in some with rusty stain on edgings. This plumage is apparently acquired by a complete moult; one (ad. ♂ Novaya Zemlia, Sept. 1st, 1902, in Tring Mus.) has remiges of both wings in quill, and is in full moult on upper- but not under-parts, one (ad. ♀ Jan. 13th) is moulting body-feathers; very little moulting material examined.

Nestling.—Like nestling *C. cygnus*, but apparently loreal down, though extending slightly further than frontal down, does not extend so far on to bill as in *C. cygnus*: down not extending so far on to intercrural space as in *C. cygnus* and not produced to such a sharp point at tip.

Juvenile.—None in fresh plumage examined. Two (March)

have juvenile feathers of upper-parts paler, and wings and tail much paler than in *C. cygnus*.

First winter and summer.—Apparently acquires some white feathers on mantle and scapulars, one (♂ 14.3.20 coll. E. L. Schiöler) has acquired new white mantle and scapulars and innermost secondaries and apparently one new pair of tail-feathers; rest of plumage as in juvenile. Very little material examined.

Second winter and summer.—Probably as adult but no material examined.

Measurements and structure.—♂ wing 515–537 mm. (measured with tape, see vol. I, p. *XIII), tail 150–168, tarsus 100–115, middle toe with claw 127–138, bill from feathers 90–98 (8 measured). ♀ wing 475–525, middle toe with claw 107–137, bill 84–95 (7 measured). Primaries: 1st narrow and more than half longest primary-covert, 3rd and 4th about equal and longest, 5th 15–24 shorter, 6th 60–72 shorter. Other structure as in *C. cygnus*.

Soft parts.—Bill (ad.) base of upper mandible yellow, yellow extending along culmen to below concave depression but laterally not to nostrils; black line at base of culmen bordering fore-head, in some extending from eye to eye, in some base of culmen entirely black and sides of bill only yellow, in others culmen black with a bridge of yellow above concave depression, rest of bill black, sides of rami of under mandible yellow, intercrural space yellow; bill (juv.) base of upper mandible to nostrils livid white, culmen mottled pink-brown, yellowish along ridge, tip, nail and edges of upper mandible blackish, intercrural space livid flesh-colour, mottled black along rami; legs and feet (ad.) black, (juv.) dirty yellowish-white or horny, each scale surrounded greyish-black; webs on upper surface black mottled white; iris brown.

CHARACTERS AND ALLIED FORMS.—*C. b. jankowskii* (E. Siberia) said to be larger with a broader bill. Distinguished from *C. cygnus* in all plumages by smaller size and yellow at sides of bill not extending to nostrils.

BREEDING-HABITS.—Breeds on low-lying ground on islands and near mouths of large rivers, close to water. *Nest*.—Large heap of moss mixed with some mud, and with depression in middle. *Eggs*.—Probably 4 is normal clutch, but 3 also recorded; creamy-white but readily stained. Average of 9 authentic eggs, 103.6×67.3 . Max.: 109×70 . Min.: 99.1×65.1 and 101.8×64.6 mm. *Breeding-season*.—During June. *Incubation*.—No positive data. Single-brooded.

FOOD.—Grasses, clover and aquatic plants; also part of small fish recorded and water-insects.

DISTRIBUTION.—*British Isles*.—Winter-visitor, Nov., occasional Oct., to March–April. Fairly frequent England and Wales in severe winters, and sometimes abundant Scotland, especially in Hebrides.

In Ireland regular visitor to parts of Ulster, Connaught and co. Kerry, and in severe winters more numerous and more general.

DISTRIBUTION.—*Abroad.*—North Russia (Petchora), Kolguev, Novaya Zemlia and arctic Asia, but replaced by slightly larger race in east Siberia. In winter south to British Isles, Norway, Finland, Germany, sometimes to Caspian and Mediterranean, central Asia, casually to Sind.

CYGNUS OLOR

287. *Cygnus olor* (Gm.)—THE MUTE SWAN.

ANAS OLOR Gmelin, Syst. Nat., i, ii, p. 501 (1789—Russia).

Cygnus olor (Gmelin), Yarrell, iv, p. 324; Saunders, p. 417.

DESCRIPTION.—*Adult male and female.* *Winter and summer.*—Entire plumage white. This plumage is acquired by a complete moult in autumn; remiges of both wings are shed together apparently before moult of body and tail commences.

Nestling.—Down on crown, nape, upper-parts and sides of body and uropygial tuft pale greyish-brown, under-parts white. Frontal down in two specimens examined extends slightly further forward than loreal down; down on intercrural space rounded in shape at tip and not extending so far on to bill as in *C. cygnus*.

Juvenile.—Crown hair-brown, feathers tipped white; nape, sides of face and neck whitish intermixed with pale drab-brown feathers, in some nape and sides of neck more or less pale drab; mantle, scapulars and upper tail-coverts when fresh hair-brown fading to drab, lower scapulars white, more or less suffused pale drab towards tip; on centre of mantle, back and rump some feathers white more or less suffused pale drab at tip; chin, throat and fore-neck more or less white, in some suffused palest drab; sides of body and flanks pale drab; rest of under-parts white, in some suffused pale drab; tail-feathers drab shading to whitish at base; primaries and all secondaries more or less suffused pale drab; primary-coverts, all wing-coverts and bastard-wing whitish more or less suffused and tipped pale drab, greater coverts with inner webs paler.

First winter and summer.—Apparently moults in a dark ash-brown head like that of juvenile and acquires a certain amount of new white body-feathers, but very little material examined.

Second winter and summer.—Probably as adult but not examined.

Measurements and structure.—♂ wing 560–622 mm. (measured with tape, see vol. i, p. *XIII), tail 189–198, tarsus 98–120, bill from knob 70–85, middle toe with claw 142–163 (10 measured). ♀ wing 535–570, bill from feathers 73–90 (9 measured) (Schiöler). Tail wedge-shaped, 22–24 stiff feathers. Bill as in *C. cygnus* but upper mandible with a knob at base which becomes much enlarged in spring, is merely a slight protuberance in female and perceptible in juvenile; culmen without concave depression, nail oblong, small and not nearly occupying whole culmen. Nostrils rather nearer

base than tip of bill. Juvenile with loral feathering scanty. Trachea not entering carina sterni which is simple. Other structure as in *C. cygnus*.

Soft parts.—Bill (ad.) pinkish-red tinged orange, nail, knob, area around and behind nostrils, base and cutting edge black, under mandible black basally with an irregular flesh-coloured area towards tip; bill (nestling) black with yellowish nail; legs and feet dark grey; iris hazel.

CHARACTERS.—No subspecies. Distinguished by large size and coloration of bill. Adult male in breeding-season with enormously enlarged knob at base of bill.

BREEDING-HABITS.—In wild state breeds on islands in swamps and on reed-grown lagoons, but in semi-domesticated state almost anywhere near water; sometimes in colonies. *Nest*.—Large heap of water-weeds and vegetable remains from water, with depression at top, usually on dry land close to water, but sometimes in water. *Eggs*.—Normally 5–7, but cases of 8–12 on record; over 9 possibly due to two females; not white like other British Swan's eggs, but covered with bluish-green tinge. Average of 50 eggs, 114.5×73.1 . Max.: 122×77.1 and 119×80 . Min.: 105×73 and 112×70 mm. *Breeding-season*.—Usually in second half April in British Isles, sometimes not till May. *Incubation*.—Practically entirely by female, male occasionally taking small share. Period apparently from 34 or 35 days to (occasionally) 42–43. Single-brooded.

FOOD.—Almost entirely vegetable; water-vegetation; *Confervæ* and *Characiæ*, *Callitriche aquatica*, *Potamogeton*, also rhizomata of reed, arrow-head and stalks and roots of other aquatic plants. Insects and their larvæ, worms and snails said to be eaten; frogs, toads and young water-birds occasionally killed but not eaten.

DISTRIBUTION.—*British Isles*.—Originally introduced and now resident and generally distributed. Truly wild birds may sometimes occur.

DISTRIBUTION.—*Abroad*.—Breeds in a wild state in south Scandinavia, Denmark, north Germany, central and south Russia, south-east Europe, and eastwards to Turkestan and Mongolia. Migratory, and wintering in basin of Mediterranean, on Caspian Sea and eastwards, occasionally in north-west India. Found in a semi-domesticated state in many places.

[NOTE.—There is no doubt that the so-called Polish Swan (" *Cygnus immutabilis* ") is only an aberrant domesticated and semi-domesticated Mute Swan.]

[NOTE.—An immature bird, supposed to be an example of the AMERICAN TRUMPETER SWAN, *Cygnus buccinator* Richardson, was shot near Aldeburgh (Suffolk) in Oct., 1866, and is in the Museum of that town (Yarrell, iv, p. 322; Saunders, p. 416). Examples of the AMERICAN WHISTLING SWAN, *Cygnus columbianus* Ord, are stated, "on weak evidence," to have been found in shops of Edinburgh poulterers (Yarrell, iv, p. 322; Saunders, p. 416).]

Genus ANSER Briss.

ANSER Brisson, Orn. I, p. 58 (1760—Type "*Anser*" = *Anser anser*, by tautonymy, according to Brisson, Orn. VI, p. 261).

Bill high at base, about same length as head, cutting edge of upper mandible decidedly concave, serrations strong, tooth-like, visible from outside. Nostrils longitudinal, about middle or little behind middle of bill. Nail occupying entire tip of upper mandible. Feathers of neck narrow, slightly elongated and somewhat convex, so that neck appears furrowed. Wings long and pointed, 3rd primary longest, 4th a little and 5th much shorter. Tail short, rounded, 16–18 rectrices. About 13 species, Palæarctic and Nearctic.

Key to species of genus ANSER.

1 {	Rump white or nearly white	<i>A. hyperboreus</i> , p. 247
	Rump ash-grey	<i>A. anser</i> , p. 233
	Rump dark brown or dark greyish-brown	2
2 {	Nail of bill whitish	3
	Nail of bill black	4
3 {	Larger, wing over 380 mm.	<i>A. albifrons</i> , p. 237
	Smaller, wing under 380 mm.	<i>A. erythropus</i> , p. 240
4 {	Upper wing-coverts dark brown-grey, larger	<i>A. fabalis</i> , p. 242
	Upper wing-coverts paler, more bluish-grey, smaller	<i>A. brachyrhynchus</i> , p. 245

ANSER ANSER

288. *Anser anser* (L.)—THE GREY LAG-GOOSE.

ANAS ANSER Linnæus, Syst. Nat., ed. x, i. p. 123 (1758—Europe. Restricted typical locality: Sweden).

Anser cinereus Meyer, Yarrell, IV, p. 253; Saunders, p. 397.

DESCRIPTION (Plate 5).—*Adult male and female. Winter.*—Narrow line of white round base of upper mandible, often ill-defined or absent; crown and centre of nape ash-brown; feathers of mantle and scapulars dark ash-brown (in some with grey bloom) with brownish-white edges, narrower on scapulars, lower scapulars black-brown; back and rump ash-grey, feathers in some tipped ash-brown; sides of back, rump and upper tail-coverts white, in some central upper tail-coverts suffused ash-grey; small whitish patch below eye; rest of head, chin and throat light ash-brown; lower-throat bordering upper-breast paler and feathers with greyer bases; sides of body and flanks as mantle, but feathers with broader tips of brownish-white and mostly with grey bloom; thighs pale ash-brown; breast and part of belly pale ash-grey or ash-brown, feathers tipped white or greyish-white (sometimes some feathers more or less mottled dark grey towards tip), lower-belly and vent white, varying number of black or dark grey feathers tipped black sparingly distributed on under-parts; under tail-coverts white; axillaries and under wing-coverts palest ash-grey; tail-feathers dark ash-brown with grey bloom, edged and broadly

tipped white, some with inner webs more or less white, outer feathers mostly white; primaries brown-black with white shafts, inner webs paler towards base, outer primaries with grey bloom on basal two-thirds; secondaries black-brown, outer webs and tips very narrowly bordered white; all primary-coverts, bastard-wing, some outer median coverts and lesser coverts pearl-grey; outer greater coverts ash-grey tipped white, inner ones sepia (some with grey bloom), and narrowly edged and tipped white; rest of median coverts as mantle. This plumage is acquired by complete moult July to Jan., moult of remiges taking place July (all remiges are shed together) and body and tail (except for a few body-feathers) not commencing in earnest until remiges are nearly grown. *Summer.*

The Grey Lag-Goose, (*Anser anser*). Tips of greater wing-coverts of
A, Juvenile, B, Adult.

—Coloration as winter and no moult apparent, but light edges to feathers of upper-parts become more or less worn off. N.B.—Some males (old birds?) have more black on under-parts than females, but a younger male often has less black than an older female.

Nestling.—Down on crown, centre of nape, upper-parts, sides of body and sides of thighs olive-brown, long filaments in some tinged greenish-yellow, bar across wing greenish-yellow or yellowish-white; fore-head, sides of face, sides of neck and under-parts greenish-yellow (in some area round eye more or less suffused olive-brown, in some sides of face canary-yellow and under-parts yellowish-white).

Juvenile.—Like adult, but no white line at base of bill, in some chin white; mantle and scapulars with browner edges than in adult; sides of body and flanks pale ash-brown, feathers shading to light brown at tips, which are buffish-white; rest of under-parts

as in adult, but with no black, though sometimes feathers of breast and belly have dark ash-brown centres or streaks and mottlings ; tail and wings as in adult. Feathers of sides of neck normal without sharply pointed tips of adult, feathers of mantle, scapulars and under-parts narrower and more rounded at tip than in adult, tail-feathers, secondaries, greater and median coverts narrower than in adult, tail-feathers more pointed and wing-coverts more rounded at tip.

First winter and summer.—Like adults, but usually no white line at base of bill ; under-parts with no black or with only an odd black feather, sometimes some feathers marked blackish-grey. Distinguished from adults by unmoulted juvenile secondaries and greater and median wing-coverts. The juvenile body-feathers, some tail-feathers (in some no tail-feathers are moulted), sometimes some innermost secondaries and median coverts are moulted from Sept. onwards.

Second winter and summer.—Like adults, but with less black on under-parts.*

Measurements and structure.—♂ wing 447–482 mm., tail 129–150, tarsus 73–82, bill from feathers 56–69 (10 measured). ♀ wing 416–468, bill from feathers 54–70. Primaries : 1st narrow, pointed and about two-thirds longest primary-covert, 3rd longest, 4th equal or 3–5 mm. shorter, 2nd 10–19 shorter, 5th 28–31 shorter, 6th 57–65 shorter ; 2nd emarginated inner web, 3rd both webs, 4th outer web. Innermost secondaries and scapulars broad and with square tips, slightly rounded in innermost secondaries, longest of which is shorter than 5th or 6th primary. Tail short, rounded, 18, exceptionally 20, broad feathers, rather rounded at tip. Feathers of neck convex and projecting, with pointed tips, giving characteristic “furrowed” appearance. Bill about length of head, higher than broad at base, upper mandible with ridge broad and flat at base, narrowed towards end, culmen sloping gradually to circular, convex nail ; tomia distinctly arched with indentations of upper mandible quite apparent, commissure gaping widely, teeth 21–23. Weight 5 lbs. 12 oz. to 12 lbs. (Alphéraky), exceptionally 16½ lbs. (Naumann).

Soft parts.—Bill (ad.) flesh-coloured to orange-yellow, nail whitish-grey ; (juv.) very light flesh-colour or even yellowish-green with some pink tinge ; legs and feet flesh-colour, claws black ; iris brown.

CHARACTERS.—No subspecies. Large size, stout flesh-coloured to yellow bill with white nail, ash-grey back and rump, pearl-grey bastard-wing, outer median coverts and lesser coverts distinguish species.

FIELD-CHARACTERS.—The four British “Grey” Geese so closely resemble each other, that they can never be specifically distinguished

* As shown by specimens in the collection of Mr. E. Lehn Schiöler, who is able to state by examination of their sexual organs that they do not breed in their first year.—A.C.J.

when merely seen flying high overhead. All are strictly inland-feeders, only resorting to coast for purposes of refuge or resting. Grey Lag is largest and readily recognizable (say with telescope up to 500 yards or more) by very pale colour of whole fore-wing—that is, shoulder, wing-coverts and big bastard-wing are all of a clear pale blue which shows up in striking contrast with darker colours that adjoin, especially as seen in flight, when passing low; or on ground when stretching a wing, when also pale ashy rump shows up. Bill larger and paler than in Pink-footed and with no black as in Bean-Goose. Note sonorous, nasal, “Gagga-gagga, gagga-gagga . . .” oft repeated. (A. Chapman.)

BREEDING-HABITS.—Haunts moorland, islands in lochs, and “flows” for breeding purposes. *Nest*.—Built in long heather, marsh grasses and *Sphagnum*, often in very wet places, of bits of heather twigs, mosses, grass, etc., with good deal of down and small feathers. On the Continent I have seen nests in water, chiefly built of dead reeds. *Eggs*.—Usually 4 to 6, occasionally 3 only or 7, while clutches of 8, 10 and 12 are probably due to two hens. Creamy-white, but often stained with yellowish or pale brown. Average of 111 eggs 87.1×58.5 . Max. : 100×61 . Min. : 78.5×56.3 and 80×54.8 mm. *Breeding-season*.—Usually last fortnight of April in Scotland. *Incubation*.—By female alone. Period 28 days. Single-brooded.

FOOD.—Grass largely eaten in spring: in autumn grain (wheat, rye, and even maize), also peas, beans, lentils, etc. Green rye also favourite food. *Zostera marina*, cloud-berries, and acorns also recorded.

DISTRIBUTION.—*England, Wales and Ireland*.—Winter-visitor, end Sept.—mid-Nov. to March—April. Rare along east coast England, and very irregular in south and west. Used to breed (Yorks., Cambridge up to 1773, Lincs. to early 1800). In Ireland rare in most counties, but visits parts of Wexford, Wicklow, Meath, Louth, Mayo, and lower Shannon. Probably formerly bred Bog of Allen and co. Down. *Scotland*.—Resident. Breeds Ross, Sutherland, Caithness, some I. Hebrides, and more plentifully O. Hebrides. On mainland does not breed south of Loch Maree in truly wild state. In winter more general, but apparently irregular on east side. Has increased of recent years in Solway.

DISTRIBUTION.—*Abroad*.—Breeds in Iceland, Europe, north-east of a line drawn from Friesland to the Lower Danube, and in Asia as far east as east Siberia and Kamtschatka (probably only exceptionally in south Spain and Lake Fetzara in north Algeria), migrating south in winter as far as Mediterranean and north Africa, China and N.W. India. Casual Madeira, Azores.

[NOTE.—A specimen of *Anser rubrirostris* Swinhoe is said to have been obtained in co. Limerick, Nov. 23, 1901 (F. Coburn, *Bull. B.O.C.*, xii, p. 80), but according to Alphéraky, Hartert and others, this supposed eastern race cannot be distinguished.]

ANSER ALBIFRONS

289. *Anser albifrons* (Scop.)—THE WHITE-FRONTED GOOSE.

BRANTA ALBIFRONS Scopoli, *Annus 1 Historico-Natur.*, p. 69 (1769—Specimen in "Museum Turrianum," presumably from N. Italy).

Anser albifrons (Scopoli), Yarrell, IV, p. 261; Saunders, p. 399.

DESCRIPTION (Plate 5).—*Adult male and female. Winter.*—Fore-head and broad band at lateral base of bill white, bordered behind by black or brown-black band, merging into dark ash-brown of crown; nape and upper-mantle dark ash-brown, in some tinged rich buff-brown or bistre-brown; rest of mantle and scapulars very dark ash-brown edged lighter brown, fading at tip to brownish-white, some feathers of mantle with dark grey bloom; lower scapulars dark sepia; back and rump dark sepia, feathers in some with dark grey bloom, edged at tip with lighter brown, those bordering upper tail-coverts in some more or less tipped white; sides of back and rump white; upper tail-coverts white, sometimes some with central ash-brown streaks; feathers on intercrural space usually more or less white (white sometimes absent), bordered behind in some by black or black-brown, sometimes with two parallel blackish streaks extending on to chin; small white patch in some under eye; sides of face and rest of neck ash-brown; upper-breast pale ash-brown, feathers fringed buffish-white; sides of body and flanks as mantle, but sometimes intermixed with black feathers, outer feathers edged white on outer web; thighs ash-brown; rest of breast, belly and vent greyish-white or pale ash-brown, more or less mixed with irregular spots and patches of black, isolated or more or less confluent, and sometimes breast and belly very heavily marked black; vent and under tail-coverts white; axillaries and under wing-coverts dark ash-brown; tail-feathers sepia tipped white, outer webs and in some inner narrowly bordered white, outer feathers sometimes with inner webs more or less white; primaries brown-black with white shafts (brown towards tip), outer primaries with grey bloom on basal two-thirds; secondaries brown-black, outer webs and tips usually narrowly bordered white, innermost and their coverts with outer webs as mantle and faintly edged white; primary-coverts and bastard-wing dark ash-grey; greater coverts sepia with dark grey bloom and tipped white; lower median coverts as mantle; lesser and rest of median wing-coverts and lesser and median primary-coverts ash-brown with dark grey bloom and lighter brown tips. This plumage is acquired by complete moult July to Jan.; remiges are shed together in July, body and tail moult usually commencing in earnest later. *Summer.*—There appears to be a partial moult Feb. and March, involving feathers of head, neck and scattered body-feathers, sometimes an odd tail-feather but possibly such birds may be completing a delayed winter-moult. Coloration as winter, but edges of feathers of upper-parts more or less worn off.

Nesting.—Down on crown, centre of nape, rest of upper-parts,

and sides of body sepia, paler on nape ; yellowish-white bar across wing ; fore-head, rest of neck, sides of face, chin and throat ashy-white tinged buff-yellow ; sepia streak from lores to eye ; remaining under-parts greyish-white, in some with yellowish tinge.*

Juvenile.—Like adult, but no white on fore-head or at base of bill, in some band at base of bill black or black-brown ; in some chin white ; mantle and scapulars as in adult, but with less dark grey bloom being uniform sepia with lighter brown edges ; central upper tail-coverts in some with ash-brown central streaks ; feathers of sides of body and flanks paler than in adult being uniform ash-brown, feathers with buffish-white or brownish-white tips, some flank-feathers with outer webs edged whitish-buff ; upper-breast as in adult ; rest of breast and belly pale ashy-white without any black markings, but sometimes some spots or frecklings of dark grey giving a speckled appearance ; lower-belly and vent white ; tail and wing as in adult. Feathers of sides and front of neck normal without pointed tips of adult, those of mantle, scapulars and under-parts narrower and more rounded at tip ; tail-feathers, secondaries, greater and median coverts narrower than in adult, tail-feathers more pointed and wing-coverts more rounded at tip.

First winter and summer.—Like adult, but usually with less white on fore-head and at base of bill (in some with quite as much white as in adult), white often more or less intermixed with black feathers, in some with little if any white at lateral base of upper mandible which is more or less black ; chin more or less black, sometimes with white patch ; usually no black markings on under-parts, but in some a few black feathers and feathers of breast and belly often more or less mottled or spotted with dark grey giving a speckled appearance, in some with dark grey centres ; new tail-feathers as in adult ; wing as in juvenile, but worn and abraded. The juvenile body-feathers (back and rump always?), some tail-feathers, in some central pair only, occasionally innermost secondaries but not rest of wings are moulted from Sept. onwards. Usually many juvenile body-feathers are retained and under-parts and tail are often not moulted.

Second winter and summer.—Not to be distinguished with certainty from adults.

Measurements and structure.—♂ wing 392–442 mm., tail 114–132, tarsus 60–71, bill from feathers 43–52 (12 measured). ♀ wing 380–421, bill 43–47. Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 4–11 mm. shorter, 5th 28–42 shorter, 6th 62–73 shorter. Tail with 16, sometimes 18, feathers. Bill shorter than head, otherwise as in *A. anser* : teeth about 28. Loral and to lesser extent frontal, feathering on bill with a more curved outline than in *A. anser*, loral feathering

* Description from nestlings in Mr. E. L. Schiöler's collection. Specimens in British Museum differ in having a yellowish-white patch more or less indicated below wing, while fore-head, rest of neck, sides of face, and under-parts are yellow.

apparently extending further on bill. Weight 4 to 6 lbs. (Popham). Other structure as in *A. anser*.

Soft parts.—Bill (ad.) whitish flesh-colour, sometimes light orange-yellow, nail white; (juv.) yellow-grey or grey flesh-colour or grey with lilac tinge, nail greyish; legs and feet (ad.) orange with paler membranes, sometimes reddish flesh-coloured, claws whitish; iris dark hazel; eyelids greyish sometimes with yellowish shade or brownish-grey but never lemon-yellow or orange as in *A. erythropus*.

CHARACTERS AND ALLIED FORMS.—*A. a. gambeli* (N. America) doubtful form said to be larger, but material from breeding grounds required for confirmation. For distinctions of *A. erythropus* see under that species. Whitish flesh-coloured or yellow bill with white nail, dark brown back and rump, ash-brown lesser and lower median coverts, and in adults broad white band at base of bill distinguish *A. albifrons* in all plumages from other British "Grey" Geese.

FIELD-CHARACTERS.—Appears much darker than either Grey Lag or Pink-footed, and apart from its white stern, shows no markedly paler appearance on rising or spreading its wings. At close range barred under-parts and white fore-heads are distinctive. Unlike other "Grey" Geese, prefers bogs as feeding ground, and is more apt to split up into family parties or small lots. More active in flight than other "Grey" Geese and possesses an astounding power of "reversing engines" when scared. A party within 25 feet of a shooter's head as he lies prone, will shoot up perpendicularly to long gun range, if not out of it, before he can raise himself to put his gun up, and similarly they can rise almost perpendicularly from ground. No other British Goose has (or exercises) this power in same degree. Notes less nasal than Grey Lag or Pink-footed, more querulous, more highly pitched and more musical, uttered in quicker time and possessing a curious metallic ring—a strangely haunting sound. Less sensitive than Grey Lag to scent of man but will often get "the wind" at 100 yards. (William Percy.)

BREEDING-HABITS.—Breeds on tundra or bare lava flats. *Nest*.—On tundra heap of heather, grasses, moss, etc., mixed with down and feathers, but in lava sand, merely a hollow lined with down. *Eggs*.—Usually 4 to 6, occasionally 7, creamy-white but becoming stained as incubation progresses. Average of 81 eggs, 78.3×53.4 . Max.: 88.5×56.5 and 85×59 . Min.: 72.3×51 and 75.6×49.2 mm. *Breeding-season*.—End May and early June in Iceland. *Incubation*.—By female apparently. Period not definitely recorded, but said by Faber to last 30 days (?). Single-brooded.

FOOD.—Mainly grasses from salt-marshes. Naumann specifies *Plantago maritima*, *P. subulata*, *Triglochin maritimum*, *Ameria maritima*, *Poa distans*. Also *Trifolium repens* and remains of large beetles, and probably at times grain, green shoots of reed and sedge, etc.

DISTRIBUTION.—*British Isles.*—Winter-visitor Oct. to March–May. Regular Caithness but otherwise scarce east coast Great Britain, sometimes plentiful south and most regular west, where, however, its distribution is irregular. In Ireland regular and often abundant on great bogs in all provinces.

DISTRIBUTION.—*Abroad.*—Breeds from Lapland (according to Göbel) and Novaya Zemlia, Kola, Kolguev, Kanin, and eastward along arctic Siberia to country of Tchuktchi. Also Iceland, probably Greenland, and arctic North America, but American authors distinguish another form under the name of *A. albifrons gambeli*, a distinction which requires confirmation.* On migration all over Europe to Mediterranean and north Africa, Caspian and Black Seas, north India, Burma (rare), Corea, Japan and China, in America to Mexico and Cuba.

ANSER ERYTHROPUS †

290. *Anser erythropus* (L.)—THE LESSER WHITE-FRONTED GOOSE.

ANAS ERYTHROPUS Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—"Habitat in Europa septentrionali").

A. erythropus, Yarrell, iv, p. 263 (in text); Saunders, p. 400 (in text); *id.*, Brit. B., i, p. 14.

Anser finmarchicus Gunner, Hand-List (1912), p. 129.

DESCRIPTION (Plate 5).—*Adult male and female.* *Winter.*—Like *A. a. albifrons*, but white band on fore-head extends further backwards on to crown usually to above centre of eye, in some to beyond posterior corner of eye; in some only a white spot at tip of feathering on lower mandible, in others this white as extensive as in *A. a. albifrons*. Rest of plumage as in *A. a. albifrons*, but freshly moulted specimens appear to have head and neck darker, feathers of upper-mantle with richer brown edgings. *Summer.*—No moult apparent. Coloration as winter.

Nestling.—As *A. a. albifrons*, but fore-head and nape as crown; upper-parts appear darker, light patch below wing merely indicated; lores sepia; sides of face yellow suffused sepia; under-parts yellow, fore-neck suffused dusky. (One specimen 3.7.01 East Finmark, in coll. N. F. Ticehurst compared with nestling *A. a. albifrons* in Brit. Mus.)

Juvenile.—Coloration as in *A. a. albifrons* but fore-head, crown and centre of nape appear darker. No white on chin in few specimens examined. Distinguished from adult by same characters which distinguish juvenile *A. a. albifrons* from adults.

* Some specimens of White-fronted Geese from Ireland have been assigned by Mr. F. Coburn to *Anser gambeli*, but the validity of this supposed race is doubtful.

† Prof. E. Lönnberg gives evidence from Linnean MSS. to show that the bird described by Linnæus under this name was the White-fronted Goose which breeds in northern Sweden, *i.e.* the Lesser White-fronted Goose (see *Ibis*, 1913, pp. 400–402).

(2-3RDS NATURAL SIZE.)

1, The Whooper Swan (*Cygnus cygnus*). 2, Bewick's Swan (*C. b. bewickii*). 3, The Grey Lag-Goose (*Anser anser*). 4, The White-fronted Goose (*A. albifrons*). 5, The Lesser White-fronted Goose (*A. erythropus*). 6, The Bean-Goose (*A. f. jabalis*). 7, The Pink-footed Goose (*A. brachyrhynchus*). 8, The Brent Goose (*Branta b. bernicla*). 9, The Barnacle-Goose (*B. leucopsis*).

[Face p. 240.]

First winter and summer.—As adult but with black on breast and belly confined to a feather or two, one March specimen (no sex) has white band on fore-head as extensive as in adult, feathers on intercrural space white, one ♀ Yenisei, June, has white on fore-head and at base of bill less developed and no white on intercrural space. Most juvenile body-feathers, some tail-feathers, some innermost secondaries and median coverts are moulted in winter and spring (only two specimens examined).

Measurements and structure.—♂ wing 367–388 mm., tail 95–109, tarsus 58–62, bill from feathers 28–35 (9 measured). ♀ wing 352–381, bill 32–35 (4 measured). Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 5–10 mm. shorter, 5th 28–35 shorter, 6th 56–67 shorter. Folded wings usually overlap tips of tail-feathers, while in *A. a. albifrons* they seldom do so. Tail-feathers 16. Bill considerably shorter and comparatively thicker at base than in *A. a. albifrons*, tomia of upper mandible very slightly curved and completely covering teeth when bill is shut ; teeth 20–22. Other structure as in *A. a. albifrons*.

Soft parts.—Bill (ad.) light rose-red to rosy flesh-colour, sometimes orange-red, nail white, (juv.) dingy pink-grey ; legs and feet (ad.) orange-yellow with paler webs, (juv.) pale dingy-yellow ; iris dark chestnut ; eyelids orange-yellow or lemon-yellow and perceptibly swollen.

CHARACTERS.—No subspecies. Distinguished from *A. a. albifrons* by much smaller size, and in adults by white on fore-head extending further back on to crown.

BREEDING-HABITS.—Very little definitely recorded. Breeds in more wooded country than Grey Lag and White-fronted Geese. *Nest.*—On elevations in marshes, sometimes sheltered by rank grass, near rivers ; a heap of grasses, moss, etc., with down and feathers. *Eggs.*—4 or 5 to 6, more yellow than white, and smooth-shelled. Average of 72 eggs, 76.4×48.8 . Max. : 84.5×50.5 and 76×52 . Min. : 69×43 mm. *Breeding-season.*—Early June in Lapland. *Incubation.*—Probably by female alone ; period not definitely recorded. Single-brooded.

FOOD.—Probably similar to allied species, but little recorded ; vegetable matter, chiefly grasses and grain.

DISTRIBUTION.—*England.*—Very rare vagrant. Young male Fensham Flats (Northumberland) Sept. 16, 1886 (A. Chapman, *Field*, Dec. 11, 1886, p. 87 ; Saunders, p. 400). [Adult female, Wash (Norfolk), Jan. 24, 1900 (F. Coburn, *Zool.*, 1901, p. 317 ; J. H. Gurney, *Ibis*, 1902, pp. 269–75), one said to have been taken near York (*Birds Yorks.*, p. 413) and one in Humber District about 1874 (J. Cordeaux, *List Birds Humber District*, p. 22), and some possibly on Solway, Jan., 1894 (H. S. Gladstone, *Birds Dumfries*, p. 243), but the histories of these specimens are not above reproach.]

DISTRIBUTION.—*Abroad.*—Breeds in tundras of Siberia (and probably Kamtschatka), westward to Kanin and Lapland. Winters in Japan, China and (in small numbers) in India, Mongolia, and probably in Turkestan, in small numbers to central, south and west Europe. Casual Egypt.

ANSER FABALIS *

291. *Anser fabalis fabalis* (Lath.)—THE BEAN-GOOSE.

ANAS FABALIS Latham, Gen. Syn., Suppl., I, p. 297 (1787—Great Britain).

Anser segetum (Gmelin), Yarrell, iv, p. 265; Saunders, p. 401.

DESCRIPTION (Plate 5).—*Adult male and female.*—*Winter.*—Fore-head and crown dark ash-brown, feathers with black-brown bases; in some a small white patch on fore-head, in some merely a few white feathers; nape buff-brown; upper-mantle ash-brown, feathers tipped buff-brown; mantle and scapulars very dark ash-brown with lighter brown edges shading to brownish-white at tip, in some feathers with grey bloom; back, rump and some upper tail-coverts black-brown, feathers edged sepia (upper tail-coverts sometimes more or less tipped white); sides of back and rump, and rest of upper tail-coverts white (central upper tail-coverts sometimes suffused dark grey); lores and cheeks dark ash-brown, lores in some black-brown; chin, throat, rest of neck and upper-breast dark ash-brown, feathers with buff-brown tinge, those of upper-breast with broad light buff tips (chin in some with white spot); feathers of sides of body and flanks as mantle, but more broadly tipped whitish, some flank-feathers narrowly bordered white on outer web and tipped same; thighs ash-brown, feathers with light buff tips; rest of breast and part of belly very pale ash-brown, feathers shading to white or buff-white at tip (in fresh plumage feathers of breast and belly with faint terminal dusky-brown lines); lower-belly, vent and under tail-coverts white (in some under-parts with an odd black feather); axillaries and under wing-coverts dark ash-brown; tail-feathers dark ash-brown, tipped and narrowly bordered white, outer ones with inner webs paler; primaries brown-black with white shafts (brown towards tip), outer primaries usually with grey bloom on basal two-thirds; secondaries brown-black, outer webs and tips usually narrowly bordered white, innermost with outer webs more or less dark ash-brown shading to lighter at border and bordered white; primary-coverts and bastard-wing dark ash-grey; greater and lower median coverts dark ash-brown broadly tipped white (in some with grey bloom), rest of median coverts same with narrow light brown or whitish tips; rest of wing-coverts ash-brown with dark grey bloom and lighter brown tips (in some lesser coverts sepia similarly edged). This plumage is acquired by complete

* Many authors have separated two supposed species: *Anser fabalis* (= *segetum* Gm.) and *Anser arvensis*, and Mr. F. W. Frohawk stated that *A. arvensis* is the usual form (*Field*, Oct. 4, 1902, p. 605), but the two supposed species are only variations of *A. fabalis*.

moult from July onwards ; moult of remiges usually appears to be almost completed before body and tail moult commences. *Summer*.—There appears to be a partial moult in spring (March and early April) involving feathers of head, neck and odd body-feathers, and occasionally some tail-feathers. Coloration as winter but light edges to feathers of upper-parts abraded.

Nestling.—Down on crown, centre of nape and upper-parts olive-brown, long filaments of nape and upper-mantle tinged greenish-yellow ; indistinct spot below wing, and bar across yellowish ; black-brown line from side of upper mandible to eye, eye-lids black-brown ; region below eye yellowish, more or less suffused olive-brown ; sides of body and back of thighs dusky-brown ; remaining under-parts whitish-yellow.

Juvenile.—Like adult, but no indication of white feathers at base of bill ; edges to feathers of mantle, scapulars and wing-coverts browner ; black-brown upper tail-coverts tipped buff, white upper tail-coverts with brownish shaft-streaks or central markings ; sides of body and flanks pale ash-brown tipped buff ; rest of under-parts as in adult, but sometimes feathers more or less suffused towards centre or narrowly streaked or spotted ash-brown ; tail-feathers as in adult, but white borders usually much narrower and in some absent ; wing as in adult, but secondaries including innermost, sometimes without white borders or tips. Feathers of sides and front of neck normal, without pointed tips as in adult ; feathers of mantle, scapulars and under-parts narrower and more rounded at tip, not broad and square as in adult ; tail-feathers, secondaries, greater and median coverts narrower, tail-feathers more pointed and wing-coverts more rounded at tip.

First winter and summer.—As adult and only to be distinguished by more worn appearance of juvenile wing, especially narrower and more worn greater and median coverts. The juvenile body-feathers (back ?, some feathers of rump) some tail-feathers, sometimes some innermost secondaries and coverts and some median coverts are moulted Oct. to April.

Second winter and summer.—As adult winter.

Measurements and structure.—♂ wing 447–473 mm., tail 117–136, tarsus 71–82, bill from feathers 56–64, depth of bill at base of both mandibles 30–33, greatest visible depth of lower mandible with bill shut 7–9 (11 measured). ♀ wing 424–452, bill 51–60. Primaries : 1st narrow, pointed and slightly more than half longest primary-covert, 3rd longest, 2nd 10–16 mm. shorter, 4th 7–10 shorter, 5th 33–40 shorter, 6th 65–72 shorter. Tail with 18 feathers. Bill as in *A. anser*, but not so stout, narrower towards tip viewed from above, of less depth throughout viewed laterally. Outline of frontal and loreal feathering as in *A. a. albifrons* but less accentuated. Teeth 24–28. Weight 7½–8 lbs.

Soft parts.—Bill (ad.) variable, in some black with rose-red, orange-pink or orange-yellow band round both mandibles just behind nail, in some as above, but band extending on upper

mandible backward under nares and along tomium almost to gape, in some upper mandible entirely yellow with only small black patch on culmen, nail variable, black, in some entirely white, in one half white and half black, lower mandible orange-pink with rami black at base; bill (juv.) blackish with band of yellow behind nail or in some yellow except for blackish patch at sides, blackish mark on top of culmen and area round nostrils, nail black streaked yellow, anterior half of under mandible including intercrural space yellow, rest black; legs and feet (ad.) yellow-orange of varying intensity, claws black; legs and feet (juv.) dingy yellow or greyish-yellow; iris brown.

CHARACTERS AND ALLIED FORMS.—*A. f. serrirostris* (breeding probably Anadyr and Kolyma delta) is larger than *A. f. fabalis* with thicker bill; *A. f. sibiricus* (N. Siberia east of Taimyr Peninsula) is like last but bill longer and more slender. For distinctions of *A. brachyrhynchus* see under that species. Dark ash-brown wing-coverts with brownish-white tips and black nail distinguish *A. fabalis* from other British "Grey" Geese.

FIELD-CHARACTERS.—Smaller than Grey Lag and altogether darker, showing no pale fore-wing. Bill as large as in Grey Lag but dark at tip and base with a central band (varying much) of orange. No white frontal band and so distinguished from *A. albifrons*. Note described by fowlers of experience as distinguishable from that of Grey Lag but my less critical ear has failed to realize any difference. (A. Chapman.)

BREEDING-HABITS.—Main haunts in more wooded districts than most Geese. *Nest*.—On islets in rivers or swamps, sheltered by rank vegetation and sometimes by willow or other bushes, and composed of down mixed with grass, moss, etc. *Eggs*.—4-5, occasionally 6, white, but stained as incubation advances. Average of 51 eggs, 84.2×55.6 . Max.: 91×57.2 and 84×59 . Min.: 74.5×53.3 mm. *Breeding-season*.—June and early in July (in high north). *Incubation*.—Presumably by female but reliable details lacking. Single-brooded.

FOOD.—Cordeaux says it is very partial to grain of all kinds, as well as beans, but will also eat grass and clover, but Saunders says it is decidedly herbivorous, and its name due to confusion with graminivorous Pink-footed Goose.

DISTRIBUTION.—*British Isles*.—Winter-visitor, early Oct.—early Nov. to March. Widely but not abundantly distributed, generally more frequent on west than east coasts Great Britain. Only one authentic example O. Hebrides (S. Uist, March, 1903), very rare extreme north Scottish mainland, occurrence in Orkneys and Shetlands not proved but once Fair Isle, Jan., 1913. In Ireland very scarce in south, but more numerous west and midlands, especially in severe winters.

DISTRIBUTION.—*Abroad*.—Nests north of about latitude 64° in Scandinavia, Finland, Kola, N. Russia, Kolguev, Novaya Zemlia

(according to Buturlin also north Livonia, and under 57° on lakes on Ural Mts.), west Siberia apparently to Petchora, Ob and Taimyr Peninsula. On migration throughout Europe to Mediterranean countries (rare north Africa), Black Sea and Caspian, Turkestan, probably Persia, casually India, Madeira, possibly Iceland, also north China. Replaced by large-billed forms in eastern Siberia, which winter in China and Japan.

ANSER BRACHYRHYNCHUS

292. *Anser brachyrhynchus* Baillon—THE PINK-FOOTED GOOSE.

ANSER BRACHYRHYNCHUS Baillon, Mém. Soc. R. Abbeville, 1833, p. 74 (France).

Anser brachyrhynchus Baillon, Yarrell, iv, p. 270 ; Saunders, p. 403.

DESCRIPTION (Plate 5).—*Adult male and female. Winter.*—Like *A. f. fabalis*, but smaller ; lores apparently never black-brown as in some *A. f. fabalis* : feathers of upper-mantle usually edged rather richer brown ; mantle and scapulars lighter, ash-grey rather than ash-brown with light brown edges shading to brownish-white at tip ; back and rump dark ash-grey ; lower-breast and belly suffused darker ash-brown than in *A. f. fabalis*, feathers edged ashy-white ; tail-feathers as in *A. f. fabalis*, but lighter usually with grey bloom, lateral feathers with broader white tips ; wing as in *A. f. fabalis*, but innermost secondaries lighter, ash-grey or ash-brown bordered white ; primary and greater coverts, lower median coverts, bastard-wing and lesser coverts ash-grey, greater and median tipped white, rest of median as mantle, but more narrowly tipped light brown or brownish-white. This plumage is acquired by complete moult in autumn and winter. *Summer.*—There appears to be a partial moult as in *A. f. fabalis*, involving feathers of head, neck and some body-feathers, and an occasional tail-feather. Specimens dated Jan. and end Feb. were in moult.

Nestling.—(Not examined.)

Juvenile.—Mantle and scapulars browner than in adult, feathers with narrower light brown edges ; some upper tail-coverts with ash-brown central streaks ; in some a white patch on intercrural feathering extending on to chin ; sides of body and flanks ash-brown, feathers edged light buff or brownish-white, some flank-feathers with outer web bordered buffish-white, feathers of breast and belly with pale ash-brown central markings, streaks or frecklings giving under-parts mottled or streaked appearance ; tail as in adult, but lateral feathers not so broadly tipped white ; wing as in adult but in some wing-coverts darker, median coverts browner. Feathers of neck without pointed tips as in adult, those of mantle, scapulars and under-parts narrower and more rounded at tip than in adult, tail-feathers, secondaries, greater and median coverts narrower, tail feathers more pointed and wing-coverts more rounded at tip. Dis-

tinguished from juvenile *A. f. fabalis* by smaller size, lighter back, rump and wing-coverts.

First winter and summer.—As adult and apparently only to be distinguished by narrower and more worn juvenile greater and median coverts. Moults apparently as in *A. f. fabalis*.

Measurements and structure.—♂ wing 435–458 mm., tail 121–152, tarsus 69–77, bill from feathers 44–50 (9 measured). ♀ wing 405–453, bill 40–45 (12 measured). Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd and 4th 3–12 mm. shorter, 5th 28–40 shorter, 6th 60–74 shorter. Tail with 16 to 18 feathers. Bill shorter than head, comparatively broad and deep at base, tomia slightly curved ; teeth 20–23. Weight from 6½–7½ English lbs. (Alphéraky). Other structure as in *A. f. fabalis*.

Soft parts.—Bill (ad.) variable, base of upper mandible, ridge of culmen above nostrils and nail black, with flesh-pink to rose-pink band round both mandibles behind nail and extending backward on upper mandible under nares and along tomium, sometimes reaching gape and sometimes confined to very narrow streak along tomium ; bill (juv.) almost black with very little rose-red on apical part ; legs and feet (ad.) flesh-pink to bright pink, (juv.) “apparently dull greyish-red” (Alphéraky) ; iris dark brown.

CHARACTERS.—No subspecies. Small size, short bill with black nail distinguish it from British “Grey” Geese other than *A. f. fabalis*.

FIELD-CHARACTERS.—Smaller than Grey Lag, slightly paler in colour, and without the striking pale blue fore-wing. Roughly of similar size to Bean-Goose and totally unidentifiable therefrom unless near enough to distinguish one main specific character—its tiny and delicately shaped beak, resembling rather that of Brent than any “Grey” Goose. Colour-pattern of beak similar to that of Bean-Goose (save that central band is pink instead of orange). Legs also pink. (A. Chapman.)

BREEDING-HABITS.—In Spitsbergen nests on small islands occasionally, but generally on ledges or terraces in face of cliffs to secure protection against arctic fox. *Nest*.—Hollow in earth, used year after year, with thick lining of moss, lichens, and arctic plants mixed with earth and plentiful supply of down. *Eggs*.—Usually 4, but also 3 to 5, while 6, 7 and 9 (by 2 females) are on record. Dull whitish. Average of 292 eggs, 78.2×52.3. Max. : 88×52.6 and 82.6×56.7. Min. : 69×51 and 77×47.4 mm. *Breeding-season*.—Usually about mid-June, but some lay early in month. *Incubation*.—By female alone ; period (noted in confinement) 26–28 days. Single-brooded.

FOOD.—Frequents barley stubbles, but according to Cordeaux, less for scattered grain than for white clover and trefoil. Grass also eaten freely and in breeding-haunts arctic plants, *Cerastium*, *Saxifraga*, *Equisetum*, etc. Young feed on leaves and buds of *Salix* (Le Roi) ; in confinement, grass.

DISTRIBUTION.—*British Isles.*—Winter-visitor, mid-Sept.—mid-Oct. to March-May. Most numerous east coast Great Britain, scarcer south and west. Rare extreme north Scotland, identified only two or three times. Orkneys, not Shetlands, a number Oct., 1909, Fair Isle, two Flannans, Ap. 18, 1911, but otherwise doubtful O. Hebrides, Isle of Man one March, 1916. In Ireland only two obtained, Lough Swilly (Donegal), Oct. 19, 1891, Lough Key (Roscommon), Feb. 17, 1908.

DISTRIBUTION.—*Abroad.*—Breeds Spitsbergen and probably Franz-Josef Land, further investigation about other possible breeding grounds desirable. On passage and in winter in north-west Europe, Holland, Belgium (rare), France, Germany, Scandinavia. Near Novgorod in Russia, Iceland, where breeding reported but not proved. (Statements of occurrence in Persia, India, Japan(!) probably erroneous.)

ANSER HYPERBOREUS *

293. Anser hyperboreus hyperboreus Pall.—THE SNOW-GOOSE.

ANSER HYPERBOREUS Pallas, *Spicilegia Zool.*, fasc. VI, p. 25 (1769—N.E. Siberia).

Chen hyperboreus (Pallas), Yarrell, IV, p. 275; Saunders, p. 405.

DESCRIPTION.—*Adult male and female.* Winter and summer.—Entire plumage except primaries and their coverts and bastard-wing white; primaries black, inner webs brown-black, outer primaries hoary-grey towards base; primary-coverts and bastard-wing ash-grey with dark brown shafts, in some outer webs slightly mottled white, in some bastard-wing white. Sometimes feathers of head, neck and under-parts stained rusty. Moults presumably as in other geese, but no material moulting remiges examined.

Juvenile.—Differs from adult in having upper-parts more or less ash-brown; fore-head greyish-white; patch in front of eye, crown down to eye, centre of nape, mantle and scapulars ash-brown, feathers more or less tipped ash-white; sometimes some feathers of mantle greyish-white, freckled ash-brown; remaining upper-parts white (sometimes feathers of rump and upper tail-coverts slightly freckled dusky-brown); under-parts white, feathers of upper-breast, sides of body and flanks more or less mottled, speckled or suffused dusky-brown; tail-feathers ash-brown with broad white tips and edged same, outer ones with inner webs more or less white (sometimes tail-feathers white more or less mottled or freckled ash-brown); primaries, their coverts and bastard-wing as in adult, but sometimes primary-coverts white more or less freckled or clouded

* Hartert (*Vöj. pal. Fauna*, II, p. 1290) uses the name *cærulescens* as he considers "*hyperboreus*" and *cærulescens* dimorphic forms of the same species. While there is considerable evidence in support of this view (cf. E. Hesse, *J. f. O.*, 1915, pp. 156-166) proof is still wanting, and therefore it seems better in this work to retain the name *hyperboreus*.—ED.

ash-brown; secondaries and greater coverts white more or less mottled or clouded ash-brown, innermost secondaries and their coverts light or dark ash-brown broadly edged white; median coverts pale ash-brown more or less freckled and tipped white; lesser wing-coverts and median and lesser primary-coverts greyish-white more or less mottled ash-brown. Feathers of upper and under-parts, tail-feathers, also greater and median coverts narrower than in adult and tips of feathers of mantle rounded not square as in adult.

First winter and summer.—As adult but distinguished by juvenile wing. Most of the juvenile body-feathers, tail-feathers(?) but not wings in specimen examined are moulted.*

Measurements and structure.—♂ wing 425–441 mm., tail 117–136, tarsus 75–82, bill from feathers 53–60 (6 measured). ♀ wing 420–430, bill 50–58 (5 measured). Primaries: 1st more than half longest primary-covert, 3rd longest, 2nd (below 4th) 6–18 mm. shorter, 4th 4–9 shorter, 5th 30–38 shorter, 6th 63–71 shorter. Innermost secondaries with slightly rounded tips, longest above 7th primary. Tail slightly rounded, 16, rarely 18, feathers. Bill considerably higher than broad at base, short, strong and robust, altogether deeper throughout its length than in *A. anser*: culmen sloping sharply to nail, tomia curved, commissure widely gaping, indentations of upper mandible quite apparent; teeth 20–28. Loral and frontal feathering as in *A. a. albifrons*.

Soft parts.—Bill (ad.) lilac-red or dark red with whitish or yellowish nail, under mandible lighter, black stripes above edge of upper and on under edge of lower mandible from gape to tip; (juv.) dark grey or brownish often with greenish tint, black stripes along mandible as in adult; legs and feet (ad.) lilac or orange-red with black claws; legs and feet (juv.) dark grey or brownish often tinged greenish; iris dark brown (*fide* Alpheraky).

CHARACTERS AND ALLIED FORMS.—*A. h. nivalis* is larger. Pure white body-plumage of adults and light ash-brown broadly margined white upper-parts of juvenile distinguish this from other British Geese.

BREEDING-HABITS.—Breeds on barren grounds in hollow in earth.

Nest.—Thick bed of down mixed with bits of grass, moss, etc.

Eggs.—Usually 5, white, with smooth shell. Average of 23 eggs, 77.8×53.3. Max.: 83.4×55.2. Min.: 71.1×55 and 79.6×50.4 mm.

Breeding-season.—Chiefly during second half June. *Incubation.*—No details, but probably by female alone, and also single-brooded.

FOOD.—In summer green rushes, insects, etc., according to Saunders; probably young eat insects and mollusca. In autumn and winter

* One (17.6.10 Greenland, Schiöler coll.) has one new central tail-feather and has acquired some new white innermost secondaries; some ash-brown juvenile body-feathers are retained on mantle.

food more varied : grasses, shoots of reeds, wild rice, many berries (including those of *Empetrum nigrum*), snails and insects.

DISTRIBUTION.—*British Isles*.—Rare vagrant. *Ireland*.—Three co. Wexford, Nov., 1871. Two (out of seven) caught co. Mayo, Oct., 1877 (Saunders, p. 405). One obtained and another seen co. Longford, Oct., 1903. Four seen co. Mayo, Dec., 1903, and fourteen Dec., 1906 (*cf. Brit. B.*, II, p. 27). *England and Scotland*.—Only one obtained (Aug., 1854, Scottish Solway), no doubt same bird as seen previously Cumberland side ; said to have been seen other occasions in Solway (*Birds Dumfries.*, p. 248). Reported as seen Northumberland, Yorks., and Gloucester winter 1890–1, 1901 and 1906 (Saunders p. 405, and *Brit. B.*, VI, p. 191), Norfolk, autumn, 1909 and 1912, and Essex April and May, 1911, Jan., 1921 (*cf. Brit. B.*, IV, p. 28, v, pp. 25, 139, VI, p. 224), but some of these later examples may have been escapes from captivity or even albinistic *A. brachyrhynchus*.

DISTRIBUTION.—*Abroad*.—Eastern arctic Asia and western arctic America. On passage and in winter in western north America, southwards to Lower California and Mexico ; in Asia south to Japan ; in Europe observed in several countries, such as Norway, Holland, France, Heligoland, Germany, Hungary, and probably elsewhere—even, perhaps, in Greece. Replaced by *A. h. nivalis* in eastern North America.

294. *Anser hyperboreus nivalis* (Forst.)—THE GREATER SNOW-GOOSE.

ANAS NIVALIS Forster, Philos. Trans., LXII, p. 433 (1772—Severn R., Hudson Bay, Canada).

Chen nivalis (Forster), Sharpe, Bull. B.O.C., x, p. xv.

DESCRIPTION.—*Adult male and female*.—Identical in all plumages with *A. h. hyperboreus* but larger.

Measurements and structure.—Wing 440–445 mm., tarsus 80–89, culmen 65–69 (*fide* Alphéraky). Bill larger, stronger and deeper than in *A. h. hyperboreus*. Other structure as in *A. h. hyperboreus*.

BREEDING-HABITS.—Little definitely recorded but probably does not differ appreciably in habits from previous form. *Nest*.—Hollow in ground, lined with down mixed with mosses, grass, etc. *Eggs*.—3 to 5, dull white. Average of 7, 81.8×55.1 . Max. : 84.4×54.2 and 81×57.4 . Min. : 79×53.2 mm. *Incubation*.—No reliable data ; but probably by female and single-brooded.

FOOD.—Probably very similar to that of Lesser Snow-Goose ; but little of what has been recorded can be definitely assigned to this form.

DISTRIBUTION.—*Ireland*.—One, Belmullet (Mayo) Oct., 1886 (*ut supra* : *cf. R. J. Ussher, List Irish Birds*, p. 33). *Scotland*.—Flock of about 5, one shot Oct., 1920, not preserved, another (immature) shot Feb. 18, 1921, near Castle Douglas (Kirkcudbright) (C. W. Phillips, *Field*, Mar. 5, 1921, p. 299 ; W. Eagle Clarke, *Scot. Nat.*, 1921, pp. 48, 69).

DISTRIBUTION.—*Abroad.*—Breeds in north Greenland and Ellesmere Land, though full range unknown; on passage and in winter in eastern America, south to Louisiana, Florida and even Porto Rico. Replaced by *A. h. hyperboreus* in western north America and arctic east Asia.

Genus *BRANTA* Scop.

BRANTA Scopoli, *Annus I Hist.-Nat.*, p. 67 (1769)—Type by subsequent designation, of Allen, 1907, *B. bernicla*).

In general much like *Anser*, but no teeth or serrations visible on cutting edge of upper mandible. Four species (and a number of subspecies) in Palearctic and Nearetic (Holarctic) regions.

Key to species of genus BRANTA.

1 {	Upper and under tail-coverts almost or quite reaching tip of tail	<i>B. bernicla</i> , p. 255
1 {	Upper and under tail-coverts not nearly reaching tip of tail	2
2 {	Jugulum black	<i>B. leucopsis</i> , p. 252
2 {	Jugulum rufous	<i>B. ruficollis</i> , p. 250

BRANTA RUFICOLLIS

295. *Branta ruficollis* (Pall.)—THE RED-BREASTED GOOSE.

ANSER RUFICOLLIS Pallas, *Spicilegia Zool.*, fasc. VI, p. 21, pl. IV (1769—Lower Ob River in Siberia and S. Russia).

Bernicla ruficollis (Pallas), Yarrell, IV, p. 281; Saunders, p. 407.

DESCRIPTION.—*Adult male and female.* *Winter.*—Fore-head, crown down to eye, cheeks below eye and nape black, black of nape continued on to upper-mantle; oval or roundish white patch in front of eye extending to bill, irregular square russet patch on sides of neck, outlined in white; behind eye small white patch which narrows into a white line merging with white line running parallel with nape on to upper-mantle; chin and throat black, feathers tipped white, chin intermixed with white, black of throat in some continued below white streak towards nape; rest of neck and upper-mantle, and upper-breast russet; a white band bordered above by a narrow black band encircles upper-mantle and breast, a white bar in front of wing; rest of mantle, scapulars, back and rump black with dull greenish gloss, scapulars in some narrowly tipped black-brown; lower scapulars black-brown, tipped white; sides of back and rump, and upper tail-coverts white; lower-breast below white band black, feathers with white bases; sides of belly and flanks white, some feathers tipped black, flanks broadly so; thighs white, some feathers with black-brown tips; belly, vent and under tail-coverts white, white of belly joining black of breast in an inverted V-shaped line; axillaries dark sepia, under wing-coverts black, under primary-coverts drab-grey; tail-feathers black, narrowly tipped white, outer ones with inner webs brown-black; primaries and their coverts, secondaries and bastard-wing black

with greenish gloss, inner webs black-brown or sepia (in some primary-coverts more or less greyish-white at tip); rest of wing-coverts black with greenish gloss, greater coverts and lower row of median broadly tipped white. This plumage is acquired by a complete moult in autumn; (one flightless specimen examined, Aug. 12th Yenesei, with remiges all in quill). *Summer*.—No spring material examined. Coloration as in winter.

Nestling.—(Not examined.)

Juvenile.—As adult, but black of upper-parts and head browner, white band round upper-mantle and breast less clearly defined, feathers margined black-brown and not bordered above by a black band as in adult; russet patch on neck smaller and paler, feathers tipped black-brown or whitish; rest of upper-mantle and upper-breast pink-cinnamon rather than russet, some feathers mottled dusky-brown towards tip; sides of belly and flanks white tipped black-brown; lower-breast brown-black, feathers with imperfectly concealed white bases; tail and wing as in adult but brown-black, tail-feathers usually more broadly tipped white; greater and lower median coverts with brownish-white tips, rest of median coverts narrowly tipped brownish. Feathers of mantle, scapulars and under-parts smaller and narrower, tail-feathers, secondaries, greater and median coverts narrower.

First winter and summer.—Apparently as adult but many juvenile feathers are retained on upper- and under-parts; wing as in juvenile. Some juvenile body-feathers, not all feathers of upper-parts, not breast, belly, vent or under tail-coverts, not tail or wings are moulted from autumn onwards. (Very little material examined.)

Measurements and structure.—♂ wing 345–361 mm., tail 99–109, tarsus 52–58, bill from feathers 24–26 (5 measured). ♀ wing 343–357, bill 23–25. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 9–14 shorter, 5th 30–40 shorter, 6th 55–68 shorter; 2nd emarginated inner web, 3rd both webs, 4th outer web. Innermost secondaries with rounded tips, longest above 7th primary. Upper tail-coverts extend two-thirds length of tail, under tail-coverts nearly to tip. Tail almost square, slightly rounded, 16 feathers. Feathers of neck normal not “furrowed.” Bill much shorter than head, higher than broad at base, somewhat conical, depressed terminally, dorsal line straight and sloping to nail; nail round and convex; intercrural space feathered almost to nail; tomia almost straight; teeth 16, not visible externally when bill shut. Loral feathering extends further forward on bill than frontal feathering.

Soft parts.—Bill, legs and feet black; iris dark chestnut or hazel.

CHARACTERS.—No subspecies. White patch on lores and russet upper-breast (paler in juvenile) distinguish this species in all plumages.

BREEDING-HABITS.—Nests on Yenisei obtained by Popham were all placed about half-way up steep slope of river-bank, while in each case Peregrine or Buzzard was breeding on cliff above. *Nest*.—Hollow thickly lined with down, mixed with grass. *Eggs*.—7 to 9 according to Popham, creamy-white. Average of 7 eggs, 66.6×46 . Max. : 69.5×46 and 68.5×47.3 . Min. : 63×44.8 mm. *Breeding-season*.—End June and early July. *Incubation*.—Only females shot from nest. Period unknown. Single-brooded.

FOOD.—Apparently grazes on young shoots of grass almost exclusively, but Saunders also adds “green vegetables.”

DISTRIBUTION.—*England*.—Very rare vagrant. One near London early 1776. One near Wycliffe (Yorks.) about same time. One Berwick-on-Tweed (Northumberland), 1818. One Maldon (Essex), Jan. 6, 1871. Two said to have been got south Devon, and one Norfolk (Saunders, p. 407). One Severn (Gloucester), Nov. 18, 1909 (*Brit. B.*, III, p. 376). Others recorded, but not substantiated.

DISTRIBUTION.—*Abroad*.—Nests in tundras of western Siberia; winters in great numbers on Caspian Sea, in steppes of Transcaspia and parts of Persia, passing through south Russia, the Khirgiz steppes, and parts of Turkestan, casually in France, Italy, Holland, Belgium, Germany, Galicia, Hungary, and even—at least in ancient times—in Egypt.

BRANTA LEUCOPSIS

296. *Branta leucopsis* (Bechst.)—THE BARNACLE-GOOSE.

ANAS LEUCOPSIS Bechstein, Orn. Taschenb., II, p. 424 (1803—Germany).
Bernicla leucopsis (Bechstein), Yarrell, IV, p. 286; Saunders, p. 409.

DESCRIPTION (Plate 5).—*Adult male and female*. *Winter*.—Forepart of crown, sides of face, chin and throat cream-white or light buff, some feathers when fresh with faint dusky or brown-black tips (in some feathers of chin and upper-throat spotted blackish forming irregular streak); lores brown-black; feathers at base of upper mandible and those extending on to lower mandible in some more or less tipped brown-black; rest of head, neck, mantle and upper-breast black, feathers of mantle with grey bases often imperfectly concealed and narrowly tipped brownish-white; scapulars ash-grey with broad subterminal bands of brown-black and narrowly tipped brownish-white, or white, lower scapulars and back dark ash-grey, tipped brown-black; rump black; sides of back and rump, and upper tail-coverts white; sides of body and flanks palest ash-grey, feathers with subterminal bar or shading of dusky-brown and broadly tipped white; thighs black, feathers usually narrowly tipped white; axillaries ash-grey; under wing-coverts ash-grey, mostly tipped white and some with subterminal dusky-brown shading; remaining under-parts white; tail-feathers black;

primaries black or brown-black, outer, and sometimes inner, webs ash-grey on basal two-thirds; secondaries brown-black, outer and inner webs towards base ash-grey, innermost as scapulars; primary-coverts and bastard-wing ash-grey darker on inner webs and at tips; rest of wing-coverts ash-grey with broad subterminal bands of black or brown-black and broadly tipped white, lesser and some median coverts sometimes with black subterminal bands more or less concealing grey bases. This plumage is acquired by complete moult July to Dec.; as in other geese remiges appear to be three-quarters grown before body and tail moult commences in earnest. *Summer*.—One (♂ 16.4.04, coll. E. L. Schiöler) was moulting some feathers of neck, upper-mantle and sides of face. No other spring material examined. Coloration as in winter.

Nestling.—(Not examined.)

Juvenile.—Neck, upper-mantle and upper-breast dull grey-black, grey bases of feathers imperfectly concealed; rest of mantle brown-black (not black as adult), feathers with imperfectly concealed grey bases and tipped brownish-white; scapulars ash-grey, ash-brown towards brownish-white tips and without broad subterminal black-brown bands as in adult; some upper tail-coverts faintly tipped dusky-brown; sides of body and flanks very pale ash-brown shading to white, not ash-grey with a sub-terminal bar of dusky-brown and tipped white as in adult; remaining under-parts and tail as in adult; wing as in adult but greater, and median coverts with subterminal bands of black-brown or dark sepia (instead of brown-black or black) and narrowly tipped brown or brownish-white (not white as in adult); lesser coverts as in adult, but white tips in some absent and subterminal bands paler and browner. Feathers of mantle, scapulars and under-parts smaller and narrower than in adult; and tail-feathers, secondaries, greater and median coverts narrower.

First winter and summer.—Like adult, but easily distinguished by retained juvenile greater and median coverts which besides being narrower and more worn are not broadly tipped white as in adult, but at most have brown or brownish-white tips, subterminal bands brown instead of brown-black or black as in adult; tail-feathers and secondaries narrower. Most of the juvenile body-feathers, not back, rump or apparently tail-coverts and not tail or wings in specimens examined, in some an odd median covert, are moulted in autumn and winter. In most (all?) examples many juvenile feathers are retained so that black areas of upper- and under-parts appear browner than in adult.

Measurements and structure.—♂ wing 385–420 mm., tail 119–140, tarsus 63–74, bill from feathers 27–32 (12 measured). ♀ wing 385–417, bill 28–31 (10 measured). Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd as long or 5–16 mm. shorter, 4th 5–12 shorter, 5th 33–48 shorter, 6th 63–79 shorter. Longest innermost secondaries above 6th primary. Upper tail-coverts extend to half and under tail-coverts to three-fourths

length of tail. Tail rounded, 16 feathers. Bill as in *B. ruficollis*: teeth about 30. Weight $2\frac{1}{2}$ –5 lbs. (Popham).

Soft parts.—Bill, legs and feet black; iris brown.

CHARACTERS.—No subspecies. Black crown and neck, creamy-white fore-head, cheeks, chin and throat distinguish this species in all plumages.

FIELD-CHARACTERS.—Brilliant appearance given to a flock (especially in bright sunshine) by contrast between glossy black necks, legs and “waistcoats,” white faces, under-parts, and boldly barred blue and dark upper-parts, renders Barnacle recognizable at great distance. Favourite feeding localities are wide stretches of “machar” land of firm springy turf inside sandhills. A common trait in all geese but more noticeably so in this species is a continual series of friendly quarrels amongst a feeding flock. Less inclined to associate with other geese than any other species, and never nearly so unapproachable, it is the “fool” amongst Geese, and only one which on occasion will fail to take alarm after having seen and distrusted a moving object within 100 yards. Occasionally goes to sea to rest on very calm days, but as a rule as much land-loving as any “Grey” Goose. Note a series of rapidly repeated short barks—some higher than others. Combined chorus produced by big flock of any geese has been likened to “music” of pack of hounds running. Taking that comparison, Barnacle’s cry is represented by one end of scale, Grey Lag’s by other; Grey Lag’s is full-mouthed music of pack of foxhounds, Barnacle’s that of host of small terriers. Almost if not quite insensitive to scent of man, and rarely if ever takes alarm from it. (William Percy.)

BREEDING-HABITS.—Only reliable accounts are those of Koenig and Manniche. Breeds on terraces and ledges in large colony in Greenland, and in scattered pairs on pinnacles and bastions of rock in sides of valleys in Spitsbergen. *Nest*.—Little down mixed with moss and lichens. *Eggs*.—3 to 5, white when fresh, but often with small spots of blood, dull and rather fine in texture. Average of 12 eggs, 77.7×49.6 . Max. : 80.8×48.6 and 80.3×51.1 . Min. : 70.6×50 and 79.5×48 mm. *Breeding-season*.—Early to middle June. *Incubation*.—By female alone; period not known. Single-brooded.

FOOD.—On breeding-ground grass, leaves and catkins of arctic willow, and seeds and leaves of various plants (*Oxyria digyna*, etc.). In winter grasses (*Carex*, *Poa*), trefoil, *Ranunculus*, etc. Alphéraky says that at times they feed on marine mollusca.

DISTRIBUTION.—*British Isles*.—Winter-visitor, mid-Sept., occasionally earlier,—mid-Nov. to April-May. Most numerous O. and some I. Hebrides, and Solway, where, however, becoming scarcer. Formerly common, now rare, parts of Wales and Cheshire, but more numerous generally on west side Great Britain than east where rare, as on south coast and inland. In northern Scotland rare, but fairly regular visitor Orkneys and well-known passage-

migrant (not wintering) Shetlands. In Ireland regular winter-visitor to coasts and islands Connaught and co. Donegal, and in small numbers to Dundalk Bay (Louth), very rare southern half.

DISTRIBUTION.—*Abroad.*—Breeds Spitsbergen and north-east Greenland, Novaya Zemlia, and north-west Siberia. On migration and in winter from Iceland to shores of Baltic and North Sea, occasionally inland (Germany, Switzerland, Austria), exceptionally south to Italy, Spain, Morocco, Azores, casually in North America.

BRANTA BERNICLA

297. *Branta bernicla bernicla* (L.)—THE BRENT GOOSE.

ANAS BERNICLA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—"Habitat in Europa boreali; migrat supra Sveciam").

*Bernicla glaucogaster** Brehm, Handb. Naturg. Vög. Deutschl., p. 849; Hand-List, 1912, p. 133.

Bernicla brenta (Pallas), Yarrell, iv, p. 290; Saunders, p. 411.

DESCRIPTION (Plate 5).—*Adult male and female.* *Winter.*—Head and neck all round, upper-mantle and upper-breast sooty-black; on side of neck an irregular patch of black feathers banded subterminally or tipped white; sometimes these patches almost meet on front of neck, sometimes feathers of nape in this area have concealed white subterminal bars; rest of mantle, scapulars, back and rump hair-brown, feathers of mantle and scapulars more or less with grey bloom and lighter brown tips; short central upper tail-coverts black-brown; sides of rump and rest of upper tail-coverts white; sides of body and flanks brown-grey, feathers broadly tipped whitish; rest of breast and belly brown-grey; vent and under tail-coverts white; axillaries and under wing-coverts brown-grey; tail-feathers sooty-black; primaries and secondaries black, inner webs more or less black-brown or sepia; primary-coverts and bastard-wing hair-brown; rest of wing-coverts as mantle, but narrowly edged light brown. This plumage is acquired by a complete moult. N.B.—Above description applies to dark form, pale form differs in having feathers of mantle and scapulars more broadly edged brownish-white, and upper-parts appear browner, not so grey; lower-breast, belly, sides of body and flanks pale ash-brown rather than brown-grey. Between these two forms there is every intergradation. *Summer.*—Two or three April birds examined were moulting some feathers of head, neck and body, but whether this is due to a spring moult or a delayed winter moult, more material is required to decide. Coloration as in winter.

* The distinction of the white-bellied form seems to be impossible; though American authors have supposed that it alone breeds in N. America, in any case in Spitsbergen and Kolguev both white- and grey-bellied examples breed. In no case can the name "*glaucogaster*" be used for the white-bellied form, as it was given by Brehm to grey-bellied specimens shot on the coast of Germany.—E. H.

Nestling.—Down of crown, centre of nape, upper-parts and sides of body pale mouse-grey, some tipped greyish-white; patch on lores and line above eye sepia; chin, throat and rest of neck white; remaining under-parts ashy-white, down with dusky-brown bases.

Juvenile.—*Dark form*.—Like adult, but no white patch on side of neck (a small white spot on chin in some), black of head, neck, upper-mantle and breast duller and browner, feathers of rest of mantle and scapulars hair-brown and mostly tipped ash-brown or ash-white; under-parts paler than in adult, sides of body and flanks paler brown-grey shading to ash-white at tip and without white tips as in adult; tail-feathers as in adult, but more or less tipped white and central pair in some with inner webs more or less white; wing as in adult, but secondaries (in some also primary-coverts, greater and lower median coverts) tipped white, rest of median and lesser coverts tipped ash-white, tips narrower on lesser coverts and in some absent. *Pale form*.—Upper-parts browner feathers of mantle with broader brownish edges; breast and belly as in pale form of adult; sides of body and flanks pale ash-brown, feathers edged ash-white; as in adult, there is every intergradation between these two forms, but apparently palest juvenile is never so pale as palest adult or dark form as dark as darkest. Feathers of mantle, scapulars and under-parts smaller and narrower than in adult, tail-feathers, secondaries, greater and median coverts narrower.

First winter and summer.—Like adult but distinguished by white tips to secondaries also primary, greater and some median coverts; greater and median coverts narrower than in adult. The juvenile body-feathers (apparently not feathers of back or always all tail-coverts), usually some or all tail-feathers, sometimes some innermost secondaries and coverts and some median coverts are moulted from autumn onwards. Sometimes moult is very incomplete and many juvenile feathers including tail and wings are retained.

Second winter and summer.—Apparently as adult.

Measurements and structure.—♂ wing 326–356 mm., tail 90–101, tarsus 56–62, bill from feathers 32–35 (12 measured). ♀ wing 326–337, bill 32–34 (9 measured). Primaries: 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 9–13 shorter, 5th 25–38 shorter, 6th 46–61 shorter. Innermost secondaries slightly pointed at tip, longest above 6th primary. Upper and under tail-coverts reach to tip of tail. Tail rounded, 16 feathers. Feathers of neck sometimes with a “furrowed” appearance. Bill as in *B. ruficollis*, but larger and sides compressed; teeth 28–30. Loral feathering does not extend beyond frontal feathering, feathering on intercrural space extends barely half-way towards nail. Other structure as in *B. ruficollis*.

Soft parts.—Bill, legs and feet black, upper surface of toes tinged olive-green; iris dark brown.

CHARACTERS AND ALLIED FORMS.—In *B. b. nigricans* (west N. America, arctic Siberia) adult and first winter have pronounced white collar nearly meeting on nape, lower-breast and belly sooty-brown, in juvenile collar is nearly obsolete, feathers of sides of neck only having white tips, under-parts darker. Uniform black head distinguishes *B. bernicla* in all plumages from its near allies.

FIELD-CHARACTERS.—An unmistakable characteristic distinguishing this from every other British Wild Goose is that it is exclusively marine. Brents recorded inland are either (1) mistaken identity, or (2) merely accidental wanderers, lost in fog, or otherwise, or (3) wounded (a single Brent is invariably a pricked bird). Brent weighs less than half its grey half-cousins and is far darker; its head, neck and shoulders sooty-black and whole upper surface deep slate-grey. Its note is a series of delightfully wild discords and bitones that have been compared with “hounds in full cry”—and I can’t improve on that. (A. Chapman.)

BREEDING-HABITS.—In Spitsbergen group nests in scattered pairs on islands, occasionally several breeding together, but also on mainland. *Nest.*—Heap of vegetable matter, moss, grasses, saxifrage stems, etc., but sometimes no extraneous matter, lined down as incubation proceeds (sometimes in middle of Eider-Duck colony). *Eggs.*—Usually 4, sometimes 3 only or 5, rarely 6. Nests with 7 and 8 eggs also recorded. Creamy or yellowish with smooth, thin shell. Average of 38 eggs, 72.5×47.9 . Max. : 81.1×49.4 and 77×51.3 . Min. : 65.3×47.5 and 69.4×45.3 mm. *Breeding-season.*—From beginning June in Spitsbergen, but chiefly about mid-June, and last half June in Grinnell Land. *Incubation.*—By female alone, male keeping guard. Period about 4 weeks but not precisely known. Single-brooded.

FOOD.—On breeding-grounds grass, algæ, moss and stalks and leaves of arctic plants (*Eriophorum*, *Ranunculus*, *Cerastium*, *Oxyria* and *Saxifraga*). Roemer and Schaudinn also record mussels in stomach. In winter feeds largely on *Zostera marina* : also *Ulva latissima* and grasses. Young feed on Gramineæ and *Oxyria* (Le Roi).

DISTRIBUTION.—*British Isles.*—Winter-visitor, mid-Sept., occasionally earlier—mid-Nov. to March-April. Most numerous and regular east coast Scotland from Dornoch Firth southwards, east and south coasts England, and all coasts Ireland, where, however, scarcer on south coast. Generally scarce and somewhat irregular on most of west coast Great Britain, and western Isles, Scotland, but in parts of Clyde flocks annually. Rare visitor Orkneys, and in Shetlands chiefly known as passage-migrant. Very rare inland.

DISTRIBUTION.—*Abroad.*—Breeds from Taimyr Peninsula in northern Siberia to Kolguev and Spitsbergen (once recorded Jan Mayen) and in America from western Greenland to Parry Is. On migration through north Russia and Norway to coasts of North Sea, Holland, Belgium, France, south to Portugal, Morocco, Egypt, in America

to south Carolina, rare Florida, and Louisiana; casual British Columbia, Barbados.

[NOTE.—THE BLACK BRENT GOOSE, *Branta bernicla nigricans* (Lawr.), which breeds on the Arctic coast and islands of western N. America and in arctic Siberia from Lena eastwards, was stated by the late F. Coburn to have been taken in Staffs., Nov., 1895, Warwick, Nov., 1897 and Norfolk, Feb., 1902, Jan., 1907 and Jan., 1909 (Gurney, *Zool.*, 1908, pp. 121–3, 1910, p. 123, Coburn, *Rep. and Trans. N. Staffs. F. Club*, XLIV, pp. 121–5), but we do not consider the records to be satisfactory.]

[NOTE.—The CANADA GOOSE, *Branta canadensis canadensis* (L.), an inhabitant of North America, has been domesticated in this country for more than two centuries, and now breeds ferally in many places, but there is no evidence that truly wild birds have ever visited us (cf. Yarrell, iv, p. 295; Saunders, p. 412).]

[NOTE.—Many examples of the introduced EGYPTIAN GOOSE, *Chenalopex ægyptiacus* (L.), an inhabitant of Africa and Palestine, have been killed in various parts of the country (Yarrell, iv, p. 330; Saunders, p. 412).]

[NOTE.—Examples, undoubtedly introduced, of the SPUR-WINGED GOOSE, *Plectropterus gambensis* (L.), an inhabitant of tropical Africa, have been killed in this country (Yarrell, iv, p. 304; Saunders, p. 412).]

Genus TADORNA Flem.

TADORNA Fleming, Philos. of Zool., II, p. 260 (1822—Monotype and by tautonymy: *T. tadorna*).

Bill rather concave, “nail” narrow, sharply bent down and recurved over lower mandible, old male in breeding season with prominent knob at base of bill. At bend of wing a conspicuous horny knob. Large green speculum, inner secondaries chestnut-rufous. Tail slightly rounded, 14 rectrices. Third primary longest. Sexes nearly alike. One species, but if *radjah* from Papuan Islands and Australia is not generically separated two.

TADORNA TADORNA

298. *Tadorna tadorna* (L.)—THE SHELD-DUCK.

ANAS TADORNA Linnæus, Syst. Nat., ed. x, i. p. 122 (1758—Coasts of Europe. Restricted typical locality: Sweden).

Tadorna cornuta (S. G. Gmelin), Yarrell, iv, p. 352; Saunders, p. 419.

DESCRIPTION.—*Adult male. Winter and summer.*—Head and neck all round dull green, in some lights tinged amethyst; chin and throat sometimes dull blackish-green; small white mark below eye; extreme point of chin sometimes white, area varying in size; lower-neck white; broad tawny band across upper-mantle extending on to breast (sometimes feathers bordering lower-mantle vermiculated brown-black); scapulars mostly black glossed dull green, when fresh faintly edged whitish (in some short scapulars minutely freckled tawny), many with one web more or less white, remainder entirely white, some with black-brown vermiculations; remaining upper-parts white (upper tail-coverts sometimes tipped black-brown); lower-neck and upper-breast white; across breast a broad band, tawny at sides merging into black in centre, black continued down

centre of breast to vent as a broad band varying in breadth individually and widening out on belly, feathers all with broad white bases and when fresh narrowly tipped brownish ; under tail-coverts mostly cinnamon-rufous, remainder white washed faintly cinnamon-rufous towards tip ; remaining under-parts white ; tail white broadly tipped black, outer feathers more or less white ; primaries : rudimentary first white tipped black, remainder black, inner webs black-brown, outer ones with bases white ; secondaries black-

The Sheld-Duck (*Tadorna tadorna*). Male adult in the breeding season.

brown, outer webs glossed metallic-green forming green speculum, inner webs with basal halves white, inner secondaries sometimes faintly tipped white, innermost white with outer web chestnut, chestnut merging into black or hair-brown towards tip or shaft of feather, remainder white with outer web usually edged black ; primary-coverts black ; bastard-wing white tipped black and more or less black on outer webs ; rest of wing-coverts white. This plumage is acquired by a body moult Aug. to Dec. In summer vermiculated tips of chestnut mantle-feathers mostly lost by abrasion.

Adult male. Eclipse.—Most body-feathers, not all those of mantle and scapulars, not back, rump nor all upper or under tail-coverts, are first moulted followed by wings and tail July and Aug. Crown, sides of face, and sides of neck blackish, feathers tipped dark green and faintly edged dusky-brown, those at base of upper mandible and cheeks with whitish bases more or less exposed ; whitish patch below eye as in winter ; chin and throat brown-black, feathers with conspicuous white bases and narrowly edged white at tip ; centre of nape still moulting in few specimens examined ; new feathers of lower-neck bordering upper-mantle white tipped blackish, some with a subterminal tawny band, those of mantle tawny with broad blackish tips, more or less vermiculated blackish towards base and with faint white terminal lines ; scapulars dull black faintly glossed greenish with faint white tips, some partly white, vermiculated blackish, others entirely white more or less vermiculated dusky and tipped black ; new upper tail-coverts white with blackish tips ; new feathers of lower-neck apparently white as in winter ; feathers of sides of upper-breast pale tawny with ill-concealed broad white bases and narrowly edged white, some more or less shaded blackish towards tip, those of centre of breast-band white with brown-black tips, more or less suffused tawny and narrowly tipped white ; feathers of band down centre of breast and belly white, tipped pale tawny more or less marked

blackish, these tips narrower on belly and almost disappearing on vent which is white; feathers of sides of belly and flanks white, tips faintly speckled blackish, some feathers more or less suffused pale tawny; new under tail-coverts light ochraceous-buff; tail and wings as winter.

Adult female. Eclipse.—Like adult male eclipse but head browner, new feathers of lower-neck bordering upper-mantle white tipped dusky-brown, and those of upper-mantle dark ash-grey indistinctly vermiculated pale tawny and whitish and faintly tipped whitish; tawny patch at sides of upper-breast merely indicated; centre of breast and belly practically white; new flank-feathers with faint terminal dusky lines. Tail and wings as winter.

Adult female. Winter and summer.—As male, but head and neck usually duller, more brown-black with less greenish gloss but sometimes as brilliant as male; in some fore-head and lores more or less white owing to exposure of white bases by abrasion of tips; feathers round base of bill and lores brownish (sometimes feathers of chin, fore-neck and sides of neck faintly tipped white); most feathers of tawny band on mantle vermiculated black towards tip and narrowly tipped black or white (more or less lost by abrasion); tawny breast-band narrower, feathers in some vermiculated black; black of breast and belly not so intense as in male and area less extensive, feathers with broader white bases imperfectly concealed; under tail-coverts pale cinnamon-rufous, long-ones white. Moults as in male.

Nestling.—Down on fore-head, lores, cheeks and narrow eye-stripe (in some absent) white; crown, centre of nape and of upper-mantle, mantle, broad bar on wing, centre of back and rump and patch on back of thighs extending to sides of rump, sooty-brown or light chocolate-brown; small patch in centre of mantle (in some ill-defined) and irregular streak on sides of back and rump white; under-parts white.

Juvenile. Male and female.—Easily distinguished from adults by absence of tawny and black coloration. Fore-head and lores almost to eye white; crown black or black-brown, feathers narrowly tipped buff-brown; nape, cheeks and sides of neck black or black-brown, feathers with very narrow white tips; line above and patch below eye white; centre of upper-mantle pale hair-brown, feathers with imperfectly concealed white bases; sides of upper-mantle more or less white; mantle hair-brown or blackish hair-brown, feathers narrowly edged white, some white and some with distal halves vermiculated hair-brown and washed ochraceous-buff; scapulars hair-brown merging into buff-brown at edges, lower scapulars mouse-grey; lower-back, rump and upper tail-coverts white, latter vermiculated brown-grey towards tips and in some tipped black-brown; chin and patch from lores to below eye white; fore-neck white, feathers mostly tipped dusky-brown; remaining under-parts white but sometimes sides of upper-breast tinged buff

and flanks with pale drab shafts and suffused same; tail black-brown edged and tipped buff-white, outer feathers more or less white; wing as adult, but primaries narrowly edged white, 7th and succeeding with broad white tips, secondaries rather less brilliantly glossed green and broadly tipped white, inner webs largely white, inner secondaries mouse-grey with chestnut outer webs, innermost as lower scapulars; bastard-wing black-brown tipped white; greater coverts mouse-grey; median-coverts white tipped mouse-grey, upper series only faintly tipped as are lesser coverts.

First winter and summer. Male.—As adult male but green of head and neck usually duller; some feathers of tawny band on mantle faintly tipped black-brown edged white (edges soon lost by abrasion); retained juvenile lower-scapulars mouse-grey (not white as in adult); tawny band on breast narrower, feathers of centre of breast-band white tipped dull black and faintly edged pink-cinnamon; black area down centre of breast and belly narrower and duller than in adult, most feathers with imperfectly concealed broad white bases and dull black tips often suffused and tipped pink-cinnamon; under tail-coverts pale cinnamon-rufous; wing as juvenile, but new innermost secondaries and wing-coverts as adult, mouse-grey tips to median and lesser coverts more or less abraded (easily distinguished from adult by white tips to inner primaries and secondaries and mouse-grey greater coverts). The juvenile body-feathers, tail, some innermost secondaries and coverts, sometimes some greater and median coverts are moulted Aug. to March, but not rest of wings. N.B.—Sometimes moult is incomplete and prolonged, many juvenile feathers being retained, in others breast and belly-band is as black and fully developed as in adult male.

First winter. Female.—As adult female but feathers of head and neck mostly with dusky-brown tips, in some a patch of white tipped dusky on cheek below eye; white bases to feathers of throat often conspicuous giving mottled appearance; tawny band on mantle and breast sometimes narrower, black band down breast more profusely washed light pink-cinnamon and more intermixed with white, sometimes breast and belly-band only imperfectly indicated, sides of breast being pale brownish-tawny, feathers speckled or shaded black-brown towards tip and with broad white bases; rest of breast-band and belly-band white, feathers mostly broadly tipped sandy-black-brown or black-brown; under tail-coverts as adult or considerably paler; wing as juvenile but new innermost secondaries and coverts as adult. Moult as male. No spring material examined.

Measurements and structure.—♂ wing 318–350 mm.; tail 100–123, tarsus 50–57, bill from feathers 52.5–60 (12 measured). ♀ wing 290–334, bill 44–54. Primaries: 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd 3–9 mm. shorter, 4th 10–18 shorter, 5th 20–32 shorter, 6th 42–55 shorter; 2nd emarginated on inner and 3rd on outer web. Innermost secondaries

rounded at tip and about equal or shorter than 6th primary. Scapulars short and rounded at tip, in eclipse with square tips. Both sexes with rounded carpal "spur," more prominent in adult male. Tail almost square only slightly rounded, 14 feathers. Upper tail-coverts almost reach tip of tail. Bill broader towards tip than at base and considerably upturned; edges of bill with more or less prominent lamellæ, more developed towards tip of upper mandible; lower mandible with lamellæ not projecting outwardly; male develops in early spring at base of upper mandible a prominent fleshy knob which is shrunken and virtually absent in late summer and autumn and only slightly indicated in 1st summer males.

Soft parts.—Bill (ad. ♂) in spring carmine or blood-red, later paler, nail dusky, (ad. ♀) duller, (juv.) greyish-pink; legs and feet (ad.) flesh-coloured, (juv.) pale greyish-white; iris brown.

CHARACTERS.—No subspecies. Red upturned bill, green head, large amount of white and chestnut band distinguish adults, while juvenile has upper-parts ash-brown and white and under-parts white.

FIELD-CHARACTERS.—At a distance a boldly pied black and white bird with pose and carriage of a goose, but at close quarters chestnut breast-band, bright red bill and pink feet are conspicuous. Flight slow and laboured. Usually haunts sandy shores and banks and muddy estuaries, where it sometimes packs in large flocks, whilst more rarely it frequents inland waters. Note of male a deep "korr, korr," of female a loud harsh "quack," but both sexes utter subdued chuckling "quack" when brood in danger, and male whistles in spring, a low clear "wh'chee-you."

BREEDING-HABITS.—A marine species, haunting estuaries, low-lying shores and mud-flats. *Nest*.—Usually in rabbit-hole or deep burrow, usually about 7 or 8 ft. from entrance but sometimes deeper; also under furze-bushes, in stone-dykes, under rocks, and occasionally almost open. Consists of large quantity of greyish-white down with feathers (see *Brit. Birds*, Vol. II, Pl. 1), marram grass, etc. *Eggs*.—Normally about 8 to 15, but 16 to 20 and even 28 and 32 on record, probably due to several females laying together, white. Average size of 100, 65.7×47.3 . Max.: 71×48.8 and 69×50 . Min.: 60×44 and 62.8×43.3 mm. *Breeding-season*.—Usually in latter half May, occasionally early in month. *Incubation*.—Chiefly by female, but called off by male in morning and evening. Period variously given as 24–26 and 28–30 days. Single-brooded.

FOOD.—Chiefly mollusca (*Buccinum*, *Paludina*, *Mya*, *Skenea*, *Tellina*, etc.), crustacea (shrimps, prawns and small crabs), with a small quantity of vegetable matter (algæ, and fragments of gramineæ) and occasionally insects (*Carabus* and larvæ of diptera).

DISTRIBUTION.—*British Isles*.—Resident. Generally distributed suitable localities coast, and especially estuaries, and in some places breeds considerable distance inland. Scarcer in south Great Britain

than north and in Shetlands very rare, and very doubtful if ever nested. In winter, numbers increased by immigrants and some evidence for emigration of breeding birds.

DISTRIBUTION.—*Abroad.*—Breeds in northern Europe, from about latitude 70° in Norway and 51° in Urals to France and even Spain, and on salt-lakes of south Siberia and central Asia, also in eastern Asia, west of Caspian and Black Seas. On migration south to Mediterranean and north Africa, as far as tropic of Cancer, to north India, Burmah, Japan, China, and Formosa. Casual Iceland and Færoes.

Genus CASARCA Bp.

CASARCA Bonaparte, Comp. List B. Eur. Amer., p. 56 (1838—Monotype *C. rutila* =*ferruginea*).

Much like *Tadorna*, but bill quite different; culmen scarcely concave, nearly straight, nail wider, nearly equal to half width of bill and only bent downwards, not recurved. 4 species, 1 Palæarctic, 1 southern Africa, 1 Australia, 1 New Zealand.

CASARCA FERRUGINEA

299. *Casarca ferruginea* (Pall.)—THE RUDDY SHELD-DUCK.

ANAS FERRUGINEA Pallas, Vroeg's Cat., Adumbratiuncula, p. 5 (1764—Tartary).

Tadorna casarca (Linnæus), Yarrell, iv, p. 347; Saunders, p. 421.

DESCRIPTION.—*Adult male. Winter and summer.*—Fore-head and crown cream-buff or warm buff, in some fore-head pale cinnamon-rufous; nape pale cinnamon-rufous shading to deeper on lower-nape; black ring varying in depth individually round lower-throat; mantle cinnamon-rufous; scapulars mostly same but some cinnamon-buff, some vermiculated dusky or hair-brown, some lower ones slate-grey suffused and vermiculated cinnamon-rufous towards tip, others with inner webs blackish or pale slate and

The Ruddy Sheld-Duck (*Casarca ferruginea*). Male adult.

outer webs pale greyish-white or white; back cinnamon-rufous or cinnamon-buff, feathers finely vermiculated black; rump and upper tail-coverts black with dull green gloss; lores and cheeks cream-buff, in some lores suffused cinnamon-rufous; chin, throat and sides of neck pale cinnamon-rufous; breast, sides of body and flanks cinnamon-rufous; belly and vent chestnut; under tail-coverts cinnamon-rufous (in some chestnut); axillaries and under wing-coverts white; tail black glossed green; primaries and their coverts black glossed dull green; secondaries black-brown, outer webs bright metallic-

green (forming green speculum) sometimes with magenta-coppery gloss, inner webs mostly white and in some with white tips, innermost secondaries with outer webs cinnamon-rufous, paler towards tip, and inner webs more or less grey or white, some short innermost slate-grey; bastard-wing black; median and lesser primary-coverts black or grey-black, vermiculated light buff or white; greater, median and lesser coverts white or white washed pink-buff. This plumage is acquired by partial moult Dec. to April involving most body-feathers, central pair of tail-feathers, innermost secondaries and coverts. N.B.—Cinnamon-rufous of upper- and under-parts is very variable in shade and becomes much faded in worn plumage.

Adult male. Eclipse.—No material with remiges in quill examined. One (♂ ad. 19/7/99 Brit. Mus.) is moulting some feathers of upper and under-parts, rest of body-plumage and wings worn. One (Sept., Tibet, no sex but apparently ♂) has wings, tail and much body-plumage new, no black collar. Two (Nov.) also want black collar. Only difference I can find between eclipse and winter-summer is absence of black collar* in eclipse. This plumage is apparently acquired by a more or less complete moult from July onwards.

Adult female. Winter and summer.—Coloration as male, but without black ring round neck and fore-head to crown, lores, area round eye, streak behind eye and usually chin white. Moult as in male. *Eclipse.*—No specimens moulting remiges examined. Apparently moult as in male and no difference in coloration between eclipse and winter-summer.

Nestling.—Similar to *T. tadorna* but does not appear to have small patch of white in centre of brown patch on mantle.

Juvenile. Female.—(No male examined.)—Fore-head light buff; crown pale drab-grey, feathers edged buff; nape cream-buff or warm buff, feathers with pale drab-grey bases; upper-mantle as adult; scapulars hair-brown with cinnamon-buff or buff fringes, which in some are more or less vermiculated hair-brown and cinnamon-buff, some of upper ones cinnamon-rufous, lower scapulars dark hair-brown faintly edged cinnamon-rufous; back and rump as adult but rump not such an intense black and only faintly glossed green; upper tail-coverts black-brown tipped warm buff; cheeks, sides of neck, chin, throat and fore-neck cream-buff or warm buff; under-parts pink-chestnut, in some pink-buff, deeper on belly and vent, flank-feathers with hair-brown bases; tail as adult but narrowly tipped buff; wing as adult but innermost secondaries with inner webs hair-brown, outer webs more or less cinnamon-rufous; greater coverts white clouded mouse-grey, paler on outer webs, which are sometimes white, innermost tipped buff; median coverts white usually suffused towards tip with pale mouse-grey

* One Nov. ♂ has some new feathers marked blackish forming an indefinite collar.

and edged warm buff, in some white washed pink-buff; lesser coverts white, in some washed pink-buff.

First winter. Male and female.—As adult eclipse but distinguished by mouse-grey of greater coverts (sometimes on inner web only) and mouse-grey edges to median coverts. The juvenile body-plumage, tail and some innermost secondaries are moulted from Aug. onwards, but not rest of wings. *First summer.*—Moult as in adult after which body and tail as in winter and summer adults, males acquiring by Feb. black ring round neck but always distinguishable by mouse-grey retained juvenile greater coverts.

Measurements and structure.—♂ wing 350–399 mm., tail 118–144, tarsus 55–65, bill from feathers 42–50 (12 measured). ♀ wing 327–357, bill 36–47. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd 2–12 mm. shorter, 4th 7–13 shorter, 5th 24–35 shorter, 6th 45–54 shorter; 2nd emarginated inner, 3rd outer, 4th slightly outer webs. Innermost secondaries rounded and shorter than 7th primary. Both sexes with rounded carpal “spur” most prominent in adult male. Scapulars slightly rounded at tip. Tail almost square only slightly rounded, 14 feathers. Upper tail-coverts almost reach tip of tail. Bill as broad at base as at tip, culmen descending and slightly concave, lamellæ equally developed along inner edge of upper mandible, lamellæ on edge of lower mandible project outwardly.

Soft parts.—Bill (ad.) blackish; legs blackish; iris brown: (Dresser).

CHARACTERS.—No subspecies. Easily distinguished by its uniform cinnamon-rufous coloration.

FIELD-CHARACTERS.—Distinguished at once by coloration, orange-buff, palest on head, with black tail and primaries and large white wing-patch which is very prominent in flight. Much less maritime than Sheld-Duck, but has similar slow and laboured flight. Swims with neck erect, fore-parts low and stern high. Call a reiterated “kark” or “kape” (Saunders) and I have heard a honking croak in flight.

BREEDING-HABITS.—Breeds in holes of any kind, in cliffs, among ruins, in burrows and it is said even in old eyries of Raptores and in hollow trees. *Nest.*—Of down with feathers, etc. *Eggs.*—8 or 9 to about 16 in number, white or tinged yellowish. Average of 71, 67.0 × 47.0. Max.: 72 × 49 and 68.8 × 49.5. Min.: 61.5 × 45.6 and 65 × 45 mm. *Breeding-season.*—May. *Incubation.*—Probably by female but no reliable details. Probably single-brooded.

FOOD.—Growing crops, corn, grass, etc., also water-weeds, fish, mollusca, crustacea, also offal and dead bodies even of human beings.

DISTRIBUTION —*British Isles.*—Rare vagrant. Many occurred June to Sept., 1892, various parts Ireland, in Cumberland, Sutherland, Elgin, Lincs., Norfolk, and Suffolk. Flocks ten to fifteen and even

twenty in some places (*cf.* F. M. Ogilvie, *Zool.*, 1892, pp. 392–8). Others recorded from time to time Dorset, Hants., Kent, Norfolk, Essex, Caithness, and elsewhere, including Sule Skerry (Orkneys), June, 1909, Elgin, July, 1913, Inverness-shire, July, 1914, Somersetshire, Nov., 1915. Some recorded examples no doubt escaped from semi-captivity (*e.g.* Cheshire, 1913).

DISTRIBUTION.—*Abroad.*—Breeds south Russia and Balkan Peninsula, east through middle Asia to China and Japan. Has bred Algeria and perhaps south Spain. Winters in India and south China to Formosa, also in north Africa. Casual in Iceland, Greenland, Scandinavia, Denmark.

Genus ANAS L.

ANAS Linnæus, *Syst. Nat.*, ed. x, i, p. 122 (1758—Type by subsequent determination *A. boschas* = *platyrhyncha*).

Anas comprises all British surface-feeding Ducks with exception of *Spatula*. Almost every species has been generically separated, on account of slight differences in structure of bill and of coloration. Bill nearly straight, wide, height at base considerably less than

Foot of the Mallard (*Anas platyrhyncha*) on left and the Common Pochard (*Nyroca ferina*) on right, to show difference in hind toe of surface feeding and diving Ducks.

length from end of feathering to nail; both mandibles with distinct but short lamellæ; nostrils oval, near base. Wings long and pointed, 2nd and 3rd primaries longest. Sexes as a rule very different, sometimes alike in plumage (American and Pacific species, *A. angustirostris*, etc.). About 50 species in all parts of Globe.

Key to species of genus ANAS.

1 {	Wing-speculum purple-blue	1	<i>A. platyrhyncha</i> , ♂ ♀, p. 267
1 {	Wing-speculum not purple-blue	2	
2 {	Chestnut patch on middle wing-coverts		<i>A. strepera</i> , ♂ ad., p. 272
2 {	No chestnut patch on median wing-coverts	3	

3	{	Upper wing-coverts mostly white	<i>A. penelope & americana</i> , ♂ ad., pp. 290, 296
		Upper wing-coverts light lavender-grey	<i>A. querquedula</i> , ♂ ad., p. 286
		Upper wing-coverts light blue	<i>A. discors</i> , ♂ ♀, p. 283
4	{	Upper wing-coverts brown	4
		Sides of head dark brown	<i>A. acuta</i> , ♂ ad., p. 298
		Sides of head chiefly bright chestnut-red	<i>A. crecca</i> , ♂ ad., p. 277
5	{	Sides of head whitish, pale brown, spotted with dark brown	5
		Axillaries spotted	6
		Axillaries uniform white	7
6	{	Rectrices with light cross-markings	<i>A. acuta</i> , ♀, p. 300
		Rectrices usually without cross-markings	
		<i>A. penelope & americana</i> , ♀, pp. 292, 297	
7	{	Wing over 200 mm.	<i>A. strepera</i> , ♀, p. 273
		Wing under 200 mm.	8
		Wing-speculum black in front, bright green behind	<i>A. crecca</i> , ♀, p. 278
8	{	Wing-speculum greenish-brown	<i>A. querquedula</i> , ♀, p. 287

ANAS PLATYRHYNCHA*

300. *Anas platyrhynchos* L.—THE MALLARD.

ANAS PLATYRHYNCHOS Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe. Restricted typical locality: Sweden).

Anas boschas Linnæus, Yarrell, iv, p. 358; Saunders, p. 423.

DESCRIPTION (Plate 6).—*Adult male. Winter and summer.*—Head and neck all round metallic-green (sometimes crown black-green) more or less glossed violet-purple, feathers of crown and nape when new with narrow sandy-brown tips (soon lost by abrasion); feathers at base of upper mandible and chin and in some throat dull blackish glossed green, narrow white collar not completely meeting on nape encircles lower-neck; upper-mantle finely vermiculated ash-brown and white, feathers suffused towards tip cinnamon-brown, feathers of lower-mantle with black-brown centres and usually only faintly vermiculated white and with broad cinnamon-brown edges; scapulars finely vermiculated grey and white, some suffused chestnut-brown, some with inner webs blackish slate-grey and some with outer webs pale smoke-grey; back black-brown slightly glossed green, rump and upper tail-coverts black glossed vivid blue-green; upper-breast rich chestnut-brown (feathers when fresh with white tips soon lost by abrasion); breast, belly, flanks, and vent finely vermiculated grey and white; under tail-coverts black glossed dull blue-green; axillaries and under wing-coverts cream; tail deep mouse-grey, outer feathers palest grey, broadly edged and slightly vermiculated white, two central pairs black glossed blue-green and curled backwards; primaries mouse-grey, paler on inner webs; secondaries mouse-grey broadly tipped white, outer webs glossed violet-purple or blue-green (according to angle of light), and with

* Linnæus described the female as *Anas platyrhynchos* on p. 125, the male as *Anas Boschas* (not *boschas*) on p. 127 of *Syst. Nat.*, ed. x. The former name has therefore been correctly accepted (Lönnerberg, *A.O.U. Checklist*, and others).—E.H.

black-brown subterminal bar; innermost mouse-grey, outer ones suffused chestnut-brown on outer webs and narrowly bordered black, that next speculum with broad velvety-black border on outer web; all primary-coverts and bastard-wing mouse-grey; greater coverts mouse-grey with white subterminal bar (depth varying considerably individually) and black terminal bar, innermost mouse-grey suffused cinnamon-brown; median and lesser coverts hair-brown, median suffused cinnamon-brown towards tips. This plumage is acquired by a moult of body-feathers, tail and innermost secondaries Aug. to Nov., curled tail-feathers and new innermost secondaries are acquired last. A few odd body-feathers may occasionally be renewed in spring, otherwise no moult. Fore-head, crown, lores, chin, throat and fore-neck become more or less dull black owing to abrasion of green tips of feathers.

Adult male. Eclipse.—The body-feathers and two central pairs of curled tail-feathers are first moulted and later rest of wing- and tail-feathers. Moult commences June or July, exceptionally May. Rather resembles adult female eclipse, but distinguished at a glance by more uniform crown and mantle. Distinguished from juvenile by under-parts not narrowly streaked black-brown. Crown and upper-nape brown-black glossed dull green, resembling juvenile male, but feathers without, or with only faint buff tips; centre of nape dark ash-brown, feathers faintly edged buff; rest of nape streaked black-brown; mantle black-brown, some feathers edged lighter brown or faintly edged light buff; scapulars black-brown edged light or warm buff; back and rump black-brown glossed olive-green; upper tail-coverts sepia or black-brown glossed green and edged warm buff; a streak from base of upper mandible through eye to nape black-brown usually glossed metallic-green; lores, cheeks, sides of neck, chin, throat and fore-neck as in eclipse female, fore-neck usually streaked black-brown; upper-breast in some as in adult female, in others with darker crescent-shaped spots or marks of black-brown rather than sepia, feathers with broad cinnamon-brown edges and tipped white; sides of breast and flanks sepia or black-brown, feathers fringed light or warm buff, sometimes speckled and vermiculated creamy; rest of breast, belly and vent as in adult female in some heavily streaked sepia, in others with small or large oval sepia spots; under tail-coverts as in adult female but with larger spots, in some suffused cinnamon; tail as in adult winter and summer male but two new central pairs sepia edged light buff, in some quite straight, in others tending to twist back; wing as in adult winter, but new innermost secondaries hair-brown rather than mouse-grey and more or less tinged olive-brown on inner webs. There is considerable individual variation in eclipse plumage.

Another type of eclipse male has lower-breast, belly, vent and upper series of under tail-coverts pale ash-brown or ash-white, more or less vermiculated dusky-brown or greyish-white, feathers sometimes with black-brown or dusky-brown drops and narrow buff fringes, sides of body and flanks more plentifully vermiculated

whitish. N.B.—Sometimes some feathers of cheeks, chin and throat have snuff-brown tips, sometimes marked blackish, others with blackish tips, sometimes glossed green.

Some birds moulting out of eclipse get some snuff-brown feathers, some shaded blackish towards tip, also buff feathers with blackish tips or streaks on cheeks, these feathers being subsequently shed.

Adult female. Winter and summer.—Crown heavily streaked black glossed dull green, feathers edged light buff; nape light buff faintly streaked black-brown; mantle and upper tail-coverts black-brown, feathers fringed pinkish or light buff, and often with irregular markings or V-shaped buff bars; scapulars as mantle, some long scapulars with streaks of pinkish or light buff; back and rump black-brown or sepia more or less glossed green, feathers edged pinkish or light buff and in some barred buff, in others with oval spots or central streaks of black-brown; cheeks and sides of neck light buff narrowly streaked black-brown; black-brown streak from lores through eye to nape: chin and throat warm buff, in some more or less spotted or streaked dusky or black-brown; upper-breast light or warm buff, in some cinnamon, centre of feathers with black-brown or ash-brown drops, streaks, or crescent-shaped marks; rest of breast, belly and vent light or warm buff, in some heavily streaked, in others more lightly spotted or streaked ash-brown or sepia; sides of body and flanks sepia broadly edged light or warm buff, and with irregular buff markings; under tail-coverts light or warm buff with central markings or large oval spots of sepia, tips creamy-white; tail sepia or ash-brown edged and more or less irregularly marked and barred warm buff; wing as in male, in some speculum narrower; new innermost secondaries sepia or olive-brown edged and with irregular markings of light buff; median coverts darker, in some tinged olive and tipped light or warm buff. The body-feathers are completely moulted Oct. to March, in some tail-feathers are moulted Oct. and Nov., occasionally an odd pair of tail-feathers may be renewed in spring; new innermost secondaries are not acquired till April or May. Forward birds, except for innermost secondaries, may be in complete breeding dress by Nov. The nest-down is acquired March and April.

Adult female. Eclipse.—The body and tail-feathers are completely moulted July and Aug. Like winter and summer but feathers of crown with narrower buff edges; mantle and scapulars more narrowly edged at sides pink-buff, feathers of mantle without buff bars, scapulars with fewer buff streaks, mantle and scapulars thus appearing darker and more uniform; innermost secondaries without buff streaks, those next speculum not so richly marked chestnut.

Nestling.—Crown, nape, mantle, back, rump and uropygial tuft, patch on side of body and back of thigh dark sepia or black-brown with an olivaceous tinge, long down-filaments in some with yellowish tinge; wing-bar, small patch on either side

of centre of back below wing and another on either side of rump light yellow ; lores, cheeks, streak over eye and sides of neck yellow-buff ; well-defined line of sepia from lores through eye to top of nape, below this line in some a streak of sepia extending half-way from nape to eye, in some a tiny streak of sepia at lateral base of upper mandible ; remaining under-parts pale yellow-buff shading to cream-buff or cream-yellow on breast and belly.

Juvenile. Male.—In general appearance resembling adult eclipse female but under-parts narrowly streaked sepia, tail-

Tips of tail-feathers of the Mallard. A, Adult.
B, Juvenile, to show difference in structure.

feathers narrower and usually with tip of shaft bare. Crown, mantle and scapulars black-brown as in adult female eclipse, but feathers of crown and mantle with narrower buff edges, mantle with few buff bars ; back and rump black-brown or sepia glossed dull olive ; lower-rump and upper tail-coverts sepia, fringed warm buff ; cheeks, sides of neck and rest of under-parts more narrowly streaked or spotted ash-brown ; tail-

feathers ash-brown edged and irregularly marked warm buff, outer feathers paler ; wing as adult male but innermost secondaries shorter, duller and less suffused cinnamon-brown ; short inner ones and innermost greater coverts hair-brown tipped buff ; greater coverts in some with narrower white tips ; median and lesser coverts as in adult male. *Female.*—As male, but feathers of back and rump black-brown edged warm buff and sometimes barred buff ; innermost secondaries shorter and browner than in juvenile male and adult female ; median and lesser coverts with buff edges (soon becoming abraded).

First winter and summer. Male.—Like adult winter and summer and when all juvenile body-feathers are renewed difficult to distinguish with certainty. Wing appears more worn than in adult and some juvenile feathers are often retained on back and rump. In some birds some snuff-brown feathers spotted or streaked dusky or black-brown are acquired on cheeks and at sides of throat intermixed with buff feathers with blackish tips, these feathers being subsequently shed. In others chestnut-brown feathers of upper-breast bordering lower-breast have small round blackish spots, while in others more coarsely vermiculated flank-feathers appear. These feathers on chin, throat and breast and flanks represent no doubt traces of a plumage now lost. The body-feathers (not always all those of back and rump), tail and innermost secondaries are moulted Aug. to Dec. or even Feb.

First winter and summer. Female.—Like adult winter and summer female and difficult to distinguish with certainty except by more worn appearance of juvenile innermost secondaries. The body-feathers (apparently not always back) and tail, but not wings, are moulted from Aug. onwards; specimens in moult occur in every month to April. Some in Aug.-Sept. appear to get a flush of feathers on mantle and scapulars resembling adult eclipse but these are in most almost at once replaced by 1st breeding plumage. Forward young females in 1st breeding plumage occur in Oct. they probably moult again in spring as some April birds examined were acquiring fresh breeding plumage like the old worn feathers. In some moult of tail is not completed (some juvenile tail-feathers being retained) until April. Juvenile secondaries are renewed and nest-down is acquired in March and April.

Measurements and structure.—♂ wing 260–288 mm., tail 82–95, tarsus 40–44, bill from feathers 50–56 (12 measured). ♀ wing 240–267, bill 43–52. Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd sometimes equal, usually 3–7 mm. shorter, 4th 7–12 shorter, 5th 18–27 shorter, 6th 27–45 shorter; 2nd emarginated inner, 3rd outer and 4th slightly outer web. Longest innermost secondary shorter than 5th primary; innermost secondaries tapering and acuminate, in eclipse blunter not so sharply tapered. Long scapulars tapering at tip, rest rounded tapering to a point laterally, in eclipse rounded. Tail rounded, 18 to 20 feathers, two central pairs (in some only one pair) curled, in eclipse straight. Bill broad, about as long as head, higher than broad at base, depressed and widened towards end, which is broadly rounded; nail rather small and decurved at tip, edges parallel, middle of culmen a little concave, terminal part behind nail convex; lamellæ scarcely exposed.

Soft parts.—Bill (ad. ♂) greenish-yellow, culmen and tip blackish, (ad. ♀) greenish-olive, culmen and tip dark horn, (juv.) reddish-horn; legs and feet (ad. ♂ and ♀) orange-red, (juv.) orange; iris brown.

CHARACTERS AND ALLIED FORMS.—*A. p. conboschas* (Greenland) has upper-parts and wing-coverts greyer, and males have flanks much more coarsely vermiculated, feathers of chestnut-brown upper-breast with black spots towards tip; *A. p. subboschas* (Iceland) requires further confirmation. Violet-purple speculum bordered above and below by black band succeeded by white one distinguishes species in all plumages.

FIELD-CHARACTERS.—Rather smaller and of slighter build, but otherwise like domestic bird. Vermiculated grey back and flanks—almost white at a distance, and in bright sunlight—and metallic-green head and neck, with narrow white collar are outstanding features in male on the water. Purple speculum narrowly bordered above and below with black and white is, when visible, certain guide to identity of mottled brown and buff female. Flight rapid and audible. Feeds

chiefly by night in fields, marshes and swamps, leaving security of ponds, lakes or sea at dusk, to return at dawn. Gregarious in winter. Call of male a low "quork," of female a loud "quark." In spring male utters a soft "dreek, dreek."

BREEDING-HABITS.—Usually nests near water, often in sheltered depression in ground, but also at times in pollarded willows, holes of trees, nests of Crows and other birds, ivy-covered ruins, etc. *Nest*.—Composed of down and feathers (see *Brit. Birds*, Vol. II, Pl. 1) mixed with leaves, grass, etc. *Eggs*.—Usually 7 or 8 to 13, occasionally more. Colour variable: usually greyish-green or greenish-buff, but occasionally pale blue. Average of 83 eggs, 57.8×41.0 mm. Max.: 62×42 and 60×43.2 . Min.: 50.5×39 mm. *Breeding-season*.—Usually in March but exceptionally even in February and thence onward to late in autumn. *Incubation*.—By female alone. Period: 26th day (W. Evans.) Probably in a purely wild state single-brooded.

FOOD.—Mainly vegetable, including many species of aquatic and land plants (*Ranunculus pantothrix*, *Callitriche verna*, *Lemna*, *Ceratophyllum submersum*, *Potamogeton*, seeds of *Galium*, also *Persicaria*, etc.); also algæ, *Zostera marina*, acorns, blackberries, grain of various kinds. Aquatic insects (Diptera, water-beetles, larvæ of caddis-flies, etc.) and small mollusca (*Tellina balthica*, water-snails, etc.), leeches, worms, frogs and their spawn so that it may be said to be almost omnivorous.

DISTRIBUTION.—*British Isles*.—Resident, passage-migrant (mid-Sept.—end Nov. to end March—mid-May), and winter-visitor (mid-Sept.—early Nov. to March). Generally distributed.

DISTRIBUTION.—*Abroad*.—Northern Hemisphere, in winter south to north Africa, Madeira, Canaries and north India. Also in North America, but at least the Greenland form is separable and possibly the Iceland; in winter (in America) south to Mexico, West Indies, and Panama.

ANAS STREPERA

301. *Anas strepera* L.—THE GADWALL.

ANAS STREPERA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe).
Restricted typical locality: Sweden).

Anas strepera Linnæus, Yarrell, iv, p. 370; Saunders, p. 425.

DESCRIPTION (Plate 6).—*Adult male*. *Winter and summer*.—Crown and nape black-brown, feathers tipped and barred cinnamon; mantle and some scapulars vermiculated blackish-grey and cream, in some feathers of lower-mantle olive-brown freckled cream, rest of scapulars mouse-grey edged buff-brown, long ones mouse-grey; back black or olive-brown, usually finely freckled and vermiculated cream; rump and upper tail-coverts black glossed dark blue; forehead, lores, cheeks, sides of neck, chin, throat and fore-neck light buff or cream, spotted and barred dusky or black-brown; feathers

of upper-breast with alternate black-brown and white bars towards tip, terminal ones crescent-shaped (barring often replaced by indefinite black-brown frecklings); rest of breast, belly and vent white or faintly freckled or barred dusky; sides of body, flanks and short under tail-coverts vermiculated as mantle; rest of under tail-coverts black; axillaries and under wing-coverts white; tail ash-brown, sometimes feathers with blackish borders, outer tail-feathers paler, edged cream or buff and occasionally marked buff; primaries mouse-grey paler on inner webs shading to white at base; outer secondaries dark mouse-grey tipped white, succeeding ones with outer webs black, inner ones with outer webs white, innermost mouse-grey; primary-coverts and bastard-wing mouse-grey, median and lesser primary-coverts same spotted and edged cream; greater coverts black, outer ones mouse-grey, in some tipped chestnut and with outer web more or less bordered black, inner ones with inner webs mouse-grey; lower series of median coverts mostly black, or chestnut tipped black, outer ones and upper series chestnut, inner ones mouse-grey spotted and freckled cream; lesser coverts mouse-grey vermiculated and spotted cream. N.B.—There are two types of males, one with a brownish and one with a more greyish head and neck. This plumage is acquired by a moult of body-feathers and innermost secondaries Aug. to Nov. or even Jan. In spring a few body-feathers may be renewed otherwise no moult.

Adult male. Eclipse.—The body-feathers are first moulted, followed by wing and tail from May or June. Upper-parts resemble juvenile male more than adult female, upper-mantle being barred but under-parts not narrowly streaked or spotted as in juvenile and wing that of adult. Head and neck as adult female; mantle black-brown or sepia, feathers with broader and more V-shaped or semi-circular bars of pink-buff than in juvenile; scapulars black-brown or sepia edged cinnamon-buff, upper ones with a V-shaped mark of same; back and rump sepia tinged olive, feathers with lighter brown edges; upper tail-coverts as in adult female; cheeks, sides of neck, chin and throat more heavily streaked than in juvenile; feathers of upper-breast whitish with transverse black-brown bars, an irregular subterminal semicircular or roundish black-brown marking, and tipped cinnamon-buff; sides of body and flanks as in adult female but feathers with V-shaped buff markings; rest of breast, belly and vent white, feathers mostly with large roundish spots, larger and not so numerous as in juvenile; under tail-coverts white with irregular sepia markings, some with dusky vermiculations; tail apparently as winter; innermost secondaries shorter, less tapering at tip and tinged brown.

Adult female. Eclipse.—Crown streaked black-brown glossed dull green, feathers edged warm buff; nape dusky-brown, feathers edged light buff; mantle, scapulars and upper tail-coverts black-brown tinged olive, feathers with broad fringes and most with more or less pronounced V-shaped markings and barrings of buff; long

scapulars olive-brown faintly tipped white ; back and rump sepia glossed olive, feathers edged and barred buff (in some back plain without buff barrings), feathers of small patch on either side of rump usually barred white ; indistinct black-brown streak from base of upper mandible through eye to nape ; cheeks, sides of neck, chin, throat and fore-neck light buff narrowly streaked dusky-brown, upper-breast warm buff, feathers with horse-shoe crescents or sub-terminal bars or spots of black-brown ; remainder of breast and belly white (in some spotted with dusky at side) ; sides of body, flanks and under tail-coverts sepia, fringed and with irregular markings of buff (in some under tail-coverts white with irregular markings of sepia) ; vent cream-white, more or less spotted dusky, or feathers shaded pale dusky ; axillaries and under wing-coverts white ; tail as male but with irregular buff markings, outer feathers buff towards base ; wing as male but middle secondaries with outer web grey and extreme outer border black, or with outer web olive-brown frosted pale grey, innermost secondaries and coverts olive-brown faintly tipped creamy ; greater coverts as male but black not so intense or extensive, outer ones mouse-grey tipped white, inner ones with inner webs olive-brown ; lower series of median coverts as male but sometimes with no chestnut, inner ones olive-brown edged cream, upper series olive-brown mostly with a buff bar and edged cream, a patch towards centre washed chestnut (sometimes only faintly indicated) ; lesser coverts olive-brown edged light buff. Very few moulting birds examined. N.B.—There is considerable individual variation in amount and distribution of black and chestnut on greater and median coverts of both sexes, but adult female and immature male never have so much chestnut on median coverts as adult male and sometimes chestnut is absent.

Adult female. Summer.—The body-feathers (back and rump?), some tail-feathers (in some central pair only), innermost secondaries and coverts and some median coverts are moulted from March onwards. Like female eclipse but upper-parts more plentifully edged and marked light or warm buff which fades to whitish-buff by late summer ; chin and throat white ; feathers of sides of body and flanks as in eclipse but edged and barred lighter buff ; tail apparently as in eclipse ; wing as in eclipse but innermost secondaries olive-brown edged and irregularly barred and marked warm or light buff, new inner greater coverts black-brown similarly barred and marked, new median coverts with black-brown centres and broadly edged warm or light buff. N.B.—Centre of belly subsequently appears spotted owing to plucking of feathers for nest revealing ash-brown feather bases.

Nestling.—Like that of Mallard but upper-parts sepia or black-brown without olivaceous tinge ; long down-filaments tinged cinnamon-buff instead of olivaceous, most pronounced in region of upper-mantle ; cream-buff eye-stripe extending well on to sides of crown ; light patches on upper-parts cream-buff instead of light yellow as in Mallard ; cheeks, sides of neck, chin, throat and fore-

neck cream-buff instead of yellow-buff; line through eye narrower and streak below this line absent; remaining under-parts cream-buff, paler on breast and belly.

Juvenile. Male.—Like eclipse female but easily distinguished by more heavily streaked or spotted under-parts; feathers of mantle and scapulars more narrowly edged buff than in adult female, sometimes with broad straight buff bars (a few V-shaped); back and rump black-brown; lower-rump and upper tail-coverts as in adult female, at either side of rump small patch vermiculated dusky-black and cream; feathers of upper-breast sepia or black-brown tipped buff and irregularly barred and marked white; rest of breast, belly and vent white heavily spotted dusky-brown giving a streaked appearance; rest of body-plumage as in adult female; tail mouse-grey or sepia, feathers edged buff; wing as adult female but black on outer web of middle secondaries more extensive, barring of upper series of median coverts more marked, amount of chestnut on outer ones varies individually and occasionally is almost absent. *Female.*—As male but mantle and scapulars scarcely barred at all, feathers with cream-buff fringes; back and rump dark sepia, feathers with lighter edges; feathers at sides of rump with whitish bars not vermiculated; remaining under-parts and tail as male; wing as male but outer webs of middle secondaries as adult female; greater coverts olive-brown tipped cream, middle ones more or less black on outer web (amount of black varies individually); median coverts olive-brown edged cream and mostly with a buff bar, those bordering greater coverts more or less black, chestnut absent or at most indicated by faint tips to outer coverts; lesser coverts olive-brown fringed light buff.

*First winter and summer. Male.**—As adult male, but back as in juvenile (black-brown glossed olive without frecklings); in some feathers of breast and belly freckled dusky towards tip giving a spotted appearance, in others breast and belly white; tail as in adult; wing as in juvenile but innermost secondaries mouse-grey. The juvenile body-feathers (apparently not back or rump) tail and innermost secondaries are completely moulted from autumn to March, but not rest of wings. Sometimes many juvenile feathers are retained.

First winter. Female.—As adult female but wing as juvenile, greater coverts usually with less black than in adult female and chestnut usually absent or merely indicated on median coverts. Mould as male but innermost secondaries do not appear to be moulted and not always all tail-feathers. *First summer.*—Like that of adult and moult apparently as in adult.

First eclipse. Male and female.—Apparently as adult eclipse.

Measurements and structure.—♂ wing 260–282 mm., tail 76–93,

* Sometimes more coarsely barred short upper scapulars and coarsely barred feathers on sides of body and flanks make their appearance and are subsequently shed. As in other species these feathers no doubt represent traces of a lost plumage.

tarsus 35–40, bill from feathers 38–45 (12 measured). ♀ wing 238–258, bill from feathers 36–42. Primaries : 1st narrow, pointed and little more than half longest primary-covert, 3rd longest, 2nd equal or 3–7 mm. shorter, 4th 9–15 shorter, 5th 22–27 shorter, 6th 36–42 shorter ; 2nd emarginated inner and 3rd outer webs. Innermost secondaries tapering (in eclipse shorter and less tapering), longest between 6th and 7th primaries. Scapulars long and pointed at tip (in eclipse broader and less pointed). Tail rounded, 16 feathers, central pair pointed. Bill shorter than head, about as deep as broad at base, sides nearly parallel but converging towards base, culmen gently concave in middle, straight and flattened anteriorly, nail abruptly decurved, lamellæ distinctly exposed.

Soft parts.—Bill (ad. ♂) leaden-grey, (ad. ♀) dusky, on sides dull orange, (juv.) pomeranian-yellow ; legs and feet (ad. ♂) dull orange (paler in ♀), webs dusky, (juv.) saffron-yellow ; iris brown.

CHARACTERS.—No subspecies. Males distinguished by black and white speculum, black greater and chestnut on median coverts, females by blackish-grey and white speculum and black or olive-brown greater coverts.

FIELD-CHARACTERS.—More addicted to fresh-water than Mallard ; is rather smaller and sits higher in water, with stern more elevated. In flight, wings appear more pointed. Crescentic marks on fore-parts, grey in male, brown in female, are noticeable at close quarters. Male has orange-yellow, not orange-red, feet, and lead-grey, not olive-green, bill ; and velvet black tail-coverts and dark chestnut wing-coverts are useful guides ; but outstanding character in both sexes, especially in flight, is white speculum. Usual call a chuckling croak ; male during courtship utters a low deliberate “ep, ep, pair” (Coward).

BREEDING-HABITS.—Usually nests in thick vegetation near water. *Nest*.—In depression of ground, lined characteristic white-tipped dark down (feathers from nest see *Brit. Birds*, Vol. II, Pl. 1). *Eggs*.—Usually 7 or 8 to 13, but 16 on record, like those of Wigeon, warm yellowish-cream. Average of 100 eggs, 55.3×39.7 . Max. : 58×41 and 57.5×43.5 . Min. : 51×34.5 and 51×34.5 mm. *Breeding-season*.—First half May. *Incubation*.—By female alone ; said to last 21 days(?). Single-brooded.

FOOD.—Mainly vegetable, buds, leaves and roots of water-plants, as well as seeds, grain and grass. In India rice is eaten, and a mass of white worms was once found in stomach. Naumann also includes besides worms, small molluscs, spawn and fry of fish and frogs.

DISTRIBUTION.—*British Isles*.—Resident and winter-visitor (mid-Aug.-end Oct. to March-mid-April). Breeds regularly in fair numbers (originally introduced) Norfolk and Suffolk and since 1909 (probably 1908) on Loch Leven (Kinross), in Caithness 1912 and 1914, in Ross and Sutherland 1913, probably in Midlothian 1916, in Fife 1918. Also bred Peebles 1906 but uncertain if genuine wild

birds (cf. *Scot. Nat.*, 1920, pp. 15–20). Elsewhere autumn to spring visitor, uncertain and scarce most parts, but common Tiree and fairly so Uist.

DISTRIBUTION.—*Abroad.*—Northern Hemisphere, breeding in temperate regions of both continents; in winter south to Abyssinia, India and China, Mexico and Florida. Accidental in Pribilof Isles, Japan, Greenland, Bermudas, Cuba, and Jamaica.

ANAS CRECCA

302. *Anas crecca crecca* L.—THE TEAL.

ANAS CRECCA Linnaeus, *Syst. Nat.*, ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).

Querquedula crecca (Linnaeus), Yarrell, iv, p. 387; *Nettion crecca* (L.), Saunders, p. 431.

DESCRIPTION (Plate 6).—*Adult male. Winter and summer.*—Fore-head, crown, nape, lores, cheeks, sides and front of neck chestnut, when fresh feathers of fore-head and crown with faint subterminal dusky bars and those of cheeks, sides of neck and fore-neck narrowly tipped white; a cream line commencing at side of chin, passes to base of upper mandible and running parallel with fore-head divides in front of eye, one line going above and one below eye to nape; between these lines encircling eye, an area of bright metallic-green (in some lights glossed violet-purple) passes backwards to upper-mantle narrowing on nape; lower-nape where bordering mantle, black glossed violet-purple; mantle and upper scapulars vermiculated blackish-grey and cream, lower-mantle towards centre olive-brown freckled cream, remaining scapulars mouse-grey, some with outer webs vermiculated blackish-grey and cream, others light buff or cream with broad bands of velvet-black on outer web; back and rump olive-brown or mouse-grey but in some feathers of lower-rump vermiculated cream; upper tail-coverts black-brown glossed green or purple and edged warm buff; chin black; upper-breast cream or light buff, feathers with round dusky or black-brown spots towards tips; sides of body and flanks vermiculated blackish-grey and cream; breast, belly and short under tail-coverts white, in some belly and vent more or less barred dusky, central under tail-coverts black, lowest ones edged white, those at side cream-buff, some with broad black subterminal bands; axillaries and under wing-coverts white; tail mouse-grey, feathers faintly edged light buff; primaries sepia, paler on inner webs; secondaries with outer webs velvet-black, inner webs sepia, tipped light buff, middle feathers with outer webs metallic-green (in some lights blue) and without buff tips, innermost mouse-grey, one next green speculum bordered velvet-black on outer web; primary-coverts and bastard-wing sepia or hair-brown; greater coverts hair-brown broadly tipped warm buff or white, forming conspicuous wing-bar varying in depth individually; innermost greater, median and lesser coverts hair-brown. This plumage is acquired by moult of body-feathers,

tail and innermost secondaries July to Dec. Tail, which is moulted in eclipse, appears to be moulted a second time in Nov. and Dec. By summer abrasion of edges of feathers makes spots on upper-breast more pronounced.

Adult male. Eclipse.—The body-feathers are first moulted followed by wings and tail end June to Aug. Some types of eclipse are apt to be confused with *juvenile male*, but scapulars are broader and with square instead of rounded tips, lower scapulars very seldom with a pronounced white tip, under-parts not narrowly streaked or spotted as in juvenile, tail-feathers new and fresh, innermost secondaries considerably longer. Mantle and scapulars being broadly edged and usually boldly marked buff easily distinguish *adult female* from eclipse male. Crown and nape as juvenile; mantle and scapulars black-brown or olive-brown, feathers edged lighter or buff-brown, some uniform except for an odd bar or so, some with broad cream or buff bars, some with whitish or buff frecklings or vermiculations;* back and rump olive-brown, feathers edged lighter (in some a few feathers with a buff bar); upper tail-coverts olive-brown, feathers edged whitish or cream (in some with a crescent-shaped buff bar); cheeks, sides of neck, chin, throat and fore-neck as adult female, but dark streak through eye less distinct, black-brown patch on lores often absent; remaining under-parts as adult female but sides of body and flanks in some sepia edged light buff with narrow V-shaped whitish or buff bars and irregularly vermiculated white, in others more or less barred black-brown and deep pink-buff; tail-feathers as in winter-summer but new central pair less tapering and not projecting so far beyond rest; innermost secondaries olive-brown instead of mouse-grey, narrowly edged light buff on outer web and usually bordered by blackish olive-brown streak preceded by light greyish-olive one on outer web.

Adult female. Eclipse.—Crown heavily streaked black, feathers edged buff or pink-cinnamon; centre of nape as crown but streaks narrower; mantle and scapulars black-brown or sepia, feathers of mantle edged light cinnamon-buff and boldly marked with crescentic V-shaped or transverse bars of same, often incomplete on scapulars, which are also streaked same (sometimes barring much less pronounced); back, rump and upper tail-coverts black-brown, feathers edged cream and often with incomplete buff V-shaped bar or mark; indistinct black-brown streak from lores through eye to nape often interrupted in front of eye (in some a cream spot on lores and patch under eye); cheeks, sides of neck, chin, throat and fore-neck light buff more or less thickly spotted or streaked black-brown or dusky; chin and throat sometimes uniform light buff; upper-breast white or light buff, feathers with crescentic sepia or black-brown markings more or less obscured by buff tips; sides of body and flanks sepia, feathers edged, streaked and barred buff or white; centre of breast and belly white; vent white, feathers

* These variations form three types (which intergrade) with mantle and scapulars: (a) uniform; (b) barred; (c) vermiculated.

shaded, streaked or spotted dusky ; under tail-coverts white with central streaks and spots of sepia ; tail-feathers sepia edged and sometimes marked light buff ; wing as male but innermost secondaries and coverts olive-brown edged cream or light buff, two next speculum with a border of dark olive-brown or velvety-black on outer web (in some bordered inside by narrow pale grey streak) ; greater coverts sometimes as male, but often with narrower and whiter tips ; median and lesser coverts olive-brown or hair-brown more or less narrowly edged whitish or light buff. N.B.—Types of females occur with under-parts as heavily spotted as in summer plumage. This plumage is acquired by a complete moult July to Oct.

Adult female. Summer.—The body-feathers, some tail-feathers, and innermost secondaries and coverts are moulted Feb. to May. There are two types of breeding plumage, one darker and plainer, one lighter and barred. The darker type has feathers of mantle, scapulars and upper tail-coverts brown-black, fringed pink-buff or pink-cinnamon, some feathers with bold crescentic markings of same ; new feathers of back and rump black or brown-black edged pink-buff at sides of tip ; crescentic markings of upper-breast black and usually less obscured by buff tips than in eclipse ; sides of body and flanks sepia or black-brown, feathers broadly edged and with irregular U-shaped markings of pink-buff or pink-cinnamon ; lower-belly (sometimes most of belly) and vent more spotted, with oval streaks and spots of dusky-brown ; under tail-coverts broadly streaked same ; new tail-feathers marked buff ; new innermost secondaries and coverts edged buff or buffish-white, that next speculum (and sometimes the others) irregularly streaked pink-buff. The lighter type has mantle and scapulars light sepia rather than brown-black, buff edges are paler and crescentic buff markings more numerous.

Nestling.—Except for its much smaller size impossible to distinguish from that of Mallard but sometimes long down-filaments of upper-parts are tipped light cinnamon-brown rather than yellowish, giving upper-parts a richer brown appearance.

Juvenile. Male.—Upper-parts rather resemble some types of male eclipse but juvenile is at once distinguished by spotted breast and belly, juvenile tail and shorter innermost secondaries usually edged light buff or white, lower stiff scapulars with pronounced white tips. Crown black-brown, feathers narrowly edged cinnamon-buff ; nape olive-brown ; mantle and scapulars plainer than adult eclipse female, with fewer and paler bars, in some scarcely barred at all ; mantle appears darker, feathers with much narrower and paler buff edges (sometimes faintly edged olive-brown instead of buff) ; back and rump olive-brown, sometimes edged cream and barred buff as in female ; rest of under-parts as adult female but cheeks, sides of neck, throat and fore-neck more narrowly streaked black-brown ; upper-breast with smaller sepia centres more obscured by buff edges ; feathers of sides of body and

flanks with fewer buff barrings; breast, belly, vent and short upper tail-coverts white, feathers mostly with small dusky spots; tail as in eclipse female but feathers with square tips and shafts projecting; wing as adult male but innermost secondaries as in adult female, one next speculum usually with deeper border of black on outer web but sometimes hardly distinguishable; white tips to greater coverts sometimes narrower. *Female*.—As male, but green speculum not so well developed; innermost secondaries next speculum usually with blackish olive-brown border on outer web, instead of velvety-black, but in some indistinguishable; greater coverts usually with whiter tips than in male, depth of white tip varies individually.

First winter and summer. Male.—Not to be distinguished with certainty from adult male unless some juvenile feathers are retained. The juvenile body-feathers, tail and innermost secondaries and coverts are moulted Aug. to Dec., but not rest of wings; some juvenile body-feathers sometimes retained.

First winter. Female.—Not to be distinguished with certainty from eclipse female when all juvenile tail-feathers and innermost secondaries are shed; moult as in juvenile male, but innermost secondaries not always moulted. *First summer*.—Like adult female, but moult usually not so complete, some first winter body-feathers being retained.

Measurements and structure.—♂ wing 175–192 mm., tail 62–72, tarsus 27–30, bill from feathers 34–38 (12 measured). ♀ wing 170–180, bill 31–36. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd about equal, 4th 6–9 mm. shorter, 5th 14–17 shorter, 6th 25–29 shorter; 2nd emarginated inner and 3rd outer web. Inner secondaries long, pointed and a little curved outwards and about equal 5th primary, in eclipse shorter and with rounded tips. Scapulars elongated, tapering and pointed, in eclipse shorter and broader with square tips. Tail slightly rounded central pair projecting beyond rest, 16 feathers, central pair tapering to point, rest varying individually, in some tapering to point, in others broader and less pointed. Bill slightly shorter than head, higher than broad at base, slightly broader at tip than at base, culmen sloping, concave, direct and then decurved at tip; nail oblong and very small; maxillary tomium straight anteriorly and convex posteriorly, lamellæ being thus completely hidden. Nape with a mane-like tuft.

Soft parts.—Bill (ad.) dark slate-grey, (juv.) upper mandible pink-horn, under pink-yellow or flesh; legs and feet green-grey; iris dark hazel.

* In moult from juvenile to first winter and summer some birds acquire some white feathers coarsely vermiculated black-brown on sides of body and flanks, these feathers as in other ducks are subsequently shed; one bird examined had acquired some olive-brown feathers with irregular and indefinite frecklings and vermiculations of whitish reminding one of feathers of the vermiculated type of eclipse plumage.

(1-3RD NATURAL SIZE.)

Wing-coverts and Specula of 1, The Mallard (*Anas p. platyrhynchos*). 2, The Teal (*A. c. crecca*). 3, The American Blue-winged Teal (*A. discors*). 4, The Wigeon (*A. penelope*). 5, The Shoveler (*Spatula clypeata*). 6, The Garganey (*A. querquedula*). 7, The Gadwall (*A. strepera*). 8, The American Wigeon (*A. americana*). 9, The Pintail (*A. acuta*).

[Face p. 280.]

CHARACTERS AND ALLIED FORMS.—For distinctions of *A. c. carolinensis* see under that form. Distinguished from other species by small size, black and green speculum, and hair-brown median and lesser coverts.

FIELD-CHARACTERS.—Small size prevents confusion with any species except Garganey. Coloration of drakes is distinctive enough, whilst Garganey duck is greyer than Teal and has only indistinct speculum. Details of drake Teal's plumage evident at close quarters, but cinnamon-buff spot on each side of rump and narrow white longitudinal line along side distinguish swimming bird at great distance. Flight very rapid. Partial to rushy moorland pools, bogs and peat-mosses in nesting season; and to fresh-water lakes and ponds and, to lesser extent, estuaries and mudflats in winter, when it is gregarious. Note of male a low far-sounding "krit, krit," of female a short, sharp "quack."

BREEDING-HABITS.—Breeds on commons, moorlands, open glades in woods, marshes, etc. *Nest.*—A hollow lined with grasses, dead leaves, bracken, etc., with down and a few small feathers (see *Brit. Birds*, Vol. II, Pl. 1). *Eggs.*—8 to 12, but 15 and 16 on record, pale buff with a tinge of green. Average of 100 eggs, 44.6×32.6 . Max.: 49.5×34 and 47.6×35.2 . Min.: 41×32.9 and 42.2×31.2 mm. *Breeding-season.*—Latter part April and early May. *Incubation.*—By female alone. Period: 22 days (W. Evans); 28 (H. S. Gladstone). Single-brooded.

FOOD.—Largely vegetable matter, including seeds of aquatic plants and rushes, duckweed (*Lemna*), *Potamogeton*, *Rumex*, *Carex*, *Polygonum*, *Zostera*, etc., also green algæ, and fruit of birch (*Betula*). In tropical countries rice also taken. Animal food recorded; insects and their larvæ (including larvæ of *Eristalis tenax* and *Phryganææ*), and worms, slugs (fide Saunders), as well as small fresh-water mollusca.

DISTRIBUTION.—*British Isles.*—Resident, passage-migrant and winter-visitor mid-Aug.—end Nov. to mid-March—mid-May. Breeds most English counties; sparsely southern and inland ones, more plentifully eastern and northern and in Wales. In Scotland widely distributed breeding-bird, and known to breed plentifully in some O. Hebrides since 1901. In Ireland breeds throughout in limited numbers. Some home-bred birds emigrate in autumn, but numbers are greatly increased in winter by Continental visitors.

DISTRIBUTION.—*Abroad.*—Palæarctic region generally, breeding more abundantly in northern portions, rare and local in Mediterranean countries, but in winter all over continent of Europe, where open fresh-water remains, and in milder parts of Asia, south to Haussa-land, Abyssinia, Blue Nile, Sokotra, India and Ceylon, Andamans and Nicobars, Burmah, Japan and China. Casual Greenland, Aleutian Isles and N. America, once Spitsbergen. Represented by *A. c. carolinensis* in North America.

303. *Anas crecca carolinensis* Gm.—THE AMERICAN GREEN-WINGED TEAL.

ANAS CAROLINENSIS Gmelin, Syst. Nat., I, ii, p. 533 (1789—Carolina to Hudson Bay).

Nettion carolinense (J. F. Gmelin), Saunders, p. 433.

DESCRIPTION.—*Adult male. Winter and summer.*—Like *A. c. crecca* but sides of face with only one cream line which extends from front of eye (not from side of chin as in *A. c. crecca*) below green area towards nape (no cream line above green area as in *A. c. crecca*), in some line from side of chin to eye faintly indicated by paler chestnut line; mantle and scapulars more finely vermiculated dark grey and cream, scapulars with no uniform cream, some with black bands on outer web; broad white crescent on side of breast in front of shoulder; sides of body and flanks more finely vermiculated than *A. c. crecca*; black border on outer web of innermost secondary bordering speculum narrower and not extending so far towards tip. Moults presumably as in *A. c. crecca*.

Adult male. Eclipse.—(Not examined.)

Adult female. Eclipse and winter and summer.—Apparently not to be distinguished from female *A. c. crecca* and moults as in *A. c. crecca*. Hardly any females in winter-summer plumage examined.

Nestling.—(Not examined.)

Juvenile. Male.—Not to be distinguished from males of *A. c. crecca*. *Female.*—(Not examined.)

First winter and summer. Male.—As males of *A. c. crecca*, but distinguished by same characters as in adults. As in *A. c. crecca* coarsely vermiculated feathers (subsequently shed) appear on sides of body and flanks. *Female.*—Not to be distinguished from *A. c. crecca*.

Measurements and structure.—♂ wing 179–191 mm., tail 65–73, tarsus 27–30, bill from feathers 34–37 (12 measured). ♀ wing 172–183, bill 33–36. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 5–7 mm. shorter, 5th 14–18 shorter, 6th 22–30 shorter. Other structure as in *A. c. crecca*.

Soft parts.—Bill (ad. ♂) black, (ad. ♀) brownish; legs and feet (ad. ♂ and ♀) light flesh; iris brown.

BREEDING-HABITS.—Breeds in open near marshes or lakes. *Nest.*—Hollow in ground or tussock, lined grasses and down. *Eggs.*—7 to 12, creamy-buff. Average size, 44.4×33 to 46.9×34.3 mm. *Breeding-season.*—Even in Alaska full clutches have been found by May 20. *Incubation.*—By female alone.

FOOD.—Only vegetable food recorded: rice, wild oats, berries, fallen grapes, nuts, etc.

DISTRIBUTION.—*England.*—Two or three. Adult male Kingsbridge estuary (Devon), Nov. 23, 1879 (H. Nicholls, *Zool.*, 1880, p. 70).

Adult male near Scarborough (Yorks.), Nov., 1851 (J. Evans, *op. c.*, 1852, p. 3472). One stated to have been shot Hurstbourne Park (Hants.) about 1840 (A. Fellowes, *op. c.*, 1880, p. 70).

DISTRIBUTION.—*Abroad*.—Replaces *Anas crecca crecca* in North America, winters in parts of United States and as far south as Lower California, West Indies and even Honduras, accidental in Hawaii, Bermudas, and Greenland, once Japan.

ANAS DISCORS

304. *Anas discors* L.—THE AMERICAN BLUE-WINGED TEAL.

ANAS DISCORS Linnæus, Syst. Nat., ed. XII, i, p. 205 (1766—Carolina to Virginia).

Querquedula discors (Linnæus), Saunders, p. 434; Yarrell, iv, p. 391 (in text).

DESCRIPTION (Plate 6).—*Adult male. Winter and summer*.—Fore-head, lores and crown black-brown; in front of eye somewhat crescentic patch of white extending almost to throat and more or less outlined black-brown; chin and throat dark sepia; cheeks, sides of neck, nape and fore-neck deep plumbeous, in some lights glossed pale magenta-pink; mantle and upper scapulars sepia glossed dull green, feathers narrowly edged and with crescentic and U-shaped irregular markings of buff (those of lower-mantle sometimes more or less uniform); some scapulars olive-brown glossed blackish-green with buff shaft-streak, some with outer webs more or less pale blue; back and rump olive-brown glossed dull green, feathers with lighter edges (in some edged pale slate-blue); on either side of rump patch of white; upper tail-coverts black-brown glossed dull greenish-black; breast, belly and vent deep pink-buff, in some pale russet spotted profusely black-brown; towards centre of breast spots tend to coalesce giving a distinctly barred appearance; sides of breast and flanks deep pink-buff with larger spots of black-brown, lower flank-feathers barred black-brown or sepia; under tail-coverts black; axillaries white; under wing-coverts white, at edge and bend of wing dusky-brown; tail-feathers sepia faintly edged light buff; primaries sepia, paler on inner webs; secondaries sepia, outer webs sometimes tipped white, middle ones metallic blue-green on outer web forming speculum, innermost secondaries sepia glossed olive, outer webs velvety blackish-green, shafts more or less brownish-white; bastard-wing and primary-coverts sepia, but median and lesser primary-coverts tipped pale blue; greater coverts white with sepia bases, some spotted with sepia on inner webs, inner ones sepia tipped pale blue, innermost sepia tinged dull green, outer webs more or less shaded pale blue towards tip;* median and lesser coverts pale blue. This plumage

* There is considerable individual variation in coloration of greater coverts; distal halves of outer and middle feathers are usually pure white, but in some (apparently adult males) inner webs have oval sepia spots.

is acquired by a moult in autumn and winter. *Summer*.—One or two specimens examined were moulting odd body-feathers. Coloration as winter.

Adult male. Eclipse.—The body-feathers and probably innermost secondaries are moulted in late summer. Upper-parts as juvenile male, under-parts as adult female, tail and wing as adult male. Crown as in female, but darker, feathers with fewer buff edges; nape as in juvenile; mantle and scapulars black-brown as juvenile, feathers with narrow pink-buff fringes, some of those of mantle with small V-shaped or crescent-shaped buff mark towards tip; back and rump black-brown glossed dark green, one or two feathers with small V-shaped buff marks; upper tail-coverts as juvenile; rest of head and neck as in adult female, but a dark streak from base of upper mandible through eye to nape; remaining under-parts as in adult female; tail and wing as in adult male. N.B.—Only one specimen in eclipse examined (♂ Aug. 9th, 1911, Kansas, Brit. Mus.).

Adult female. Eclipse.—Fore-head and crown black-brown, feathers edged buff; nape buff narrowly streaked dusky; rest of upper-parts black-brown, feathers edged light buff or (except scapulars) often greyish-white, and a few with V-shaped or indefinite buff markings (some scapulars sometimes with buff shaft-streaks); loreal spot white (in some streaked dusky); cheeks, sides and front of neck light buff narrowly streaked dusky; black-brown streak (in some ill-defined) from eye to nape; chin buffish-white; upper-breast dusky-brown, feathers with broad fringes, streaks along shafts and numerous oval spots or markings of buff; remainder of breast, belly, vent and under tail-coverts whitish or pink-buff heavily streaked or spotted dusky-brown, these markings more or less concealed; sides of breast and flanks sepia with buff V-shaped or irregular markings and fringes; axillaries, under wing-coverts and tail as male; wing as in male but speculum duller, outer webs of middle secondaries sepia tinged dull green, innermost secondaries sepia tinged dark olive-green and narrowly edged cream on outer webs; greater coverts apparently not with distal halves white as male, outer ones sometimes with outer webs white towards tip, inner webs with large oval sepia mark, rest with sepia tips tinged pale blue, narrowly tipped white and often with one or two white bars, sometimes outer greater coverts sepia narrowly tipped white all round and with one or more white bars; median and lesser coverts as male. This plumage is acquired by complete moult in autumn.

Adult female. Winter and summer.—Coloration as in eclipse but feathers of crown more broadly edged buff; upper-parts darker, feathers more broadly edged light buff and mostly with U-shaped buff bars; new tail-feathers with broader edges and with irregular markings of pink-buff. Towards end of summer under-parts appear more spotted and streaked owing to abrasion of edges of feathers. Insufficient material available to determine moult.

Nestling.—Pattern and coloration differs from *A. c. crecca*. Upper-parts sepia, down with long golden tips; bar across wing and streak on either side of back from below wing extending to yellow patch at side of uropygial tuft, cream-yellow; fore-head, cheek and broad eye-stripe sulphur-yellow; sepia line from upper mandible through eye to nape discontinuous in front of eye; below this line a sepia streak extending half-way from nape to eye; sides of body and under-parts cream-yellow. (Only one examined.)

Juvenile. Male.—Like eclipse female but mantle and scapulars without buff bars; lower scapulars in some tinged dark green; back and rump black-brown glossed dull green, feathers with deep plumbeous edges; chin and throat light buff usually speckled dusky; upper-breast streaked ash-brown, feathers with long yellowish-white fringes; sides of body and flanks light sepia edged and with irregular bar of yellow-buff; breast, belly, vent and under tail-coverts light greyish or whitish-buff with narrow streaks or small spots of pale dusky; tail and wing as adult male, but innermost secondaries and coverts sepia edged buff, glossed black-green on outer webs; speculum sometimes duller than in adult; greater coverts as adult but distal halves usually with less white, inner webs of outer coverts sometimes with oval dusky spot at tip. *Female*.—As male; wing as adult female but outer webs of innermost secondaries tinged olive rather than dark green; greater coverts in some apparently with less white.

First winter and summer. Male.—As adult male but greater coverts usually with less white and inner webs usually with more numerous oval sepia markings. The juvenile body-plumage (not back or rump), tail and innermost secondaries are moulted from Aug. onwards. *Female*.—Apparently not to be distinguished from adult female but greater coverts sometimes with less white. Molt presumably as in male. No specimens in spring moult examined.

Measurements and structure.—♂ wing 180–196 mm., tail 61–72, tarsus 28–31, bill from feathers 38–44 (12 measured). ♀ wing 175–192, bill 38–40. Primaries: 1st narrow, pointed and rather more than half longest primary-covert, 2nd and 3rd about equal and longest, 4th 4–7 mm. shorter, 5th 12–15 shorter, 6th 19–28 shorter; emargination as in *A. c. crecca*. Innermost secondaries long and pointed, longest about equal to 6th primary. Shafts of long tapering scapulars extending beyond rest of feathers in adult ♂ but in eclipse ♂, ad. ♀, and juveniles scapulars rounded at tip. Tail rather pointed, 14 tapering feathers. Bill slightly longer than head, maxillary tomium sinuated so as to expose distinctly lamellæ of basal half, terminal half of culmen slightly but distinctly convex. Other structure as in *A. c. crecca* but mane-like tuft on nape lacking.

Soft parts.—Bill (♂) uniform black, (♀) upper black, lower black-brown; legs and feet (♂) yellowish, webs dusky-grey, ♀ black-brown; iris brown.

CHARACTERS.—No subspecies. Small size and pale blue median and lesser wing-coverts distinguish species in all plumages.

BREEDING-HABITS.—Nests in neighbourhood of lakes, but often at some distance from water. *Nest*.—Depression in ground, lined with grasses, down, etc. *Eggs*.—8 to 12, but generally about 8–9, creamy-buff. Average size of 17 eggs, 45.7×33 . Max. : 48.6×34.5 and 46×35 . Min. : 44.1×32 and 45.6×31.3 mm. *Breeding-season*.—Early June or late May. *Incubation*.—By female.

FOOD.—Recorded as feeding on pond-weeds and roots of aquatic plants.

DISTRIBUTION.—*British Isles*.—Two or three. Female Upper Nithsdale (Dumfries), 1858 (Saunders, p. 434, *Birds Dumfries*, pp. 276–8, *addenda*, p. 21). Female Dee estuary (Cheshire), about 1860 (*Vert. Fauna Cheshire*, p. 332). Immature female (probably wild bird) Ballycotton (Cork), Ireland, Sept., 1910 (*Bull. B.O.C.*, xxvii, p. 15; *Brit. B.*, iv, p. 252). Male Anglesey early 1919 (*Brit. B.*, xiii, p. 85).

DISTRIBUTION.—*Abroad*.—Western Hemisphere; breeding in Canada and United States, wintering in parts of United States and south to West Indies and South America. According to Kennard (*Auk*, 1919) represented by *A. d. albinucha* in Louisiana and south-western States. Casual in Bermudas, Denmark, Holland (once).

ANAS QUERQUEDULA

305. *Anas querquedula* L.—THE GARGANEY.

ANAS QUERQUEDULA Linnæus, *Syst. Nat.*, ed. x, i, p. 126 (1758—Europe. Restricted typical locality : Sweden).

Querquedula circia (Linnæus), Yarrell, iv, p. 393; Saunders, p. 435.

DESCRIPTION (Plate 6).—*Adult male*. *Winter and summer*.—Fore-head and crown black-brown, feathers of hinder-crown edged rust-brown, those of fore-head and fore-part of crown with narrow white or brownish-white shaft-streaks; broad white superciliary band extends from front of eye and runs parallel with crown to nape; nape ash-brown, tinged auburn, feathers with white shaft-streaks; mantle black-brown or dark olive-brown, feathers fringed light sepia or greyish-olive; feathers at sides of upper-mantle as breast, feathers towards centre freckled cream; scapulars pale lavender-grey mostly edged white at sides, longer ones dark green, some with outer webs deep grey and with broad white shaft-streaks, under ones olive-green or olive-brown edged white, some with ash-white shaft-streaks; back black-brown or dark olive-brown, feathers fringed greyish-olive or cream-brown; rump and upper tail-coverts dark sepia, feathers with irregular wavy and V-shaped bars of light buff and edged same or greyish-olive; chin and throat black; lores, cheeks, sides and front of neck auburn, feathers with narrow white shaft-streaks; breast pink-buff, feathers with black-brown bars, V-shaped or crescentic on upper-breast, more or less trans-

verse on lower-breast ; sides of body and flanks white with numerous strong wavy bars of black ; lower flanks broadly tipped grey ; belly and vent white with wavy bars and frecklings of dusky-brown (sometimes belly white) ; under tail-coverts white with oval spots of sepia in some coalescing to form bars ; axillaries white ; under wing-coverts white, those at edge of wing and lesser ones sepia ; tail-feathers sepia narrowly edged white, outer often and sometimes middle ones with irregular markings and tips of buff ; primaries sepia, paler on inner webs ; secondaries light sepia broadly tipped white, outer ones with outer webs pale lavender-grey, middle ones with outer webs dull green, innermost olive-brown, on outer webs blackish-green edged white, one bordering speculum tinged pale green-grey on outer web ; primary-coverts sepia, inner ones more or less pale grey on outer webs ; bastard-wing pale sepia ; greater coverts pale mouse-grey broadly tipped white, inner ones suffused pale lavender-grey, and narrowly tipped white, innermost with inner webs sepia ; rest of wing-coverts pale lavender-grey, when fresh faintly edged whitish-grey. This plumage is acquired by a body-moult (apparently tail is moulted again) also innermost secondaries Aug. to Feb., exceptionally March.

Adult male. Eclipse.—The body-feathers are first moulted followed by wings and tail June to Aug. Distinguished from adult female by lavender-grey wing-coverts and from juvenile male by innermost secondaries and broader white tips to greater coverts (juvenile has wing-coverts duller, under-parts mottled and typical juvenile tail). Crown, nape, mantle, scapulars and upper tail-coverts as in female, but upper tail-coverts often with a V-shaped buff bar but not barred or freckled cream ; back and rump olive-brown, feathers edged olive-grey ; under-parts as adult female but feathers of sides of body and flanks usually with a white mark speckled dusky along shafts, or with irregular broad barrings of white speckled dusky ; tail and wing as winter and summer male, but innermost secondaries with square or slightly rounded, instead of pointed, tips.

Adult female. Eclipse.—Crown black-brown, feathers edged cinnamon-buff ; nape ash-brown ; remaining upper-parts dark sepia, scapulars, back and rump tinged olive, feathers edged light buff, upper tail-coverts sometimes freckled or with irregular bar of cream ; spot on lores cream-white, more or less well-defined sepia streak from above lores through eye, and above it from back of eye to nape an irregular white streak ; cheeks, sides of neck and fore-neck light buff, narrowly streaked black-brown ; chin and throat white ; feathers of upper-breast, sides of body and flanks sepia broadly fringed white or light buff, sepia centres partially obscured on breast ; centre of breast, belly and vent white usually with numerous oval spots, marks, or streaks of sepia, concealed by long white fringes but usually more or less apparent on belly and vent ; under tail-coverts white with oval and irregular V-shaped markings or streaks of sepia ; tail as male ; wing as male but speculum with

less green gloss, in some green gloss hardly apparent ; innermost secondaries sepia edged white and glossed dull olive, one next speculum without grey tinge ; greater coverts ash-brown with much narrower white tips ; median and lesser coverts ash-brown, in some narrowly edged greyish or ash-white, more or less suffused with varying amount of dull lavender-grey. This plumage is acquired by complete moult Aug. to Jan.

Adult female. Summer.—Most body-feathers, down, usually all tail-feathers, some innermost secondaries and coverts (tail-feathers and innermost secondaries are not always moulted) are moulted March to May. Coloration as eclipse, but feathers of crown and nape plentifully edged buff, feathers of mantle, scapulars back and new innermost secondaries with broad pink-buff fringes, pronounced at sides of feathers, not narrowly edged light buff as eclipse ; new upper tail-coverts sepia edged and with irregular pink-buff markings ; flank-feathers as eclipse, but more or less irregularly marked with white or buff ; new tail-feathers sepia with streaks and irregular markings and broad edges of pink-buff.

Nestling.—Similar to nestling Mallard and Teal but lower line on side of head continued to base of upper mandible, (in some this line is interrupted) and connected just in front of eye with upper line ; light yellowish spot on lores ; belly and vent greyish-yellow instead of cream-yellow.

Juvenile. Male.—Like eclipse female but easily distinguished by mottled or streaked under-parts, juvenile tail and duller wing-coverts. Upper-parts as adult female but feathers of mantle smaller and buff edges less pronounced ; scapulars narrower, edged cinnamon-buff instead of light buff as are upper tail-coverts ; feathers of back and rump edged pale olive-grey ; rest of head and neck as adult female but streaks narrower ; feathers of upper-breast, sides of body and flanks sepia broadly edged cinnamon-buff ; feathers of rest of breast, belly and vent with ash-brown centres partially concealed by light buff or white tips producing mottled or streaked appearance, streaks most pronounced on belly and vent ; under tail-coverts sepia edged light buff, or white spotted sepia ; tail-feathers sepia edged light buff ; wing as adult male but innermost secondaries and coverts sepia, sometimes tinged olive edged cream or buff, greater coverts usually with narrower white tips, median and lesser coverts duller lavender-grey, some tipped dusky-brown. *Female.*—As male, but wing like adult female though speculum usually with little or no green gloss ; secondaries with narrower white tips ; wing-coverts sepia or ash-brown, greater coverts with narrower white tips, median and lesser faintly edged ash-white with little or no lavender-grey suffusion.

First winter and summer. Male.—As adult and when full plumage is assumed only to be distinguished by narrower white tips to greater coverts and duller median and lesser coverts and more worn appearance of wing. The juvenile body-feathers, tail (apparently in some central pair only) innermost secondaries and

coverts are moulted from late autumn (Oct. and Nov.) to spring. Sometimes some juvenile body-feathers are retained until assumption of eclipse plumage.

First winter. Female.—As adult female eclipse but distinguished by narrower white edges to juvenile greater coverts and browner wing-coverts without or with little lavender-grey suffusion and usually with no green gloss on speculum. Moults as male. *First summer.*—As adult summer, but tail and innermost secondaries appear to be more rarely renewed. Distinguished from adult by wing as in first winter.

Measurements and structure.—♂ wing 187–198 mm., tail 62–70, tarsus 26–30, bill from feathers 36.5–40 (12 measured). ♀ wing 175–194, bill 34–39. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 2nd and 3rd about equal and longest, 4th 4–8 mm shorter, 5th 12–17 shorter, 6th 22–29 shorter. Innermost secondaries long and pointed and shorter than 5th or 6th primaries, in eclipse with square or rounded tips. Scapulars long and tapering, in eclipse short, with square or slightly rounded tips. Bill as in *A. discors* but tomium hardly sinuated, other structure as in *A. c. crecca* but nape without mane-like tuft.

Soft parts.—Bill (ad. ♂) dull black, (ad. ♀) greenish-grey, greyish-brown on top of culmen; legs and feet dull leaden-grey; iris dull umber-brown.

CHARACTERS.—No subspecies. Small size, green speculum without any black and pale lavender-grey median and lesser coverts distinguish males from allied species, while absence of black in speculum and ash-brown wing-coverts distinguish female in all plumages.

FIELD-CHARACTERS.—Outstanding features of drake's plumage are broad white eye-stripe extending to back of neck and pale blue shoulder. The elongated scapulars and crescentic marks on pale brown breast only discernible at close quarters. Duck resembles Teal, but is lighter in colour, more slender in build; and, on wing, longer neck is noticeable. Even more rapid in flight than Teal, but lacks its sudden turns and downward plunges. Seldom seen on salt water, its usual haunts are marshes, shallow pools and fresh-water lagoons. Note, a loud, harsh "knack" or "knake"; male's call in spring a peculiar rattle-like note which has been likened to chirping of a cricket.

BREEDING-HABITS.—Nests in meadows in neighbourhood of marsh or open water. *Nest.*—Depression in ground, lined grasses and characteristic white-tipped down (feathers from nest, see *Brit B.*, Vol. II, Pl. 1.). *Eggs.*—7 to 11, rarely 12 or 13, warm creamy-buff. Average size of 85 eggs, 45.4×33.04. Max.: 49.2×32.9 and 43.8×35.5. Min.: 39.3×29.7 mm. *Breeding-season.*—Last week April or early May. *Incubation.*—By female alone: period 22–24 days. Single brooded.

FOOD.—Largely animal as well as vegetable, including spawn and young of frogs and fish (Naumann), fresh-water mollusca (*Planorbis*, etc.), worms, leeches, insects, especially aquatic beetles (*Hydrobius*, *Parnus*, *Cyclonotum*, etc.), water-boatman (*Naucoris*), larvæ of Phryganeidæ. Vegetable matter includes seeds, buds and leaves of many water-plants (*Potamogeton*, *Sparganium*, *Scirpus*, *Carex*, *Glyceria*, *Juncus*, *Nymphæa*, *Polygonum*, *Rumex*, *Ranunculus aquatilis*, and *Lemna*). Sea-weed has also been recorded on coast and rice in India.

DISTRIBUTION.—*British Isles.*—Summer resident (beginning April to early Sept.) and vagrant. Breeds regularly Norfolk, Suffolk, and Kent; has bred Durham (1880–7), Yorks. (1882, 1908), Essex, Hants. (1897), Somerset (1910), Lincs. (1914), Sussex (1918). Elsewhere vagrant—usually spring, less frequently autumn, and exceptionally winter. Especially rare Wales, west and north England, Scotland (not occurred O. Hebrides), and Ireland.

DISTRIBUTION.—*Abroad.*—Palæarctic region generally, breeding chiefly in subarctic portions, migrating in winter as far south as northern and tropical Africa, and Seychelles, and south Asia as far as Philippines, New Guinea, Celebes, Sula Is., Sunda Is., Moluccas, once Australia.

ANAS PENELOPE

306. *Anas penelope* L.—THE WIGEON.

ANAS PENELOPE Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality: Sweden).

Mareca penelope (Linnæus), Yarrell, iv, p. 397; Saunders, p. 437.

DESCRIPTION (Plate 6).—*Adult male.* *Winter and summer.*—Fore-head and crown cream or cinnamon-buff (paler when worn) feathers of hinder-crown with black bar at tip; nape chestnut, tips of feathers with narrow bar of black glossed green; mantle and upper scapulars finely vermiculated dark mouse-grey and white, long scapulars with mouse-grey shaft-streaks; lower scapulars plain mouse-grey, some freckled cream towards tip; back and rump mouse-grey, feathers with darker shafts and vermiculated white (sometimes more uniform); sides of rump white; central upper tail-coverts pale mouse-grey edged white or light buff, some with broad white tips vermiculated mouse-grey, lower ones blackish-grey or black edged light buff, remainder black; lores, cheeks and sides of neck chestnut, feathers mostly tipped black; a patch behind eye to nape with broad black tips glossed metallic-green; chin and throat black; feathers of fore-neck chestnut with numerous black tips (black tips and bars of head and neck become worn off); upper-breast pink-vinaceous, feathers narrowly tipped white, feathers bordering fore-neck usually with wavy dusky bars; sides of body and flanks strongly vermiculated dark mouse-grey and white, many feathers clouded towards base with pink-vinaceous; centre of

breast, belly and vent white, patch behind tibia finely vermiculated dusky; under tail-coverts black; axillaries and under wing-coverts white freckled and clouded dusky; tail-feathers mouse-grey narrowly edged white or buff, central pair deep (sometimes blackish) mouse-grey without white edges; primaries sepia, paler on inner webs; secondaries sepia with small white tips, all save two outermost with proximal half of outer web metallic-green, distal half black, that next innermost with outer web white narrowly margined black towards tip, innermost secondaries mouse-grey, outer webs black edged white and usually with white shaft-streak, short ones uniform; primary-coverts and bastard-wing as primaries; greater coverts with broad black tips, outer webs white and inner mouse-grey, innermost feathers mouse-grey faintly edged white; median coverts white, inner ones, lesser coverts and bend of wing mouse-grey edged light buff or white. This plumage is acquired by a moult of body-feathers, innermost secondaries and central pair of tail-feathers Aug. to Jan.

Adult male. Eclipse.—The body-feathers are first moulted followed by wings and tail June to Sept. Resembles adult *female*, but easily distinguished by white wing-coverts. Head and neck resembling adult female, but fore-part of crown usually with larger and fewer black-brown spots and bars; hinder-crown and nape more heavily spotted and barred black glossed green; chin, throat, sides of neck and fore-neck rich cinnamon-brown narrowly streaked black, sometimes with a green gloss; feathers of upper-mantle sepia or black-brown with broad cinnamon-brown, buff-brown, olive-grey or pink-buff fringes, more or less strongly barred pink-buff or pink-cinnamon (more uniform type, has bars less pronounced, and more or less concealed), feathers of centre of mantle usually with barring less pronounced and light edges broader*; scapulars black-brown with broad barrings, markings and edgings of rich cinnamon-brown, some with white tips or faint white wavy barrings, lowest scapulars as in winter; (sometimes scapulars intermixed with dark ash-brown feathers with one or both webs coarsely vermiculated whitish, some shading to cinnamon-brown at tip); feathers of back and rump dark ash-grey with faint white or buff tips (back sometimes finely vermiculated white); upper tail-coverts much as in adult female but in some more or less without barring, in others irregularly barred whitish; upper-breast rich cinnamon-brown, feathers sometimes tipped buff-brown, mostly with sepia or black-brown partially concealed spots or bars; sides of body and flanks rich cinnamon-brown (sometimes some flank-feathers whitish with one or both webs coarsely vermiculated dark ash-brown, some suffused cinnamon-brown); rest of under-parts as in adult female; central pair of tail-feathers mouse-grey or sepia only slightly longer than rest, not finely tapering to a point

* These variations form three types (which intergrade) with mantle: (a) barred; (b) less barred; (c) vermiculated.

as in winter; wing as winter but innermost secondaries with rounder, less pointed tips.

Adult female. Eclipse.—Crown pinkish or pale pink-buff, feathers with oval spots and irregular V-shaped bars of black glossed dull green, giving streaked or spotted appearance; nape as crown but spots and bars smaller and browner without greenish tinge; mantle sepia or dark ash-brown, feathers edged whitish or buff, some feathers of upper-mantle with more or less pronounced narrow pink-buff bars; scapulars black-brown broadly edged and sometimes barred pink-buff or cinnamon, lowest scapulars dark sepia, tipped white (mantle and scapulars usually without barring); back and rump black-brown or ash-brown (sides of rump pink-cinnamon) feathers edged white; upper tail-coverts sepia fringed buff or whitish and usually with buff V-shaped marks or irregular bars; cheeks, sides of neck, chin, throat and fore-neck pink-buff or pink-cinnamon heavily spotted and streaked dusky or black-brown (in some chin and part of throat uniform); feathers of upper-breast deep pink-buff mostly with terminal bars or spots of sepia and long white or buff fringes; sides of body and flanks deep pink-buff or cinnamon-brown, feathers edged white; centre of breast, belly and vent white, feathers of latter shaded dusky-grey; under tail-coverts white with dark sepia V-shaped oval, or transverse markings, long feathers sepia or black-brown edged and broadly barred white or buff; axillaries and under wing-coverts as male; tail-feathers as male but sometimes with buff marks, central pair deep mouse-grey usually with an obsolete buff bar and edged white; primaries as male; four outer secondaries deep mouse-grey or sepia tipped white (outer web in some speckled white), rest of secondaries sepia or blackish mouse-grey, outer webs brown-black and tipped white, usually with a green gloss (green speculum sometimes almost as brilliant as in male), innermost secondaries and their coverts with outer webs black-brown (in some glossed dull green) and edged white, inner webs olive-brown, one next speculum with outer web white as in male; greater coverts ash-brown or sepia with outer webs edged greyish-white and with narrow black-brown tips, in some both webs tipped black and with a whitish subterminal bar (in some broadly tipped white); median coverts ash-brown or sepia with broad white edges, in some suffused pink-buff, or with a transverse buff-bar; lesser coverts dark ash-brown faintly edged white (soon lost by abrasion). This plumage is acquired by complete moult July to Sept.

Adult female. Winter and summer.—The body-feathers, sometimes some tail-feathers, some innermost secondaries and coverts, occasionally an odd median covert are moulted Oct. to April. Some acquire most of breeding plumage by Dec. or Jan., tail-feathers are usually moulted Jan. or Feb., innermost secondaries not till April or May. There are two types of plumage, one plain, one barred, these types again fall into two types, a greyish or a reddish one. In barred type, feathers of mantle are sepia or ash-brown (in some

an odd feather black-brown) with strong and numerous transverse pink-buff or pink-cinnamon bars, feathers narrowly edged same or whitish, in the grey type with deep olive-grey edges; scapulars brown-black or sepia with pink-buff or pink-cinnamon edges and bars, never apparently with broad cinnamon edges characteristic of eclipse; new feathers of rump and upper tail-coverts black-brown with crescent shaped or transverse buff or white bars and edged whitish or pink-cinnamon; new feathers of upper-breast and sides of breast in some with subterminal black-brown bars; new flank-feathers as eclipse, in some with indefinite black-brown bars or markings; new tail-feathers as winter, but in some irregularly marked buff; new innermost secondaries black-brown with irregular longitudinal light pink-cinnamon markings (variegated with black) and narrowly edged same. Plain type has feathers of upper-parts with fewer and usually incomplete bars.

Nestling.—Upper-parts similar to Mallard but sepia or black-brown without olivaceous tinge, down-filaments cinnamon-buff instead of yellowish, wing-bar, and patches (often ill-defined) on either side of centre of back and rump cinnamon-buff; eye-stripe, cheeks and sides of neck suffused pale cinnamon-brown; line through eye absent but in some a darker streak extending from lores to below eye; chin and throat cream or cinnamon-buff; fore-neck suffused cinnamon-buff or pale cinnamon-brown; remaining under-parts cream-buff.

Juvenile. Male.—In general appearance resembling adult female but distinguished at once by wing-coverts. Head and neck as adult female; mantle usually darker, feathers of mantle and scapulars with narrower edges and bars; bars not so pronounced as in adult winter-summer female and sometimes absent*; lowest scapulars with narrower white tips often freckled dusky; under-parts as adult female but sometimes belly and vent barred and spotted dusky; tail-feathers sepia narrowly edged white or light buff; wing as adult female, in some outer secondaries with outer webs bordered black, in some green speculum absent, outer webs of middle secondaries being black or blackish-grey in some lights with a greenish gloss; innermost secondaries olive-brown, outer webs tinged dull greenish-black and with a buff or white edge; greater coverts ash-brown or with outer web white and inner web greyish-white, with dull black tips and often a subterminal buff or white bar, or ash-brown with broad white tips; innermost as innermost secondaries; median coverts vary greatly, in some ash-brown clouded buff and tipped drab-grey or greyish-white and with dark shafts, some white irregularly marked ash-brown (very distinct from those of adult female which have broad pure white edges); lesser coverts and coverts of bend of wing dark ash-brown, latter sometimes narrowly

* As in adult ♀ there are two types, one barred and one with mantle more uniform; a rarer variety has feathers of centre of upper-mantle dark ash-grey with olive-grey edges and indefinite whitish frecklings and vermiculations.

edged white.* *Female*.—As male but mantle and scapulars without bars, feathers only occasionally with indistinct bar; lowest scapulars as adult female but white tips narrower and occasionally speckled dusky (usually broader and whiter than in male); wing as adult female but speculum usually duller black, in some sepia, often more or less mottled or clouded white, innermost secondaries and coverts olive-brown, outer webs in some slightly glossed dull green, narrowly edged light buff, one next speculum usually with less white on outer web than in adult female and white often greyish; greater coverts ash-brown with white or buffish-white tips (in some speckled black or with a more or less blackish tip); median coverts olive-brown with buff-white, drab-grey or buff tips, in some clouded or irregularly barred buff, in some almost as broadly tipped white as in adult female; lesser coverts as juvenile male. In some breast, belly and vent are more or less spotted dusky-brown.

First winter. Male.†—Most body-feathers, sometimes all tail-feathers, sometimes none, sometimes one or two central pairs only, sometimes some innermost secondaries, occasionally an odd median covert are moulted Oct. to Feb., March or April, often feathers of back and rump and other juvenile body-feathers are retained. As adult winter and only to be distinguished by retained juvenile body feathers, tail-feathers and wing-coverts.

First winter. Female.—As adult eclipse and only to be distinguished by retained juvenile body-feathers, tail-feathers and juvenile median and lesser coverts. Most body-feathers, not all those of back and rump, some tail-feathers (usually central pair only), occasionally but not usually innermost secondaries are moulted Oct. to March. Some Feb. birds examined had not commenced to moult the juvenile plumage. In such cases probably very little 1st winter plumage is acquired, the birds moulting straight into first summer plumage. *First summer*.—In advanced birds a considerable amount of breeding plumage is acquired in March, April and May; in some all tail-feathers are renewed, others retain some juvenile ones. Moult of tail takes place winter and spring, central pair is nearly always renewed. Innermost secondaries irregularly marked buff are acquired in some. In less forward birds very little breeding plumage is acquired and new feathers contrast strongly with worn and faded ones of first winter and in some cases juvenile plumage.

First eclipse. Male.—As adult eclipse and only to be distinguished when juvenile wing-coverts have not all been shed. Moult as in adult.

* The type with little barring on upper-parts, with greater coverts ash-brown tipped white and median coverts ash-brown suffused buff are difficult to distinguish from some types of juvenile females with similar wing-coverts, but vermiculated grey and white feathers which are soon acquired at side of rump in male afford infallible guide.

† In assumption of first winter plumage whitish feathers coarsely vermiculated grey-brown and more or less suffused pale pink-cinnamon, may be acquired and are subsequently shed.

Measurements and structure.—♂ wing 254–270 mm., tail 95–108, tarsus 35–40, bill from feathers 33–36 (12 measured). ♀ wing 236–255, bill 31–34. Primaries: 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or 2–4 mm. shorter, 4th 11–14 shorter, 5th 25–29 shorter, 6th 40–45 shorter; 2nd emarginated inner and 3rd outer webs. Innermost secondaries moderately long and pointed and between 6th and 7th or 7th and 8th primaries; in eclipse less pointed at tip. Scapulars elongated and tapering to an obtuse point; in eclipse with rounded, almost square, tips. Tail short, rounded, 14 feathers, central pair tapering sharply to a point and projecting beyond rest; in eclipse less pointed and only slightly projecting. Bill small, rather narrow, shorter than head, edges parallel nearly to tip where they gradually converge to form a rounded tip, lamellæ of upper mandible almost concealed.

CHARACTERS AND ALLIED SPECIES.—No subspecies. For differences of *A. americana* see under that species. From other British ducks adult male distinguished by dark mouse-grey and white vermiculated upper-parts, black and green speculum and white wing-coverts, adult and juvenile females have speculum blackish or partly metallic-green, only one inner secondary with outer web white and greater coverts with hardly any black (distinction from Gadwall). Juvenile male has speculum blackish usually with a little green, median coverts with no chestnut, greater coverts with hardly any black (distinction from juvenile Gadwall).

FIELD-CHARACTERS.—At close quarters male is unmistakable, whilst golden fore-head and crown—creamy-white in a strong light—identifies him at a distance too great for chestnut head and neck, vermiculated grey back and flanks, and black under tail-coverts with pure white area in front of them to be seen plainly. Female, intermediate in size between Mallard and Teal is of slighter build than either, and differs further in short bill, pointed tail, general rufous tints and grey under tail-coverts. On the wing white abdomen of both sexes, large white shoulder-patch of male, and conspicuous double white wing-bar of female, coupled with slender build are good characters. Out of breeding-season is usually seen on coast, congregating, sometimes in thousands, on muddy shores and estuaries, especially where *Zostera* abounds, but a good many winter on inland waters. Call of male a loud and sudden “whee-ou,” of female a purring growl.

BREEDING-HABITS.—Nests on moorlands and rough pastures. *Nest.*—Often in heather quite close to streamlet, or in wiry grass close to water, lined with some grass or heather stalks and down (feathers from nest, see *Brit. B.*, II, Pl. 1.). *Eggs.*—Usually 7–8, but 9 and 10 on record, creamy and fine grained. Average of 117 eggs, 54.7×38.7 . Max.: 59.5×38.5 and 58×41 . Min.: 49.9×35.2 mm. *Breeding-season.*—During second half May in

Scotland. *Incubation*.—By female alone. Period 22–23 days (Heinroth); 24–25 (Gladstone). Single brooded.

Food.—Probably almost entirely vegetable. Grasses of various species, including *Glyceria fluitans*; also *Equisetum*, *Polygonum*, *Potamogeton*, *Ranunculus flammula* and *repens*, seeds of *Carex*. On coast in winter *Zostera marina* is favourite food. Blackberries and grain have also been recorded.

DISTRIBUTION.—*British Isles*.—Resident, passage-migrant and winter-visitor (mid-Aug.—end Nov. to early March—end May). Breeds regularly Sutherland, Caithness, Ross, Cromarty, Inverness, Perth and Kincardine; and in Argyll, Kinross and Midlothian and borders of Roxburgh and Selkirk, at all events in recent years; has nested Shetlands, Orkneys, Kircudbright., Coll (*cf. Scot. Nat.*, 1920, pp. 33–42). Has also bred, but probably not truly wild birds, Yorks. (1897 and 1901), Lincs. (1898), Cumberland (1903 and 1908), Merioneth. (1898), and Norfolk (1919). * Some evidence, but no proof, of breeding occasionally other parts. Common winter-visitor on all coasts and occasionally inland waters. In Shetlands, chiefly autumn and spring migrant, few winter.

DISTRIBUTION.—*Abroad*.—Palæarctic region generally, breeding in northern parts, Iceland, Færoes, Scandinavia, north Russia and north Asia to Kamtschatka, wintering in more southern latitudes as far as north Africa, Persia, India, Burmah, Sunda Islands, and China; irregular visitor to North America from Alaska and Greenland to Florida and California. Casual Greenland, Spitsbergen (once), Madeira, Canaries, Azores, Pribilof and Marshall Isles.

ANAS AMERICANA.

307. *Anas americana* Gm.—THE AMERICAN WIGEON.

ANAS AMERICANA Gmelin, Syst. Nat., I, ii, p. 526 (1789—N. America).
Mareca americana (Gmelin), Yarrell, iv, p. 403; Saunders, p. 439.

DESCRIPTION (Plate 6).—*Adult male. Winter and summer*.—Resembling *A. penelope* but a patch of metallic-green (in some lights reddish-bronze) on side of head, surrounding eye and extending to nape, feathers with buff bars and tips, bars in some more or less concealed except where bordering nape (buff tips are more or less lost by abrasion); nape buff, feathers barred black; mantle and scapulars as in *A. penelope* but vermiculated pink-vinaceous and dark mouse-grey; back and rump deep mouse-grey with much finer vermiculations than in *A. penelope*; lores, cheeks, sides of neck, chin and throat light buff heavily spotted and streaked black-brown; sides of body and flanks pink-vinaceous more or less vermiculated dark mouse-grey; axillaries and median under wing-coverts white, coverts at edge and bend of wing pale dusky-brown freckled white; remaining under-parts as in *A. penelope*; tail as in *A. penelope* but central pair often more acutely tapering; wing as in *A. penelope* but speculum with less green and larger amount

of black, green confined to narrow proximal band, outer secondaries with outer webs almost entirely black, secondary next innermost with outer web often clouded grey; greater coverts with broader black tips. Moults presumably as in *A. penelope*, but very little material examined.

Eclipse. Male and female.—(Not examined.)

Adult female. Winter and summer.—Similar to *A. penelope* but crown and nape cream or light buff instead of pink-buff or pink-cinnamon; cheeks, sides of neck, chin, throat and fore-neck cream or light buff, instead of pink-buff or pink-cinnamon heavily spotted dusky-brown; axillaries and under wing-coverts as in male; green when present on speculum less extensive, rest of speculum black, secondary next innermost with outer web clouded palest grey; greater coverts with outer webs white, inner webs ash-brown and with broad velvet-black tips (in *A. penelope* ash-brown or sepia, outer webs edged greyish-white and with narrow black-brown tips); rest of wing-coverts including innermost greater as in *A. penelope*. Moults apparently as in *A. penelope*.

Nestling.—Apparently not distinguishable from that of *A. penelope*.

Juvenile. Male.—Similar to that of *A. penelope* but fore-head and fore-part of crown cream or light buff heavily streaked sepia; hinder-crown sepia, feathers with white edges and V-shaped bars (in *A. penelope* pink-buff or pink-cinnamon, feathers irregularly barred and marked black); cheeks, sides of neck, chin, throat and fore-neck light buff or cream (in *A. penelope* pink-buff or pink-cinnamon) and similarly spotted black-brown; axillaries, under wing-coverts and speculum as in adult male *A. americana* but in some green of speculum as extensive as in juv. *A. penelope*; secondary next innermost with outer web clouded palest grey but not so extensively as in adult male *A. americana*; greater coverts as adult male. *Female.*—Similar to female *A. penelope* but head, neck, axillaries, under wing-coverts and greater coverts as juvenile male, and distinguished from juv. female *A. penelope* by same characters as given under juvenile male.

First winter and summer. Male.—As adult winter, but distinguished by juvenile wing-coverts. Moults as in *A. penelope*. *Female.*—As adult female but distinguished by juvenile median and lesser coverts having narrow grey-buff, not broad white, edges. Moults apparently as in *A. penelope*.

Measurements and structure.—As in *A. penelope*.

Soft parts.—Bill (ad. ♂) light grey-blue, tip black; legs and feet light bluish; iris brown.

FIELD-CHARACTERS.—Drake easily distinguished from *A. penelope* by paler appearance of head and neck. Duck more difficult, but head and neck look paler and in flight under-parts show rather more white than in female *A. penelope*. In all other respects both sexes strongly resemble European Wigeon. Drake utters same "whee-ew." Found during winter in marshes and tidal flats near

bays and inlets. Where much persecuted is extremely shy, sheltering during day amid reeds and herbage and feeding only at dawn and dusk. When alarmed by gunshot makes straight for open sea. (C. E. Alford.)

BREEDING-HABITS.—Nests in prairie region near lakes and also in north. *Nest*.—In tussock of grass or under low scrub, in willow clumps, etc., placed in depression of ground or sheltered by vegetation and lined with down. *Eggs*.—7 to 11, much like those of European Wigeon. Average size of 33 eggs, 55.4×39.3 . Max. : 58×40.2 and 56.5×41.2 . Min. : 52.5×39.2 and 53×37.4 mm. *Breeding-season*.—June. *Incubation*.—By female alone. Single brooded.

FOOD.—Chiefly vegetable ; roots of aquatic plants, seeds, buds, etc. *Vallisneria* specially recorded.

DISTRIBUTION.—*Great Britain*.—Very rare vagrant. Male identified, and female probably, at London Market, winter 1837–8. Young male found at Leeds game-stall, Feb., 1895 (Saunders, p. 439). Adult male shot Benbecula (O. Hebrides), Jan. 3, 1907 (*Bull. B.O.C.*, xix, p. 57). Adult male seen Anglesey, June, 1910, may have been an escape from captivity (*Brit. B.*, iv, pp. 87, 256) as may adult male Bardowie Loch (Stirling). Dec. 14, 1919 (*op. c.*, xiii, p. 244) and adult male R. Eden (Fife) Nov. 24, 1919 (*Scot. Nat.*, 1920, p. 13). Other occurrences (unauthenticated) recorded.

DISTRIBUTION.—*Abroad*.—N. America, north to Alaska and Hudson Bay, south to Utah, Colorado and Wisconsin ; wintering south to Guatemala, Costa Rica and West Indies. Casual Hawaiian Isles, Bermuda, France, Azores, Japan and Bering Island.

ANAS ACUTA

308. *Anas acuta acuta* L.—THE PINTAIL.

ANAS ACUTA Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—"Habitat in Europæ maritimis." Restricted typical locality : Sweden).

Dafila acuta (Linnæus), Yarrell, iv, p. 380 ; Saunders, p. 429 ; Hand-List. (1912), p. 138.

DESCRIPTION (Plate 6).—*Adult male. Winter and summer*.—Crown black-brown, centre of nape black glossed dull green, all feathers when fresh tipped buff ; broad white band from hinder-crown parallel with nape to side of breast ; mantle finely vermiculated blackish-grey and white ; upper scapulars as mantle, others with coarse vermiculations of black and light buff and with distal halves black on outer web, a few with broad black shaft-streaks, long tapering ones black bordered drab-grey (some with a cream-buff streak, and often freckled cream), lower ones drab-grey ; back and rump mouse-grey, feathers often freckled cream ; at sides of rump patch of cream-buff ; central upper tail-coverts shaded grey with black shafts and cream-buff edges, outer ones with outer webs black ; cheeks, sides of neck, chin, throat and fore-neck brown,

patch on side of neck in some lights glossed green or bronze-pink ; sides of body and flanks vermiculated blackish-grey and white ; breast and belly white ; lower-belly and vent white finely freckled and vermiculated dusky-grey ; under tail-coverts black, some mottled and long ones bordered white ; axillaries white with brown shafts ; coverts at edge and bend of wing and under lesser coverts mouse-grey, rest of under wing-coverts white freckled dusky-brown ; central pair of tail-feathers black, next pair with outer web black, inner web grey, shading to buff at border, others with outer webs blackish-grey edged white, inner webs mouse-grey, remainder mouse-grey paler on inner webs and edged light buff ; primaries sepia, paler on inner webs ; secondaries sepia with broad white tips sometimes suffused light pink-cinnamon on outer webs (two outermost and inner webs of middle secondaries usually freckled buff just above white tips), remaining secondaries with outer webs metallic-green, in some lights glossed bronze-pink with a subterminal border of velvet-black, innermost light mouse-grey with broad black shaft-streaks, one bordering speculum with inner web sepia, outer black with a light grey streak next shaft ; primary-coverts and bastard-wing as primaries but median and lesser primary-coverts mouse-grey with dark shaft-streaks and buff frecklings ; greater coverts mouse-grey with broad cinnamon tips and frecklings, absent on inner ones ; median and lesser coverts mouse-grey with dark shaft-streaks. This plumage is acquired by a moult of body, tail and innermost secondaries Aug. to Jan.

Adult male. Eclipse.—The body-feathers are first moulted followed by wings and tail June to Aug. May be confused with juvenile male rather than adult female, from latter at once distinguished by absence of broad buff edges to feathers of upper-parts, while under-parts are not so heavily spotted and streaked as in juvenile. Crown as adult female ; centre of nape ash-brown, feathers with buff tips and barrings ; feathers of mantle, back and rump blackish-grey tipped greyish-olive, many barred and freckled white or buff ; short scapulars as mantle but darker, mostly tipped buff, rest black or black-brown with light mouse-grey edges and tipped buff ; upper tail-coverts sepia irregularly barred and edged buff or cream ; rest of head and neck as adult female ; feathers of upper-breast with irregular markings of sepia and ashy-white more or less concealed by broad buff fringes ; sides of body and flanks sepia, feathers with broad irregular U-shaped light buff or white bars and with broad white fringes, many freckled, spotted and more or less vermiculated white ; lower-breast and belly white or ash-white, feathers mostly with oval spots of sepia or dusky-brown (in some merely shaded pale dusky or freckled same) ; lower-belly and vent more or less heavily marked dusky-brown, feathers broadly tipped white or buff and irregularly barred and vermiculated white ; under tail-coverts white, irregularly marked or freckled sepia ; central pair of tail-feathers black-brown or sepia, next pair sepia edged buff, inner webs mouse-grey, all feathers broader at tip than

in winter ; wing as winter but new innermost secondaries with tips rounder and less pointed and in some edged light buff. N.B.—Another type of eclipse has feathers of mantle, scapulars, back and part of rump dark ash-grey or blackish-grey, more or less coarsely vermiculated greyish-white, sides of body and flanks usually not so strongly barred and more or less vermiculated ash-brown and white. Every intermediate phase occurs between these two types. Amount and degree of spotting on under-parts varies considerably.

Adult female. Eclipse.—Crown streaked black-brown, feathers broadly edged cinnamon or buff ; nape pink-buff narrowly streaked dusky ; mantle and scapulars black-brown, feathers with broad V- or U-shaped marks of light buff or pink-buff and edged same ; scapulars with broad streaks, and markings of same, lowest ones sepia edged white at tip ; back and rump black-brown, feathers with V-shaped or transverse bars and tips of light buff or cream ; upper tail-coverts sepia with broad cream or buff fringes and with irregular pink-buff streaks and bars ; cheeks and sides of neck pinkish or light buff narrowly streaked black-brown ; chin, throat and fore-neck light buff, feathers with small dusky spots towards tip, in some chin and throat uniform ; feathers of upper-breast with sepia or dusky-brown centres more or less concealed by broad cream-buff fringes ; sides of body and flanks light sepia with irregular U-shaped markings and streaks of pink-buff or cream-buff and edged same ; lower-breast white, feathers with imperfectly concealed dusky-brown bases ; belly and vent white or cream, spotted, mottled and streaked dusky-brown ; under tail-coverts white with irregular markings of pale sepia ; axillaries white marked dusky-brown ; under wing-coverts ash-brown edged white ; tail-feathers : central pair black-brown, remainder sepia edged cream and all more or less with irregular streaks and bars of pink- or cream-buff ; wing as male but green speculum usually absent or ill-defined, outer secondaries streaked and margined buff on outer web, rest with outer webs buff-brown, sometimes mottled black, in some lights with a greenish or coppery-pink tinge, black sub-terminal border narrower often ill-defined, and white tips narrower than in male, innermost secondaries sepia narrowly bordered white or buff (in some with black-brown central shadings and irregular white or buff markings), one next speculum sepia tipped white, outer web often black-brown, usually with a pale drab or buff border along shaft ; wing-coverts pale sepia, greater coverts with broad pink-buff tips ; median and lesser coverts narrowly edged and sometimes barred buff. This plumage is acquired by a complete moult in autumn. N.B.—A type of female occurs with breast, belly and vent more or less heavily spotted sepia.

Adult female. Summer.—Most body-feathers, central pair of tail-feathers (sometimes most tail-feathers) and sometimes some innermost secondaries are moulted March to May but not rest of wings. Coloration as winter but mantle, scapulars, new feathers of

back, rump, upper tail-coverts and new tail-feathers usually more broadly margined and barred with deeper buff, new innermost secondaries broadly edged and irregularly streaked pink-buff or pink-cinnamon.

Nestling.—Pattern of upper-parts similar to nestling Mallard but upper-parts light sepia, down-filaments tinged cream-buff and yellow markings replaced by white ; patch on either side of centre of back sometimes continued into an elongated streak towards rump ; eye-stripe white, and sometimes continuous with white streak down side of nape to breast ; line through eye to nape light sepia, ill-defined bordering nape ; cheeks below eye white with an irregular patch of light sepia ; under-parts greyish-white, fore-neck suffused cinnamon-buff or greyish-buff.

Juvenile. Male.—Like eclipse female but upper-parts darker, feathers of mantle barred cream and without pink-buff edgings and markings and under-parts heavily streaked or spotted dusky-brown. Crown as adult female ; nape light buff narrowly streaked dusky ; rest of upper-parts black-brown, feathers edged cream and mostly with transverse or V-shaped cream bars, scapulars with irregular buff streaks and bars, barrings and edgings of back and rump sometimes ill-defined ; rest of head and neck as adult female but cheeks and sides of neck paler buff ; breast, belly and vent cream or buff heavily streaked or spotted dusky-brown ; sides of body and flanks black-brown or sepia, feathers edged, barred and with irregular spottings and markings of white or cream, sometimes intermixed with white feathers coarsely vermiculated dusky-brown ; under tail-coverts white, marked and spotted sepia ; tail-feathers dark sepia edged cream and more or less irregularly barred and streaked same ; wing as adult male but white tips to secondaries and cinnamon tips to greater coverts narrower and innermost secondaries olive-brown or black-brown, paler on outer webs, which in some are mouse-grey and narrowly edged cream, some with a mouse-grey shaft-streak, one bordering speculum as in adult but shorter and usually more broadly tipped white ; innermost greater coverts sepia with light buff edges ; median and lesser coverts usually browner mouse-grey than in adult and usually narrowly edged cream or light buff, inner median coverts in some with a wavy cream bar. N.B.—There is also a type of juvenile with mantle partly vermiculated white as well as barred. *Female.*—As male but wing as adult female ; innermost secondaries plainer than in adult female and without buff markings (in some darker, black-brown rather than sepia) narrowly edged white and in some irregularly marked same.

First winter and summer. Male.—As adult male and only to be distinguished by some juvenile feathers of back and rump which are often retained, shorter central tail-feathers and retained juvenile wing-coverts. The juvenile body-feathers, not always back and rump (which are sometimes incompletely moulted), tail (in some outer tail-feathers are retained), all innermost secondaries

(including one next speculum) and coverts, but not rest of wings, are moulted Sept. to Feb. or March.

First winter. Female.—As adult female eclipse and apparently not distinguishable except by more worn appearance of median and lesser coverts with narrower buff edges. Moult apparently as in male. *First summer.*—Like adult summer female but mantle, scapulars, new feathers of back and rump, upper tail-coverts, new tail-feathers and innermost secondaries less richly marked with buff and edges narrower and paler. Most body-feathers, some tail-feathers and innermost secondaries are moulted in spring.

Measurements and structure.—♂ wing 262–280 mm., tail 177–209, tarsus 39–42, bill from feathers 48–53 (12 measured). ♀ wing 242–266, bill 45–50. Primaries : 1st narrow, pointed and more than half longest primary-covert, 3rd longest, 2nd equal or 2–4 mm. shorter, 4th 8–13 shorter, 5th 22–27 shorter, 6th 37–45 shorter ; 2nd emarginated inner, 3rd and 4th slightly outer web. Innermost secondaries long and tapering, longest between 5th and 6th primaries, in eclipse broader at tip. Scapulars pointed and tapering, in eclipse shorter and with rounded tips. Tail with 16 feathers tapering to a point, central pair lanceolate and considerably longer than rest, in eclipse broader and less pointed, central pair broadly lanceolated and only slightly exceeding next pair in length. Bill longer than head, narrow, edges nearly parallel, terminal two-thirds of culmen straight and nearly horizontal, basal portion rapidly ascending.

Soft parts.—Bill (ad. ♂) plumbeous-blue, nail, base and strip along culmen black, (ad. ♀) bluish-horn, (juv.) blackish-grey ; legs and feet (ad. ♂) greyish, joints darker, webs black, (ad. ♀ and juv.) greenish-grey ; iris brown.

CHARACTERS AND ALLIED FORMS.—In *A. a. tzitzihua* (N. America) males have speculum broader and when fully adult tail longer. Green speculum and mouse-grey wing-coverts together with long neck and size distinguish adult and juvenile males from other British ducks ; adult and juvenile females might possibly be confused with young Wigeon and Gadwall but may at once be distinguished by inner secondary next speculum having no white on outer web except at tip.

FIELD-CHARACTERS.—Slender form and elegant carriage—sits very lightly on the water—distinguish female from Mallard duck when swimming. Drake is unmistakable ; white breast, white line down either side of brown neck, and creamy-white spot in front of black under tail-coverts show up at distance too great for elongated tail-feathers, elevated like a boat's bowsprit, to be seen. Long neck, pointed tail and slender form are just as diagnostic in flight, which is very rapid and accomplished by quick beats of narrow, pointed wings. Mainly a winter visitor, frequenting sea-coast and estuaries, where it often consorts with Wigeon, but uncommon on fresh-water far from sea. Call, a low “quack,” but is rather silent except in breeding-season when male is loquacious, uttering a musical “quuck, quuck” which has been likened to notes of a violin.

BREEDING-HABITS.—Chiefly found nesting on islands in lakes. *Nest.*—On ground among long grass or heather, lined with down (feathers from nest, see *Brit. B.*, II, Pl. 1.). *Eggs.*—Generally pale yellowish-green, but sometimes yellowish-cream. Average of 40 British eggs, 53×37.1 . Max.: 56.1×37.5 and 52.5×39.1 . Min.: 50.7×36.7 and 54.4×33.6 mm. *Breeding-season.*—About mid-May in Scotland and a week earlier in Jutland. *Incubation.*—By female alone. Period 22–23 days (Heinroth). Single brooded.

FOOD.—Somewhat varied, including insects, diptera, coleoptera (*Dytiscus*, etc.); mollusca (*Rissoa ulvæ*, *Planorbis*, etc.); small fish (once); and vegetable matter, including seeds of *Cochlearia*, *Potamogeton*, *Carex*, *Polygonum*, *Hydropiper*, *Rumex* and *Pilularia*; also on coast, *Zostera marina*. Newstead records acorns; Naumann spawn and young of frogs.

DISTRIBUTION.—*British Isles.*—Resident and winter-visitor (end Aug.–mid-Oct. to end March–end April). Has bred Skye in 1889, Loch Leven (Kinross) since 1898 (and probably before), Loch Gelly (Fife) 1920, Selkirk in 1901, South Uist (O. Hebrides) in 1902, Shetlands 1905 and 1908, Orkneys several years, and increased in 1910 and since, Moray area 1913, while a clutch of eggs in Brit. Mus. is labelled “Inverness-shire” (*cf. Scot. Nat.*, 1921, pp. 37–42). May have bred Ireland many years ago. Otherwise regular, but rather scarce, winter-visitor to most parts coast and occasionally inland.

DISTRIBUTION.—*Abroad.*—Northern old world Hemisphere, breeding in northern parts from about 70° down to lat. 50° , also in south Spain and south France; in winter south to northern Africa, India, China, Borneo, and Philippines, Panama, Porto Rico, Cuba, Hawaiian Islands, and Laysan. Casual Madeira, Spitsbergen and Greenland. Represented by closely allied subspecies in N. America.

Genus SPATULA Boie.

SPATULA Boie, Isis 1822, I, p. 564 (Monotype: *S. clypeata*).

Agrees with *Anas* in structure, except in bill, which is rather longer than head, in front very flat and enormously widened, being twice as broad as at base. Lamellæ very fine, long, close together. Fourteen rectrices. Sexes different. Four species, of which one only in northern hemisphere.

SPATULA CLYPEATA.

309. *Spatula clypeata* (L.)—THE SHOVELER.

ANAS CLYPEATA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—Restricted typical locality: S. Sweden).

Spatula clypeata (Linnæus), Yarrell, iv, p. 375; Saunders, p. 427.

DESCRIPTION (Plate 6).—*Adult male. Winter and summer.*—Crown brown-black glossed dull green; nape, cheeks and sides of neck metallic blue-green (in some lights glossed violet-mauve); lores,

chin, throat and fore-neck dull black slightly glossed green ; centre of mantle dark sepia or black-brown, feathers edged and a few freckled white ; sides of upper-mantle white ; short scapulars white, some tipped or freckled dusky and with inner webs and tips

Bill of the Shoveler (*Spatula clypeata*) from the side and from above.

black-brown or intermixed with black feathers, two long scapulars on either side pale blue, one with white stripe on inner web along shaft and bordered dull green, remainder dull green, some with olive-brown or creamy-brown shaft-streaks ; back, rump and upper tail-coverts black-brown glossed metallic-green, sides of rump white ; long upper tail-coverts sepia edged creamy ; upper-breast white (some eclipse feathers often retained with subterminal semi-circular bands) ; sides of body and flanks pink-cinnamon with numerous fine wavy bars of black ; centre of breast, belly and vent bay, when fresh feathers narrowly edged white (sometimes barred or spotted blackish), and those of lower-belly and vent in some more or less barred dusky ; under tail-coverts black glossed dull green, short ones with bases white and more or less vermiculated black, long ones with buff bars and frecklings towards tip ; axillaries and under wing-coverts white ; central pair of tail-feathers sepia tinged olive and edged or mottled white, others with outer webs sepia, inner webs white or buffish-white freckled dusky, outer ones mostly white with brown shafts ; primaries sepia paler on inner webs ; secondaries sepia (sometimes faintly tipped white on outer webs), all save two outer ones metallic-green on outer webs, innermost with outer webs blackish blue-green or dark green, inner webs olive-brown and with narrow white shaft-streaks towards tip ; bastard-wing sepia ; primary-coverts sepia but the median and lesser ones tinged blue ; greater coverts sepia with broad white tips (sometimes with dusky spot at tip of inner web) inner ones olive-brown, tips shaded blue or green ; median and lesser coverts pale blue, sepia at base. This plumage is acquired by a moult of body-feathers, central pair of tail-feathers and innermost secondaries Aug. to Dec.

Adult male. Eclipse.—The body-feathers and central pair of tail-feathers are first moulted, followed by wings and rest of tail May (exceptionally April) to Aug. Upper-parts somewhat resemble juvenile male and adult eclipse female, under-parts adult eclipse female, but easily distinguished from former by under-parts, fresh new tail-feathers and much longer innermost secondaries, and from latter by more brilliant wing. Crown and nape as eclipse female; mantle and scapulars as eclipse female but without bars and scapulars often edged white instead of buff, lower scapulars longer and with more pronounced buff or white shaft-streaks; back and rump as winter-summer male; at sides of root of tail usually a patch of white feathers barred black-brown; upper tail-coverts sepia glossed green and usually edged buff (in some irregularly barred buff or white); under-parts as eclipse female but cheeks and sides of neck more heavily streaked black-brown (sometimes ash-brown) and chin, throat and fore-neck sometimes more heavily streaked, upper-breast, sides of breast and flanks usually more plentifully marked and barred; rest of breast, belly and vent cinnamon, many feathers with sepia spots or barrings usually most pronounced on vent; central pair of tail-feathers sepia narrowly edged white; wing as adult winter, but innermost secondaries broader and less pointed at tip. N.B.—Sometimes during moult from eclipse to winter-summer, sepia scapulars barred buff or white or irregularly freckled and broadly edged white, and white breast-feathers with subterminal black-brown bars and pink-buff tips are acquired. These feathers are subsequently shed.

Adult female. Eclipse.—Fore-head and crown black-brown, with a greenish gloss, feathers edged pink-buff, centre of nape ash-brown, rest pink-buff narrowly streaked dusky-brown; mantle and scapulars sepia (sometimes with greenish gloss), feathers fringed pink-buff, sometimes some with V- or U-shaped buff bars, lowest scapulars tinged dull green on outer web and sometimes with a buff shaft-streak towards tip; back sepia (sometimes glossed green), feathers edged pink-buff, rump and upper tail-coverts same but mostly with V-shaped pink-buff markings; from base of culmen to nape a pink-buff eye-stripe streaked sepia (sometimes ill-defined); patch in front of eye and streak behind eye to nape thickly streaked black-brown; cheeks, sides of neck and fore-neck pink-buff narrowly streaked black-brown; chin and throat pink-buff, sometimes with faint black-brown streaks; feathers of breast, belly, flanks and vent with dusky-brown or sepia centres more or less concealed by broad pink-buff or pink-cinnamon fringes and usually irregularly marked same; under tail-coverts buff with oval or transverse sepia markings; axillaries and under wing-coverts as male, those at edge of wing with sepia centres; central tail-feathers sepia, remainder ash-brown all broadly edged pink-buff and mostly irregularly marked buff, outer ones more or less pink-buff; wing as male but green speculum usually less developed, four outer secondaries with outer webs dull greenish-brown or greenish-black, secondaries

usually narrowly edged white at tip of outer web, innermost secondaries sepia glossed olive and edged pink-buff and usually with light shaft-streak towards tip ; greater coverts with narrower white tips, inner ones olive-brown, some tinged dull blue and edged light buff or white ; median and lesser coverts duller blue than in male with narrow buff edges (sometimes absent). This plumage is acquired by a complete moult July to Sept.

Adult female. Winter and summer.—The body-feathers, some tail-feathers, innermost secondaries but not wings are moulted Dec. to April. Feathers of head and neck with broader pink-buff edges than in eclipse ; feathers of mantle and scapulars and upper tail-coverts sepia (sometimes black-brown) with broad crescent or transverse light or pink-buff markings and broad edges of same, some scapulars tinged olive ; feathers of back and rump sepia or black-brown with broad pink-buff edges and bars, those of rump with crescent-shaped marks ; under-parts and tail as winter ; wing as winter but innermost secondaries with broader edges and more or less irregularly shaded light buff. N.B.—In late summer under-parts appear more or less spotted owing to abrasion of edges and exposure of dusky-brown bases.

Nestling.—Similar to that of Mallard but upper-parts usually darker, down-filaments tipped cinnamon-buff rather than yellowish, yellow patches on upper-parts paler and in some ill-defined, no light bar on wing ; cheeks and eye-stripe cinnamon-buff not yellow-buff, a black-brown line through eye and an incomplete line below it as in Mallard ; chin and throat cinnamon-buff ; fore-neck same or greyish-buff ; remaining under-parts greyish-white occasionally suffused cream-yellow. Older nestlings are easily identified by shape of bill.

Juvenile. Male.—Like adult eclipse female but under-parts narrowly streaked light sepia, median and lesser coverts as adult male but duller ; upper-parts as eclipse female, mantle feathers without bars, in some edged greyish-white instead of buff ; one or two short scapulars barred buff (sometimes barred and partially edged whitish) ; back and rump black-brown or olive-brown glossed dull green ; patch at side of root of tail buff, feathers barred, tipped or spotted light brown ; cheeks, sides of neck, chin, throat and fore-neck as eclipse female but paler buff and rather more finely streaked ; feathers of upper-breast, sides of body and flanks and under tail-coverts light sepia edged and sometimes barred or spotted cinnamon-buff, longer under tail-coverts as eclipse female ; feathers of centre of breast, belly and vent narrowly streaked or spotted light sepia or dusky-brown and tipped and sometimes barred pink-buff ; tail-feathers sepia or ash-brown narrowly edged cream-buff (outer feathers often paler) ; wing as adult male but secondaries usually with very distinct white tips to outer webs ; innermost secondaries with outer webs dull olive-green narrowly tipped white or buff, inner webs olive-brown lighter towards shafts, tips of innermost secondaries rounded not pointed as in adult ; greater coverts some-

times with narrower white tips especially on inner webs and generally with oval dusky spot at tip of inner web, innermost as innermost secondaries but tipped buff; median and lesser as adult but in some duller blue, median sometimes shaded buff-brown at tip. *Female*.—As male but back and rump browner, some with feathers edged buff; patch of barred brown and white feathers at root of tail absent; wing as adult female but in some green speculum absent, outer webs of secondaries being plain sepia as inner webs or at most glossed dull blackish-green, innermost sepia, in some tinged olive, mostly tipped white on outer web; greater coverts sometimes with much narrower white tips and mostly with oval dusky spot at tip of inner web, innermost sepia faintly shaded buff at edge; median and lesser coverts usually duller and browner, in some with buff edges as in adult.

First winter. Male.—Apt to be confused with adult male eclipse but may be distinguished by lighter head, less brilliant green back and more uniform lower-breast, belly and vent varying from russet to bay, by worn juvenile tail-feathers when not all shed, juvenile innermost secondaries and often duller blue median and lesser coverts though sometimes these are as brilliant. Crown, nape, mantle and scapulars as juvenile; back and rump intermixed with new dark green feathers, some new dark green upper tail-coverts edged buff; rest of head and neck as juvenile, in some sides of face and neck more heavily streaked and spotted (with ash-grey in some rather than black-brown); feathers of lower-neck and upper-breast dark ashy or sepia with broad U-shaped marks of pink-cinnamon or white and wide fringes of pink-cinnamon (sometimes some feathers of upper-breast with white centres and subterminal dusky-black crescentic marks or bars); sides of body and flanks as male eclipse; rest of breast, belly and vent varying from russet to bay, sometimes feathers with dusky-black markings or frecklings more or less concealed and when fresh faintly tipped whitish; under tail-coverts pink-buff more or less vermiculated, barred or marked blackish, some tipped whitish and usually intermixed with juvenile feathers; new tail-feathers as adult; wing as juvenile. The juvenile body-feathers not usually all those of back, not all upper or under tail-coverts, some tail-feathers, but not wings, are moulted Aug. to Oct. *First summer*.—The body-feathers, apparently not lower-breast, belly or vent, rest of tail-feathers, innermost secondaries and coverts are moulted Nov. to March or even later, backward examples continuing to acquire feathers of breeding plumage up to commencement of moult into eclipse. Difficult to distinguish from adult except by more worn appearance of flight-feathers and by usually duller wing-coverts and narrower white tips to greater coverts. Sometimes, some dark horse-shoe shaped markings are retained on white shield of fore-neck.

First winter. Female.—As adult female eclipse but feathers of mantle and scapulars edged paler buff; wing as juvenile and distinguished from adult usually by duller speculum but sometimes as

brilliant as adult, median and lesser coverts usually duller and browner. The juvenile body-feathers, not always back and rump, tail-feathers and occasionally innermost secondaries and coverts are moulted Aug. to Jan. *First summer*.—Moult as in adult female but usually only central pair of tail-feathers renewed. Plumage as adult female and only to be distinguished by speculum and median and lesser coverts being sometimes duller.

Measurements and structure.—♂ wing 232–252 mm., tail 73–85, tarsus 32–37, bill from feathers 62–69 (12 measured). ♀ wing 217–235, bill 59–64. Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or 3–5 mm. shorter, 4th 8–10 shorter, 5th 20–26 shorter, 6th 34–40 shorter ; 2nd emarginated inner and 3rd outer web. Innermost secondaries long and tapering, longest equals 7th primary or between 6th and 7th, broader and less pointed at tip in eclipse. Scapulars long and tapering, in eclipse shorter and mostly with rounded tips. Tail short and rounded, central pair longest, 14 pointed feathers. Bill longer than head, compressed at base, much expanded and almost spatulate terminally where about twice as wide as at base ; lamellæ very thin, lengthened, almost completely exposed posteriorly, where they resemble teeth of fine comb.

Soft parts.—Bill (ad. ♂) leaden-black, in eclipse brown, (ad. ♀) greenish-brown above, margins inclining to yellow, lower mandible dull orange, nail brown, (juv.) pink-horn ; legs and feet (ad. ♂ and ♀) orange-red, (juv.) orange-brown ; iris (ad. ♂) golden to reddish-orange, (ad. ♀) yellow, (juv.) brown.

CHARACTERS.—No subspecies. Distinguished in all plumages from other British ducks by spoon-shaped bill and well-developed fine comb-like lamellæ.

FIELD-CHARACTERS.—Rather smaller than Mallard, with shorter neck and heavier build, features which are accentuated by its enormous spatulate bill, the Shoveler's dominating character in swimming and in flight. Female resembles Mallard in colour, but has pale blue shoulder and green speculum. White neck and breast of male contrasting strongly with green head and broad chestnut breast-band are diagnostic. Swims with fore-parts deeply sunk, but stern is not elevated like Gadwall's. Flight direct, but less rapid than Mallard's. Haunts pools, bogs and swamps where there is shallow water and abundant cover more than open lakes, and seldom resorts to sea unless compelled by frost. Rather a silent bird ; utters a low "took, took" in flight, and at times a creaking "quack."

BREEDING-HABITS.—Breeds on meadows near water, edges of marshes, etc. *Nest*.—On dry ground, among grass, heather or sheltered by gorse, lined with grass and down (feathers from nest, see *Brit. B.*, II, Pl. 1.). *Eggs*.—Usually 8 to 12 but 13–14 said to be recorded, greenish to buff. Average of 100 eggs, 52.2×37 . Max. : 56.5×38 and 54×39 . Min. : 48×37 and 50.5×34.5 mm. *Breeding-season*.—Usually about last week April onward. *Incubation*.—

By female alone normally; male once recorded incubating. Period 23-24 days. Single brooded.

FOOD.—Post-mortem results show chiefly fresh-water mollusca (*Planorbis*, *Hydrobia*, etc.) also *Littorina* and *Rissoa*, and vegetable matter, especially seeds of *Scirpus*, *Phragmitis*, *Potamogeton*, etc., and on coast, *Zostera*. Other water-weeds such as *Lemna*, *Glyceria*, etc., also taken; aquatic insects (especially water-beetles), and at sea, amphipoda and small crustacea. Naumann also includes spawn and fry of frogs and fish, as well as small worms.

DISTRIBUTION.—*England and Wales*.—Resident, forsaking most breeding-places in autumn and then, as well as in winter, more widely distributed; winter-visitor (m d-Sept.-Nov. to mid-March-mid-April). Since 1876 greatly increased as breeding-species, and now nests Northumberland, Cumberland, Durham, Yorks., Lancs., Lincs., Notts., Staffs., Salop, Warwick, Norfolk, Suffolk, Cambs., Beds., Herts., Essex, Kent, Sussex, Hants., Dorset, Somerset, and Devon. In Wales much scarcer, but nests Anglesey and once Merioneth. *Scotland*.—Breeds good many places in Tweed, Forth, Tay, one locality Aberdeen, Moray, also Solway, Clyde, once west Sutherland, Tiree, since 1903 in Outer Hebrides, Orkneys (*cf. Scot. Nat.*, 1920, pp. 155-64, 195-6). Increasing.—*Ireland*.—Breeds every province. Increasing.

DISTRIBUTION.—*Abroad*.—Northern hemisphere. Breeds as far north as lat. 68°, but not proved in Spain and Algeria and no recent records from Egypt; in America to Alaska. Winters south to Senegambia and Somaliland, India, Ceylon, China, Borneo, Philippines, Japan, Hawaiian Islands and in America to West Indies and Colombia. Casual Madeira and Canaries, Bermudas, Newfoundland and once near Cape Town.

[NOTE.—Wanderers from captivity of the NORTH AMERICAN SUMMER-DUCK, *Anas sponsa* (L.), are sometimes shot (Saunders, p. 432).]

Genus NETTA Kaup.

NETTA Kaup, Skizz. Entwicklungsgesch. u. Natürl. Syst., pp. 102, 196 (1829—Monotype: *N. rufina*).

In structure generally like *Nyroca*, but larger, bill rather long, narrower in front than behind, cutting edge straight, colour red or reddish. Serrations of upper mandible short, coarse, directed inwardly. Edge of feathering on sides of bill forming almost a straight line. Sexes different, male fully crested. 1 species.

NETTA RUFINA

310. *Netta rufina* (Pall.)—THE RED-CRESTED POCHARD.

ANAS RUFINA Pallas, Reise d. versch. Prov. d. Russ. Reichs, II, p. 713 (1773—S. Russia).

Fuligula rufina (Pallas), Yarrell, IV, p. 407: *Netta rufina* (Pallas), Saunders, p. 441.

Nyroca rufina (Pall.), Hand-List (1912), p. 139.

DESCRIPTION.—*Adult male.* Winter and summer.—Fore-head and crest cinnamon-rufous shading to paler on hinder-crown; nape and upper-mantle dull black; mantle and scapulars drab, lowest scapulars mouse-grey; broad white crescentic patch across base of scapulars; back drab, lower-back, rump and upper tail-coverts black glossed dull green (in some long tail-coverts drab); rest of head and neck pinkish-vinaceous, lower-neck all round black; patch on sides of breast and belly white, feathers usually tipped or finely vermiculated dusky; sides of body and flanks drab intermixed with white feathers more or less freckled dusky and sometimes tipped drab; rest of under-parts black, sometimes brown-black; axillaries and under wing-coverts white; tail-feathers drab-grey, outer ones with inner webs paler or more or less white; primaries hair-brown, inner webs and inner primaries except at tip, white suffused pale drab; secondaries white suffused pale drab with a subterminal hair-brown band and white tip, inner ones drab-grey, innermost drab; primary-coverts and bastard-wing hair-brown; lesser primary-coverts white; rest of wing-coverts light drab; lesser coverts bordering edge and bend of wing white. No moulting birds examined.

Adult male. Eclipse.—(Not examined.)

Adult female. Winter and summer.—Fore-head, crown, crest, and side of head to level with eye cinnamon-brown, crest much less developed than in male; nape and mantle drab-brown; scapulars and upper tail-coverts yellowish-drab or buff-brown, lower scapulars, back and rump olive-brown; lores, cheeks, chin, throat and rest of neck greyish-white; feathers of upper-breast drab fringed yellowish-white; feathers of sides of body and flanks yellowish-drab fringed white; feathers of rest of under-parts pale drab-grey fringed ashy-white; lower under tail-coverts, axillaries, and most under wing-coverts white; tail and wing as in male, but white of primaries and secondaries washed palest drab and lesser coverts bordering edge of wing ashy-white. N.B.—No spring material examined and only summer birds seen (one May, one June in Tring Mus.) were in worn plumage and possibly birds of previous year.

Nestling.—Crown, nape, upper-parts and sides of body sepia, down with long greenish-golden tips; bar across wing, patch on either side of back and another on either side of base of uropygial tuft, pale yellow; ill-defined sepia streak through eye; cheeks, sides of neck and remaining under-parts pale yellow, shading to greyish-white on belly, vent, and under tail-coverts; down round tarsus and extending slightly on to vent sepia.

Juvenile. Male.—Apparently like adult female but only sexed specimen examined had partially acquired first winter-summer plumage on head and neck. Feathers of under-parts smaller than in adult female and drab-grey with yellowish-white or white tips, drab-grey bases only partially concealed giving under-parts a mottled appearance as in juvenile *N. f. ferina*; tail-feathers very worn but apparently coloration as in adult, tips square with bare shaft

projecting; wing as in adult but innermost secondaries narrower and apparently with more pointed tips. *Female*.—Apparently as adult female, but crest absent; under-parts and tail as in juvenile male; wing apparently as in adult female, but only rather worn specimens examined.

First winter and summer. Male.—As adult winter but under-parts browner, feathers with narrower black tips and narrow white edges. The juvenile body-plumage, tail and innermost secondaries and coverts are moulted from autumn (?) to spring but not rest of wings. *Female*.—Probably identical with adult female, but no certain example examined.

Measurements and structure.—♂ wing 256–278 mm., tail 58–74, tarsus 40–43, bill from feathers 48–52 (12 measured). ♀ wing 249–269, bill 44–50. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd equal or 2–3 mm. shorter, 4th 9–13 shorter, 5th 21–27 shorter, 6th 39–44 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries of moderate length, more or less pointed towards tip, longest between 5th and 6th primaries. Scapulars moderately long, tips slightly rounded. Tail rounded, 16 feathers. Adult male with a much developed crest. Bill broad and flattened at base, slightly narrowing towards tip, culmen slightly concave beyond anterior corner of nostril, nail considerably decurved; lamellæ of upper mandible projecting.

Soft parts.—Bill (ad. ♂) bright vermilion-red, nail flesh pink, (ad. ♀), reddish-brown, (juv.) dusky above, brownish below (Hume); legs and feet (ad. ♂) orange-red or vermilion-red, joints, edges of scutes and webs slatish, (ad. ♀) pinkish, webs black, (juv. ♂) olivaceous-orange; iris (ad. ♂) reddish-brown or orange-red, (ad. ♀) hazel, (juv. ♂) brown or reddish-brown becoming orange-red or red in spring.

CHARACTERS.—No subspecies. Distinguished in all plumages from other British ducks by white speculum bordered above and below with drab (in ♀ suffused drab), and uniform drab wing-coverts.

FIELD-CHARACTERS.—Male known at once by crimson bill, golden-bay erectile crest, intensely glossy black under-parts, white wing-bar and white patch on shoulder. Female more soberly coloured, but dull red bill and greyish-white cheeks and throat contrasting with dusky crown are good characters. Like other diving-ducks, rises with difficulty, pattering along surface for some yards and not springing cleanly from water as Mallard and Teal do. Obtains most of its food by diving, but to some extent by grovelling on the bottom with fore-parts submerged and hind-parts tilted vertically after manner of surface-feeders. Flies with rapidly whirred wings. Call, hoarse, grating “kur-r-r,” similar to that of many diving-ducks.

BREEDING-HABITS.—Breeds on islands in lagoons, sheltered by bushes; also in thick rushes or flags in reedy pools. *Nest*.—Thick bed of down on foundation of dead rushes or water-plants. *Eggs*.—

5	{	Upperside darker, nearly black, indication of crest	<i>N. fuligula</i> , ♀, p. 322
		Upperside not so dark, no indication of crest 6	
6	{	As a rule with white feathers round base of upper mandible	<i>N. marila</i> , ♀, p. 326
		No white feathers round base of upper mandible	
			<i>N. nyroca</i> , ♀, p. 319

NYROCA FERINA

311. *Nyroca ferina ferina* (L.)—THE COMMON POCHARD.

ANAS FERINA Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—Europe. Restricted typical locality; Sweden).

Fuligula ferina (Linnæus), Yarrell, iv, p. 413 : Saunders, p. 443.

DESCRIPTION.—*Adult male. Winter and summer.*—Head and neck all round chestnut, chin with minute white spot ; upper-mantle, lower-neck and upper-breast black, feathers of upper-breast when fresh edged white or rusty ; rest of mantle and scapulars finely vermiculated white or greyish-white and black-brown ; lower scapulars mouse-grey more or less vermiculated white ; back dusky-brown vermiculated and freckled white ; rump and upper tail-coverts black ; centre of breast white, feathers more or less vermiculated dusky ; sides of body and flanks white finely vermiculated black-brown ; lower-belly and vent white coarsely vermiculated black-brown ; under tail-coverts black ; axillaries and under wing-coverts white ; tail deep mouse-grey ; primaries mouse-grey, pale ash-brown on inner webs, shaded sepia or dusky-black towards tip and inner ones often faintly freckled white, 2nd, 3rd, and 4th with outer webs shaded sepia ; secondaries light grey tipped white and more or less freckled same, inner ones with outer web bordered by narrow black line, innermost as scapulars ; primary-coverts dark sepia ; bastard-wing dusky-brown, tips freckled white ; rest of wing-coverts mouse-grey plentifully vermiculated white. N.B.—Secondaries and wing-coverts are more plentifully vermiculated in some than in others. This plumage is acquired by a moult of body-feathers and innermost secondaries Aug. to Nov.

The Common Pochard (*Nyroca f. ferina*).
Adult male.

Adult male. Eclipse.—The body-feathers are first moulted followed by tail and wings July and Aug. Rather like adult winter-summer female but upper-mantle not cinnamon-brown, rest of mantle more coarsely vermiculated ; nape, cheeks and sides of neck

rich auburn ; wing (if not flightless) as in winter-summer male. Feathers of crown black-brown, tipped auburn ; nape auburn ; upper-mantle dark mouse-grey or brown-grey, feathers more or less faintly freckled or vermiculated greyish-white and in some tips auburn or faintly tinged buff ; mantle and scapulars coarsely vermiculated deep mouse-grey and greyish-white ; rest of upper-parts as in winter-summer ; cheeks, sides of neck, chin, throat, and fore-neck auburn, feathers with ashy-white bases, imperfectly concealed on fore-neck and usually conspicuous on chin and throat ; chin-spot if present ill-defined ; feathers of upper-breast deep mouse-grey deepening to blackish-grey at tip and tipped white (or cinnamon-buff) and more or less speckled same at tip ; feathers of sides of body and flanks drab or mouse-grey coarsely vermiculated greyish-white towards tip ; rest of breast and belly as adult female but many feathers usually more or less vermiculated whitish towards tip (in some intermixed with white feathers finely vermiculated dusky-brown) vermiculation of under-parts more pronounced in some than in others ; lower-belly and vent as in winter-summer but intermixed with drab-brown feathers, speckled or vermiculated whitish at tip ; short under tail-coverts black-brown tipped white and more or less freckled same, lower ones vermiculated ash-brown and white ; innermost secondaries mouse-grey coarsely vermiculated greyish-white.

Adult female. Winter.—Crown black-brown, feathers tipped cinnamon-brown ; nape and upper-mantle cinnamon-brown, feathers of upper-mantle sometimes faintly vermiculated white (in some nape auburn) ; rest of mantle, scapulars and back deep mouse-grey or brown-grey, coarsely vermiculated greyish-white ; lower scapulars more or less uniform ; rump and upper tail-coverts black or black-brown, sometimes faintly dusted with tiny white specks ; lores, small patch under eye and streak behind eye greyish-white washed cinnamon-buff (in some these areas uniform with cheeks) ; cheeks, sides of neck and fore-neck dusky, feathers tipped cinnamon-brown and narrowly edged white when fresh (sometimes cheeks, sides of neck and fore-neck auburn) ; chin and throat white often faintly spotted dusky ; feathers of upper-breast deep mouse-grey or drab-brown shading to cinnamon-brown or cinnamon-buff at tips and broadly tipped white ; feathers of sides of body and flanks drab or mouse-grey with distal halves or tips vermiculated white ; feathers of centre of breast and belly mouse-grey or light drab broadly tipped ash-white ; feathers of rest of belly, vent and under tail-coverts deep mouse-grey or sooty-brown with narrower white tips, in some vermiculated white ; lower under tail-coverts greyish-white vermiculated dusky ; axillaries and under wing-coverts as male ; tail and wing as male, but secondaries without frecklings or vermiculations and more narrowly tipped white, innermost mouse-grey or warm sepia, in some outer web vermiculated whitish ; wing-coverts deep mouse-grey, tips speckled white. This plumage is acquired by complete moult July to Nov.

*Adult female. Summer.**—The body-feathers, tail, sometimes some innermost secondaries are moulted Feb. to May, but not wings. Coloration as winter but lower-mantle and scapulars dark mahogany-brown, feathers tipped buff-brown, many feathers vermiculated ash-white at tip, mantle and scapulars much darker than in winter plumage and much less vermiculated; under-parts as in winter but sides of body and flanks rich cinnamon-brown with buff-brown tips, some feathers partly edged white or indistinctly vermiculated greyish-white at tip.

Nestling.—Down of crown, nape and upper-parts black-brown with an olivaceous tinge; bar across wing, irregular patch on side of back below wing, and small patch on either side of rump greenish-yellow; eye-stripe and cheeks pale yellow or greenish-yellow; irregular brown streak, ill-defined in some, from below eye to nape; sides of body and usually sides of vent and back of thighs black-brown tinged olivaceous; remaining under-parts greenish-yellow (in some tinged greyish), paler on vent and uropygial tuft.

Juvenile. Male.—Like adult winter female but distinguished by less vermiculated upper-parts and characteristically mottled appearance of under-parts. Head, neck and upper-mantle as in adult female, but not such a rich cinnamon-brown; cheeks and sides of neck paler than in adult female; white patch under eye but no white streak behind eye; nape and sides of neck apparently never auburn as in some adult females; scapulars sepia tipped cinnamon-brown, intermixed with hair-brown or mouse-grey feathers, more or less vermiculated greyish-white; remaining upper-parts as in adult winter female, but rump and upper tail-coverts without white frecklings; feathers of upper-breast with deep mouse-grey bases, in some blackish-grey subterminal shadings, and tipped white or buff; sides of body and flanks deep mouse-grey (flank-feathers with ill-defined vermiculations of light drab or white) tipped buff-brown or white; rest of under-parts deep mouse-grey or sooty-brown, feathers with narrow white or buff-brown tips, which do not obscure grey bases as in adult winter female and thus under-parts have a characteristically barred or mottled appearance; tail as in male but with square abraded tips; wing much as adult female (sometimes with less freckling) and differing from adult male in having secondaries if vermiculated at all, only towards tip, inner ones (with dark line bordering outer web) with no vermiculations; innermost secondaries and coverts dark hair-brown more or less freckled white; rest of wing-coverts deep mouse-grey speckled cream towards tip, not mouse-grey vermiculated white as in adult male. *Female.*—As male, but mantle, scapulars and flanks without vermiculations, feathers of mantle and scapulars tipped buff-brown, mantle more or less freckled or dusted greyish or ash-

* In the genus *Nyroca* the summer plumage of the adult female is duller than that acquired in autumn and is possibly the eclipse plumage assumed at an earlier date than in other ducks.

white ; wing as adult female but secondaries including innermost and wing-coverts without frecklings or vermiculations.

First winter and summer. Male.—As adult but in many, juvenile body-feathers are retained, especially those of breast, belly and vent ; easily distinguished from adult by juvenile wing. Many body-feathers, tail and occasionally some innermost secondaries and coverts are moulted Aug. to Feb. but not rest of wings. Some are in full winter-summer plumage by end Oct., while others with juvenile breast and belly occur end Feb.

First winter. Female.—Coloration as adult winter female and only to be distinguished by retained juvenile wing-coverts. Many body-feathers, usually some or all tail-feathers, occasionally some innermost secondaries are moulted from Aug. onwards, some have moulted into first winter by Oct. ; while others with juvenile breast, belly and vent occur in Jan. *First summer.*—Forward females appear to have a more or less complete body-moult in April and assume a summer plumage and nest-down like that of adult ; less forward birds, probably do not acquire a complete 1st winter plumage but commence instead to get some feathers of summer dress which may or may not be completely acquired (not much material examined).

First eclipse. Male.—As in adult eclipse and only to be distinguished if any juvenile body-feathers are retained and by juvenile wing if not moulted.

Measurements and structure.—♂ wing 211–220 mm., tail 50–55, tarsus 35–38, bill from feathers 45–49 (12 measured). ♀ wing 201–212, bill 43–47. Primaries : 1st narrow, pointed and about half longest primary-covert, 3rd longest, 2nd equal or slightly shorter, 4th 5–8 mm. shorter, 5th 14–21 shorter, 6th 27–36 shorter ; 2nd emarginated inner web, 3rd outer web. Innermost secondaries elongated with slightly rounded tips, longest between 4th and 5th or 5th and 6th primaries. Scapulars with somewhat rounded tips. Tail short, much rounded, 14 stiffish feathers. Bill about as long as head, higher than broad at base, slightly wider towards tip, frontal angles acutely pointed, culmen broad, rather concave in front of nostrils, convex at tip, nail small and rounded at end ; lamellæ of upper mandible concealed.

Soft parts.—Bill (ad. ♂) base and tip blackish-slate, middle portion light grey-blue, (ad. ♀) duller, (ad. ♀ summer) olive slate-grey, tip blackish-olive, lower mandible blue-grey tinged pink ; legs and feet (ad. ♂) dull grey, webs blackish-slate, (ad. ♀) very light greenish-grey, joints and webs slate ; iris (ad. ♂) reddish-yellow, in spring brilliant red, (ad. ♀) brown, in summer reddish hazel-brown, (juv. ♂) light brown becoming pale yellow.

CHARACTERS AND ALLIED FORMS.—*N. f. americana* (N. America) is larger, male is also distinguished by magenta-coppery gloss on nape and sides of neck, and by other differences, adult females appear to have upper-parts less vermiculated. Common Pochard

is easily distinguished from all its British congeners in all plumages by grey speculum and wing-coverts.

FIELD-CHARACTERS.—Bright chestnut-red head and neck, vermiculated pale grey back and black breast and under tail-coverts separate male at once from other British ducks. Colour of female much less pronounced, but general dull brown tint of upper-parts coupled with greyish-white cheeks and throat and absence of white on wing are useful characters. Rather more squat and heavy than Tufted Duck, which it resembles closely in its gregarious habits, fondness for freshwater, straight and rapid flight by quick beats of short wings, diving powers, difficulty in rising from water, hoarse croaking call, and general behaviour. Male utters soft low whistle in breeding-season.

BREEDING-HABITS.—Prefers ponds and lakes where there is growth of reeds, flags, rushes, etc., to provide cover for nest. *Nest.*—Usually in or close to water; built rather like that of Coot of dead flags, broken reeds, etc., and lined down (feathers from nest, see *Brit. Birds*, II, Pl. 1). *Eggs.*—6 to 11, but 13 and 14 on record; greenish-grey, with waxy surface. Average of 110 eggs, 61.4×43.7 . Max.: 68×45.5 and 64×46.5 . Min.: 57.2×43 and 61×39.2 mm. *Breeding-season.*—Usually given as first half May, but full clutches may be found by April 26 in England, and during latter half May in Scotland. *Incubation.*—By female alone. Period 23–24 days. Single brooded.

FOOD.—Mainly vegetable; roots and buds of aquatic plants (*Potamogeton*, *Myriophyllum*, *Ceratophyllum*), also *Glyceria*, *Polygonum*, and seeds of these as well as reeds, rushes, etc. Also small fish, worms, tadpoles, aquatic insects (water-beetles, etc.) and mollusca (*Tellina*, *Pisidium* and other small freshwater forms).

DISTRIBUTION.—*England and Wales.*—Resident and winter-visitor (early Sept.—mid-Nov. to March–April). Increasing and now breeds, or has bred, in all maritime counties of east coast, as well as Hants., Dorset, Sussex, Herts., Bucks., Berks., Beds., Staffs., Leicester, Notts., Salop, Lanes., Merioneth, and probably Anglesey. In winter more widely dispersed, but irregular in numbers and localities. *Scotland.*—Breeds most parts, but only winter-visitor to Shetlands and mainly so to O. Hebrides, where truly wild birds have probably nested. *Ireland.*—Winter-visitor. A pair with young identified in Monaghan, 1907, and stated to have bred in cos. Kerry, Tipperary, Westmeath, Meath, Sligo, Down and Antrim.

DISTRIBUTION.—*Abroad.*—Palæarctic region generally from Atlantic Ocean to Japan, breeding chiefly in subarctic portions, wintering in Mediterranean countries, east to India, China, and Japan. Accidental in Azores, Canaries, Madeira, also Pribilof Isles. Replaced by an allied race in North America.

NYROCA NYROCA

312. *Nyroca nyroca nyroca* (Güld.)—THE FERRUGINOUS DUCK.

ANAS NYROCA Gldenstdt, Nov. Comm. Sc. Petrop., xiv, i, p. 403 (1770—S. Russia).

Fuligula nyroca (Gldenstdt), Yarrell, iv, p. 418 : Saunders, p. 445.

DESCRIPTION.—*Adult male. Winter and summer.*—Head and neck all round bay ; chin with a white spot (sometimes immediately below chin a dusky-brown patch) ; dusky-brown or black collar encircles lower-neck and nape, some feathers tipped bay ; sides of upper-mantle bay ; remaining upper-parts black or black-brown glossed dull green, feathers of mantle and in some scapulars with faint bay frecklings, those of upper-mantle sometimes tipped bay ; upper and sides of breast bay ; sides of belly and lower flanks cinnamon-drab, feathers broadly tipped auburn and intermixed with auburn feathers ; centre of breast white, feathers vermiculated ashy towards base ; feathers of belly and vent deep ash-brown with buff or white tips and more or less freckled same towards tip ; under tail-coverts white ; axillaries and under wing-coverts white with a few dusky markings ; tail-feathers black-brown, outer pair in some freckled white at edge ; primaries dusky-brown, tips black-brown glossed dull green, inner webs much paler and shading to pure white, inner ones more or less white on both webs ; secondaries white, with broad black-brown tips glossed olive-green, which on inner ones are narrowly edged white, one next innermost secondaries with inner web more or less dusky-brown and with a faint brown line on outer web, still less distinct on outer webs of preceding secondaries and often completely absent ; innermost secondaries black-brown glossed olive-green ; all primary-coverts and bastard-wing black-brown, slightly glossed dull green ; greater coverts black-brown glossed olive-green ; median and lesser coverts olive-brown with hardly perceptible buff-brown frecklings. N.B.—Owing to extensive abrasion of white tips of feathers in some, centre of breast in late summer appears more or less vermiculated ash-brown. Hardly any material in moult examined.

Adult male. Eclipse.—Resembles adult female, but upper-mantle apparently lighter brown ; sides of face and neck, chin and throat paler. The body-plumage (tail and innermost secondaries?) is first moulted followed by wings and tail end May to Aug. Fore-head, crown and top of nape as in winter-summer ; nape and new feathers of upper-mantle hair-brown, narrowly edged russet ; new scapulars black-brown or sepia tinged olive ; cheeks and sides of neck russet ; chin and throat same, but feathers with ill-concealed ash-white bases ; lower-neck with russet-brown semi-circular collar, feathers faintly tipped white ; feathers of upper-breast bay with imperfectly concealed drab-brown bases and broad white tips tinged russet ; sides of body and flanks as adult female ; rest of under-parts as winter-summer male ; tail in full moult and both wings short and in quill in one specimen examined.

Adult female. Winter.—Crown bay; nape, mantle and scapulars black-brown or sepia tinged olive, feathers mostly edged russet and slightly freckled same; back, rump and upper tail-coverts as male; cheeks and sides of neck auburn shading to russet on throat and fore-neck; chin usually with a white spot; upper-breast drab-brown or black-brown, feathers fringed deep russet or white tinged russet (in some tipped bay); flanks, sides of body and sides of vent dusky-brown or drab-brown, feathers shaded and edged russet or buff-brown; rest of breast white, some feathers with imperfectly concealed drab bases; remaining under-parts, tail and wings as in male. *Summer.*—No spring material examined. Colour of head and neck appears to be less rich, upper-parts with no frecklings and throat more or less intermixed with white, which may be due to abrasion.

Nestling.—Crown, nape, mantle, back, uropygial tuft and sides of body warm sepia, down with golden-brown tips; wing-bar, patch on either side of mantle and at base of uropygial tuft pale yellow; eye-stripe, cheeks and sides of neck, chin, throat and upper-breast pale yellow; belly pale yellow intermixed with warm sepia; vent and thigh all round more or less warm sepia.

Juvenile. Male and female.—Like adult winter female but distinguished by mottled appearance of under-parts. Upper-parts as in adult winter female but feathers of crown black-brown with bay tips; nape ash-brown or drab-brown; cheeks, sides of neck, chin, throat and fore-neck dusky-brown, feathers tipped auburn (in some white chin-spot absent and chin and throat ashy-white, feathers tipped pale auburn); sides of body, flanks, and vent as in adult female; under tail-coverts white irregularly barred or marked brown; rest of under-parts drab, feathers edged white or pink-buff (some feathers of breast tipped russet) giving under-parts a mottled appearance; tail and wing as adult female.

First winter and summer. Male.—As adult winter-summer male but median coverts generally browner and more worn. The juvenile body-feathers, tail and innermost secondaries and coverts are moulted Oct. to Feb. but not rest of wings; sometimes some juvenile body-feathers are retained. *Female.*—Probably as adult female and moult as in male but no material examined.

Measurements and structure.—♂ wing 174–192 mm., tail 48–58, tarsus 29–31, bill from feathers 40–43 (12 measured). ♀ wing 176–185, bill 36–40. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd equal and longest (3rd sometimes slightly shorter than 2nd), 4th 3–8 mm. shorter, 5th 14–16 shorter, 6th 22–28 shorter. Bill shorter than head, slightly broader at tip than at base, culmen less abruptly concave. Other structure as in *N. f. ferina*.

Soft parts.—Bill (ad. ♂) greenish-black, greyer at tip and along cutting edge, under mandible horn-brown, (ad. ♀) blackish-lead, greyer at tip and along cutting edge, under mandible as in male,

(juv. ♂) slate-blue-black lighter towards nail; legs and feet (ad. ♂) black marked greenish-yellow, (ad. ♀) greenish-grey, webs black, (juv. ♂) lead-blue with greenish shade; iris (ad. ♂) white, (ad. ♀) brown, (juv. ♂) dark brown becoming pearl-grey about March.

CHARACTERS AND ALLIED FORMS.—In *N. n. baeri* (E. Asia and Japan) adult males have head and neck black glossed green, adult females black-brown glossed dull green. Adult males of *N. n. nyroca* are easily distinguished from other British *Nyroca* by bay head, neck and upper-breast, adult females by bay crown, cheeks and sides of neck and juveniles by having feathers of crown tipped bay and flank-feathers tipped russet.

FIELD-CHARACTERS.—White eye of male contrasting with reddish-brown head is infallible guide at close quarters. Warm brown colour, darker on back and shading into bay on breast and flanks with white under tail-coverts identify male on water at distance. Colours of female less pronounced, but white wing-bar, visible in flight or when swimming bird flaps its wings, prevents confusion with female Pochard. In both sexes silky-white under-parts shading into grey on abdomen are evident in flight. A freshwater duck of shy and retiring habits, affects pools in marshes and swamps, particularly if overgrown with vegetation, rather than open water. Call a harsh, sharp “kek, kek, kek” (Witherby).

BREEDING-HABITS.—Haunts still lagoons and backwaters overgrown with aquatic plants. *Nest*.—In thick cover, clumps of sedge, rushes or rank vegetation not far from water, lined vegetable matter and down. *Eggs*.—6 or 7 to 14, and once even 20, pale yellowish or buff. Average of 100 eggs, 52.3×38.2 . Max.: 62.8×36 and 57×43 . Min.: 48.4×37 and 48.9×33.7 mm. *Breeding-season*.—Generally from early to late May, sometimes early June. *Incubation*.—By female only. Period 27–28 days (Blaauw); 30 days (Favier). Single brooded.

FOOD.—Varied, both animal and vegetable, latter includes seeds and remains of *Polygonum*, *Potamogeton*, *Nymphœa alba*, *Carex*, *Lemna*, etc. Animal food includes small fish, worms, small mollusca, insects and larvæ such as Odonata and larvæ (*Libellula* and *Agrion*) Phryganeidæ and larvæ, coleoptera (*Sitones*, etc.).

DISTRIBUTION.—*British Isles*.—Rare vagrant. *England*.—Over fifty recorded from Norfolk and a few Suffolk, Cambs., Notts., Yorks., Northumberland (one), Lancs. (one), Oxon. (four), Essex (one), Kent (two or three), Surrey (one), Sussex (nine), Hants. (a few), Dorset (one), Devon (three), Cornwall (one) Brecon (one), Radnor (one), Montgomery (seven), Carnarvon (one). *Scotland*.—One or two Firth of Forth and two on Tay. *Ireland*.—Eight or nine.

DISTRIBUTION.—*Abroad*.—Breeds in Marocco, Algeria, south, central and east Europe and eastwards to valley of Ob, Turkestan, Kashmir, Pamirs and south Tibet. Winters in Mediterranean

countries to Canaries and Nigeria, Abyssinia, Sokotra, Asia Minor to India and Burmah. Casual Japan, reported Iceland.

[NOTE.—A male example of BAER'S DUCK, *Nyroca nyroca baeri* (Anas [Fuligula] Baeri Radde, Reise S. v. O. Sibirien, II, p. 376, pl. 15, 1863—S.E. Siberia), was obtained on Tring Reservoirs (Herts.) on Nov. 5, 1901 (N.C. Rothschild, *Bull. B.O.C.*, XII, p. 25), and another on the Trent (Notts.) about mid-April, 1911 (J. Whitaker, *Brit. B.*, VII, p. 268). These may have been wild birds but since "water-fowl" are sometimes kept in semi-captivity without even being properly identified it seems inadvisable to admit this duck to the list. It breeds in east Siberia and is found on passage and in winter in Japan and China and irregularly in Burmah and India.

NYROCA FULIGULA

313. *Nyroca fuligula* (L.)—THE TUFTED DUCK.

ANAS FULIGULA Linnæus, Syst. Nat., ed. x, i, p. 128 (1758—Europe. Restricted typical locality; Sweden).

Fuligula cristata (Leach), Yarrell, IV, p. 430: Saunders, p. 447.

DESCRIPTION.—*Adult male. Winter and summer.*—Crest, head and neck all round and rest of upper-parts black (chin sometimes white), crown, crest, cheeks and sides of neck glossed magenta or violet-purple, in some lights cheeks and sides of neck glossed dark green, rest of upper-parts glossed dull green; mantle and scapulars minutely freckled or dusted cream; upper-breast black, feathers when fresh tipped white; breast and belly white; sides of body and flanks white, sometimes faintly freckled dusky; lower-belly white, more or less vermiculated dusky; vent and under tail-coverts black; axillaries white usually freckled dusky and under wing-coverts mostly white; tail-feathers black-brown; primaries dusky-brown with black-brown tips, inner webs paler, inner ones with outer webs ashy-white; secondaries white, broadly tipped black-brown, inner ones with a dusky line bordering outer web, one next innermost with inner web dusky-brown, innermost black glossed dull green; wing-coverts black or black-brown glossed dull green, median and lesser coverts minutely freckled cream. This plumage is acquired by a body-moult Aug. to Dec.

The Tufted Duck (*Nyroca fuligula*).
Adult male.

Adult male. Eclipse.—The body-feathers (? innermost secondaries) are first moulted followed by tail and wings July and Aug. Head and neck all round brown-black, feathers of chin, throat and fore-neck with brownish-white bases more or less exposed; black crest usually shed or much worn; mantle and scapulars as in winter but duller black and with less green gloss, feathers of whole mantle dusted with tiny white specks; remaining upper-parts as in winter;

upper-breast brown-black, feathers narrowly (those bordering lower-breast broadly) fringed white ; sides of body and flanks pale drab, some feathers vermiculated greyish-white and intermixed with white feathers vermiculated drab ; lower-belly and vent white, feathers more or less vermiculated dusky and intermixed with drab feathers more or less vermiculated whitish ; under tail-coverts brown-black, some white vermiculated dusky ; tail and wing as in winter. Crest is apparently only shed once and is renewed during post eclipse moult.

Adult female. Winter.—Crown and crest black-brown (sometimes almost black), feathers edged cinnamon-brown ; nape and upper-mantle sepia, feathers tipped cinnamon-brown ; mantle and scapulars black-brown glossed dull green, feathers usually edged cinnamon-brown, lower-mantle and scapulars sparsely dusted white ; back, rump and upper tail-coverts black glossed dull green (in some upper tail-coverts black-brown) ; cheeks, sides of neck, chin, throat and fore-neck warm sepia, many feathers with black tips and with ill-concealed brownish bases, in some (old females ?) these parts almost black with purple gloss ; feathers round base of upper mandible usually more or less white especially on lores, tiny white spot on chin in some ; lower-neck and upper-breast sepia or black-brown, feathers broadly fringed yellowish-white or white, those bordering fore-neck often edged cinnamon-brown ; sides of body and flanks drab, feathers fringed yellowish-white or white, in some vermiculated white at tip ; centre of breast and belly white ; vent ash-brown, feathers shaded white towards tip ; under tail-coverts mostly white vermiculated and spotted dusky-brown ; axillaries and under wing-coverts as in male ; tail and wing as in male but black-brown tips to secondaries rather narrower. This plumage is acquired by complete moult July to Nov.

Adult female. Summer.—The body-feathers, tail, innermost secondaries and coverts are moulted March to June. Coloration as winter but sepia or black-brown feathers of upper-breast edged golden cinnamon-brown ; sides of body and flanks cinnamon-brown, feathers tipped buff-brown ; rest of under-parts sepia, feathers of breast, belly and vent more or less tipped white or yellowish-white (in some intermixed with white feathers) ; lower under tail-coverts mottled white towards tip ; tail and wings as winter. N.B.—Under-parts vary considerably individually from more or less white with a few sepia feathers to mostly sepia with a few white feathers.

Nestling.—Like that of Common Pochard but upper-parts darker with no light patches ; in some an indistinct brownish-yellow patch on side of back below wing ; cheeks and sides of neck sooty-yellow, in some almost as dark as upper-parts, indistinct black-brown line from culmen around and beyond eye ; ill-defined streak from lores to nape, connected in front of eye with first line ; below this an ill-defined black-brown moustachial streak (these lines absent in some) ; chin and throat sooty-yellow ; upper-breast

sooty-brown, down with yellowish tips ; centre of breast and belly yellowish-white or pale greenish-yellow, belly more or less suffused sooty-brown ; uropygial tuft sooty-brown.

Juvenile. Male.—Very like adult winter female but distinguished by streaked or barred appearance of belly and vent. Crown black-brown, feathers edged cinnamon-brown as in some adult winter females ; upper-parts as in adult female, but feathers of upper-mantle with narrower cinnamon-brown edges ; mantle and scapulars often more plentifully dusted white ; varying amount of white on lores and chin, but apparently not on fore-head, in some white absent or merely indicated ; cheeks, sides of neck, chin, throat and fore-neck black-brown, feathers mostly with narrow yellowish tips ; remaining under-parts as in adult winter female, but feathers of sides of body and flanks without vermiculations ; feathers of belly and vent dusky-brown, narrowly edged white, producing a barred appearance ; tail and wing as in adult male, but tips of tail-feathers usually square with bare shaft projecting. N.B.—One example had breast more or less narrowly streaked dusky. *Female.*—As male but upper-parts lighter and usually without or with only a few white dots ; cheeks, sides of neck, throat and fore-neck light sepia, feathers without black tips as in adult female ; remaining under-parts and tail as male ; wing as adult female.

First winter and summer. Male.—Advanced young males acquire most of the adult winter-summer plumage (though some juvenile feathers appear always to be retained on lower-belly) by Dec. Usually distinguishable from adult by retained juvenile feathers of vent, shorter crest and feathers of sides of body and flanks finely vermiculated dusky-brown, more pronounced in some than in others. April birds occur which have only acquired a certain amount of winter-summer plumage and still retain juvenile tail-feathers. Many juvenile body-feathers, usually tail, sometimes innermost secondaries are moulted Oct. to May but not rest of wings. *First eclipse.*—As adult eclipse and only to be distinguished by retained juvenile feathers on lower-belly and vent.

First winter. Female.—Like that of adult winter female and apparently only to be distinguished when some juvenile body-feathers are retained. Birds in 1st winter plumage with new tails, but with some juvenile feathers on under-parts occur in Jan., while others even in March are in worn juvenile plumage. Moults as in male. *First summer.*—Not examined.

Measurements and structure.—♂ wing 198–208 mm., tail 49–57, tarsus 30–35, bill from feathers 38–42 (12 measured). ♀ wing 189–202, bill 38–41. Primaries : 1st narrow, pointed and more than half longest primary-covert, 2nd longest, 3rd equal or 3 mm. shorter, 4th 7–12 shorter, 5th 18–24 shorter, 6th 30–38 shorter. Bill a little shorter than head, about same height as breadth at base, wider towards tip, culmen less abruptly concave than in *N. f. ferina*, nail small and decurved. Adult male with well developed crest, 1–2

(occasionally 3) inches long, in female seldom exceeding 1 inch ; young ♂ and ♀ with feathers of hinder-crown slightly elongated forming a rudimentary crest. Other structure as in *N. f. ferina*.

Soft parts.—Bill (ad. ♂) slate-blue, nail black, (ad. ♀) slate-grey, nail black ; legs and feet (ad. ♂) lead-blue, (ad. ♀) light grey faintly tinged greenish ; iris golden-yellow.

CHARACTERS.—No subspecies. Adult male distinguished by black head and crest, females and juveniles have upper-parts faintly dusted, never vermiculated white (distinction from Scaup), juvenile females can be confused with those juvenile female Scaup with no vermiculations on upper-parts but in Scaup upper-parts are lighter, white at base of bill more extensive and bill larger and broader.

FIELD-CHARACTERS.—The dependent occipital tuft, apparent enough at close quarters, especially in male, is not always obvious at a distance unless blown clear of bird's head by wind, but broad snow-white sides of otherwise black male (Scaup is grey, not black, on back) identify him on water a great way off. Female has no distinctive markings on water, but sooty-brown plumage and heavy build are useful guides. Occasionally she has a narrow white line at base of upper mandible, but nothing comparable with broad white band on face of duck Scaup. In flight, which is rapid and noisy, both sexes look black above and white below, with white wing-bar and a narrow white subterminal line along whole inner margin of wing. Chiefly a freshwater duck, addicted to lakes, reservoirs, and large sheets of water which afford it spacious diving room. Call a harsh "kur-r-r, kur-r-r" ; and in breeding-season male utters a low, clear "tuc, tuc, tuck ; quit, quit, quitta ; wheeo, whit ; quit, quit, quie" (Whitaker).

BREEDING-HABITS.—Found on lakes and ponds in breeding-season.

Nest.—Often on islands, or on shore, generally within a few yards of water, but occasionally as much as 20 yards away or more, sheltered by tussock of grass or rushes, low bushes or rank vegetation ; lined dead grasses or rushes and well supplied with down (feathers from nest, see *Brit. Birds*, II, Pl. 2). Exceptionally has bred on wall in island. *Eggs*.—Usually 7 or 8 to 13, but 14 to 20 on record and sometimes several ducks will lay in a joint nest (21, 28, etc.). Eggs, large, rather elongated, greenish-grey. Average of 150 eggs, 58.9×40.75 . Max. : 65.9×46.3 and 63.9×47.2 . Min. : 53×38 and 58.6×37.7 mm. *Breeding-season*.—Last fortnight May in England ; end of May and early June in Scotland. *Incubation*.—By female alone. Period usually 25 to 27 days, but rather variable 24 and 28 days on record. Single brooded.

FOOD.—Varied, both animal and vegetable but chiefly former. Small fish, and spawn, frogs, tadpoles, mollusca, both fresh and salt water (*Limnæa*, *Rissoa*, *Littorina*, *Mytilus*, *Pisidium*, etc.), large numbers of insects, especially diptera, but also water-

- beetles, *Notonecta*, etc. Also grass, duckweed (*Lemna*), berries of hawthorn and water-plants (*Polygonum*, *Potamogeton*, *Rumex*, etc.).

DISTRIBUTION.—*British Isles.*—Resident, passage-migrant and winter-visitor (mid-Sept.—end Nov. to end March—mid-May). During last twenty years greatly increased and extended range as breeding-species. Now nests in most English counties, in Anglesey, in Scotland all over south and east as far north as Caithness and Orkneys, as well as in I. and O. (since 1903) Hebrides, but still only rare visitor to west coast from Argyll north. In Ireland only known as winter-visitor until 1877, now breeds many counties in all provinces. In winter more plentiful and more widely dispersed.

DISTRIBUTION.—*Abroad.*—Palæarctic region generally, from Atlantic to Pacific, in Europe south to Balkans, but not in Mediterranean region. In winter south to India and east to China, Japan, Malayan Archipelago, Pelew and Marianne Isles. Casual Pribilof Isles. In Africa south to Abyssinia where it is said to breed. Once recorded Liberia.

NYROCA MARILA

314. *Nyroca marila marila* (L.)—THE SCAUP-DUCK.

ANAS MARILA Linnaeus, *Fauna Svecica*, ed. II, p. 39 (1761—Lapland).
Fuligula marila (Linnaeus), Yarrell, IV, p. 423 : Saunders, p. 449.

DESCRIPTION.—*Adult male.* *Winter and summer.*—Head and neck all round, upper-mantle and upper-breast black, crown, nape, cheeks and sides of neck glossed green, in some lights purple; feathers of upper-breast bordering white lower-breast, white with dusky-black vermiculations; mantle and scapulars white coarsely vermiculated black-brown; lower scapulars black-brown, some more or less vermiculated white; back black-brown vermiculated white; rump and upper tail-coverts black-brown glossed dull green; rest of breast and belly white; feathers of sides of belly and flanks white with a few faint wavy dusky lines; lower-belly and vent white more or less vermiculated dusky and black-brown; under tail-coverts black; axillaries white vermiculated dusky at tip; under wing-coverts mostly white; tail-feathers sepia or mouse-grey with dark shafts; primaries sepia or dusky-brown, tipped black-brown faintly glossed olive, inner webs paler shading to white, outer webs of inner primaries more or less white or palest drab; secondaries

The Scaup-Duck (*Nyroca m. marila*). Adult male.

white with broad black tips glossed green and usually more or less vermiculated white, inner ones with inner webs dusky or black-brown, innermost black-brown glossed dull green usually speckled or vermiculated white ; primary-coverts, bastard-wing and greater coverts black-brown, in some speckled white at tip, greater coverts glossed dull green ; rest of wing-coverts dusky-brown or brown-black glossed dull green and more or less speckled or vermiculated white, amount of vermiculation varying individually. This plumage is acquired by a body-moult also innermost secondaries Sept. to Dec. or even Feb.

Adult male. Eclipse.—The body-feathers (back and rump ?) and innermost secondaries are first moulted followed by wings and tail July to Sept. Resembles adult female but easily distinguished by more heavily vermiculated upper-parts and absence of pure white face band. Fore-head, lores and chin whitish, some feathers tipped black ; head and neck all round black-brown glossed dull greenish-black on cheeks and sides of neck, feathers with ashy-white bases ill-concealed on sides of neck ; nape in some cinnamon-brown ; upper-mantle dusky-black, feathers edged cinnamon-brown and more or less speckled or vermiculated greyish-white, sometimes tipped and vermiculated light auburn ; mantle and scapulars black-brown or black coarsely vermiculated white ; lower-neck dusky-black or black, feathers fringed yellowish-white ; upper-breast dusky-black or black, feathers broadly fringed white (sometimes speckled with white towards tip and sometimes with sub-terminal cinnamon-brown shading) ; sides of body and flanks white or dusky-white vermiculated drab and usually intermixed with drab-brown feathers with or without white vermiculations and specklings ; feathers of lower-belly suffused pale ash-brown, some

The Scaup-Duck. Adult female.

vermiculated same ; vent as in adult female ; under tail-coverts white vermiculated black, some tipped black ; remaining under-parts, tail and wings as adult winter-summer.

Adult female. Winter.—Broad band at base of bill white, in some ill-defined on chin and white only at extreme point ; crown and nape black-brown, feathers more or less edged cinnamon-brown crown where

bordering white fore-head intermixed with black feathers ; upper-mantle cinnamon-brown, sometimes faintly speckled white ; mantle and scapulars sepia or brown-black, feathers coarsely vermiculated white distally ; back and rump as in male ; upper tail-coverts sepia tipped cinnamon-brown or buff-brown ; cheeks,

sides of neck, throat and fore-neck cinnamon-brown, feathers mostly tipped black, in some these areas black-brown ; throat and sides of neck sometimes glossed greenish and with white bases of feathers usually only partially concealed on auricles and often ill-concealed on throat and fore-neck ; feathers of lower-neck and breast dusky-brown darker towards tip shading into cinnamon-brown, in some with narrow white edges ; feathers of lower-breast broadly edged white ; sides of body and flanks light cinnamon-brown, feathers vermiculated white towards tip ; centre of breast and belly white ; vent sooty-brown, some feathers vermiculated whitish ; under tail-coverts white more or less vermiculated dusky-brown, some tipped blackish ; tail and wing as male but innermost secondaries without vermiculations, at most slightly speckled white towards tip ; wing-coverts less, and more finely, vermiculated than in male. This plumage is acquired by complete moult Aug. to Dec.

Adult female. Summer.—The body-feathers are apparently completely moulted April and May but very little material has been examined. Coloration as winter but feathers of crown and nape cinnamon-brown with blackish-brown bases, in some ill-concealed on crown ; upper-mantle as winter, rest of mantle and scapulars cinnamon-brown or warm sepia, feathers tipped buff-brown, in some vermiculated whitish at tip ; on auricular region whitish patch ; throat sooty-brown or pale cinnamon-brown, feathers with ill-concealed whitish bases ; upper-breast as winter ; sides of body and flanks light cinnamon-brown, feathers tipped buff-brown ; rest of breast and belly and vent as winter but in some intermixed (most plentifully on lower-belly and vent) with dusky or sooty-brown feathers, tipped buff or whitish ; under tail-coverts in some more or less uniform sooty-brown tipped buff-brown ; tail and wings as winter.

Nestling.—Like that of Common Pochard but upper-parts usually lighter, being olive-brown with no light patches ; in some an ill-defined yellow-brown patch on side of back ; cheeks yellow-buff (in some suffused brownish) ; remaining under-parts light cream-yellow ; upper-breast suffused yellow-buff ; sides of body, vent and uropygial tuft suffused brown.

Juvenile. Male.—Resembling adult winter female but white band at base of bill narrower, often absent on fore-head and ill-defined on chin, in some intermixed with brown feathers ; nape sepia ; lower-neck and upper-mantle sepia speckled white ; centre of mantle as in adult female but less, and more coarsely, vermiculated ; scapulars sepia or black-brown tipped buff-brown, some coarsely vermiculated white towards tip ; rest of upper-parts as adult female ; under-parts as adult female but cheeks, sides of neck, throat and fore-neck lighter cinnamon-brown, neck and upper-breast in some darker ; sides of body and flanks buff-brown, feathers with lighter tips, those of lower-flanks more or less speckled or vermiculated white ; belly white ; feathers of lower-belly and vent dusky-brown (darker on vent) mostly with narrow white tips

giving a characteristic barred or streaked appearance ; under tail-coverts white with dusky-brown subterminal bars and shadings ; tail as adult male in coloration but structure juvenile ; wing as adult male but coverts usually less vermiculated, innermost secondaries usually with no vermiculations but sometimes faintly speckled white. *Female*.—As juvenile male, but upper-parts without or with few vermiculations ; crown sepia, feathers tipped cinnamon-brown ; mantle and scapulars as male but with no vermiculations ; centre of mantle dark sepia, feathers tipped buff-brown (sometimes slightly vermiculated at tips) ; back uniform brown-black with a few white frecklings, not vermiculated white as in juvenile male and adult female ; under-parts as male but cheeks, sides of neck, and throat lighter, feathers without black-brown tips ; fore-neck and upper-breast lighter ; flanks with no white vermiculations or speckles ; tail as male ; wing as adult female but innermost secondaries and coverts without white frecklings ; median and lesser coverts with no vermiculations, in some with a dusting of tiny white specks.

*First winter and summer. Male.**—Easily distinguished from adult by retained juvenile body-feathers. In most birds upper-parts resemble adult but some juvenile feathers are usually retained on centre of mantle ; back and rump browner than in adult ; under-parts as adult but juvenile feathers often retained on upper-breast, sides of body, flanks and under tail-coverts ; rest of breast, belly and vent as in juvenile (sometimes some feathers of belly are renewed) wing as in juvenile but new innermost secondaries as adult. Many juvenile body-feathers apparently not back, rump, lower-breast, belly or vent but occasionally belly, tail, sometimes some innermost secondaries are moulted Sept. to April.

First eclipse. Male.—One July specimen examined (Schöler coll.) in body-moult into eclipse plumage which appears to resemble that of adult. Feathers of breast, belly and vent were retained juvenile plumage.

First winter. Female.—Upper-parts as in adult winter female but mantle and scapulars less vermiculated ; back as in juvenile ; new feathers of upper-breast, sides of body, flanks and under tail-coverts as adult female ; rest of breast, belly and vent as juvenile. Many body-feathers (apparently not back, lower-breast, belly or vent), some or all tail-feathers but not wings are moulted from September. *First summer*.—Forward young females acquire a certain amount of summer plumage. April specimens examined were acquiring new feathers on head, neck, mantle, scapulars, rump, upper and under tail-coverts, upper-breast, sides of body and flanks, new growing feathers of sides of body and flanks being characteristic of adult summer plumage ; rest of breast, belly and vent as juvenile ; tail new or in moult and still with some juvenile feathers.

* In assumption of this plumage some white flank-feathers, vermiculated and sometimes tipped buff-brown are sometimes acquired but are soon shed.

One March and one April moulting innermost secondaries. Birds in moult occur from Sept. to April, some acquire a first winter plumage by Jan., others have few new feathers by this date and probably in spring commence to moult straight into first summer plumage or if they only acquire first winter plumage by March probably do not acquire any summer plumage.

Measurements and structure.—♂ wing 220–230 mm., tail 50–63, tarsus 35–38, bill from feathers 43–47 (12 measured). ♀ wing 210–220, bill 41–46. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd longest, 3rd equal or 2–3 mm. shorter, 4th 7–10 shorter, 5th 20–22 shorter, 6th 32–38 shorter. Bill about as long as head, as high as broad at base but becoming depressed and broadening to tip which is semi-circular, culmen sloping gradually to tip, scarcely concave, nail small and decurved. Other structure as in *N. f. ferina*.

Soft parts.—Bill (ad.) lead-blue, slightly darker in female; legs and feet (ad.) lead-blue, duller in female; iris rich golden-yellow.

CHARACTERS AND ALLIED FORMS.—*N. m. mariloides* (China and Japan) is smaller and male has coarser vermiculations on upper-parts; *N. m. nearctica* (N. America) is larger. *N. affinis* (N. America) is smaller. Vermiculated upper-parts and white speculum distinguish Scaup in all plumages from other British *Nyroca* but for distinction of those juvenile females with no vermiculations on upper-parts, see Tufted Duck under “characters”.

FIELD-CHARACTERS.—At distance drake might be mistaken for Tufted Drake, especially as crest of latter is not always visible, but Scaup has back much lighter. Duck often difficult to distinguish from female Surf-Scoter, white spots on latter’s face being easily mistaken at distance for a white band round base of bill, which would denote female Scaup. Female and immature Tufted also have some white at base of bill, but not a *clearly defined band* as in female Scaup. In flocks, usually 7–25 individuals and associates freely with other species. Very silent during winter. Dives in 2–3 fathoms. Usual duration of dive 25–30 seconds. (C. E. Alford.)

BREEDING-HABITS.—Sociable where found commonly; many pairs breeding close together. *Nest.*—Sometimes mere hollow lined with grasses and down (feathers from nest, see *Brit. Birds*, II, Pl. 2); at times conspicuous or sheltered by tussock of grass or heather and near water. *Eggs.*—7 or 8 to 11, but 19 and even 22 have been found in one nest, olive-grey in colour. Average of 100 eggs, 61.7×43.6 . Max.: 68.1×44.7 and 59×48 . Min.: 54.5×41.5 and 66.3×40.7 mm. *Breeding-season.*—From end May through June. *Incubation.*—By female alone. Period said to be four weeks. Single brooded.

FOOD.—Almost entirely animal, but buds and seeds of water-plants are eaten in summer, and *Zostera* has been recorded, as well as algæ, which are brought to the surface for eating. Staple food

mollusca ; young mussels (*Mytilus edulis*), cockles (*Cardium*) ; also *Littorina littorea*, *L. retusa*, *Lacuna*, *Rissoa*, *Cerithium*, *Nassa*, *Pisidium*, and *Nucula* ; also smaller crustacea. Many insects (Diptera) and small fish taken in freshwater lakes in summer.

DISTRIBUTION.—*British Isles*.—Resident, passage-migrant and winter-visitor (mid-Sept.—mid. Nov. to end March—early June). Bred Sutherland 1899, and in an island of Uist group (O. Hebrides) 1897–9 (two pairs), 1900 (three pairs), probably also 1901 and certainly 1902. Also 1906 in another island in same group. Also bred same group 1910 and 1913 (*cf. Brit. B.*, II, pp. 85, 132, 209, 283, 416 ; VI, p. 368 ; VII, p. 149). Also recorded breeding Orkneys (*B.O.U. List* (1915), p. 177). Otherwise winter-visitor to all coasts and seldom on inland waters.

DISTRIBUTION.—*Abroad*.—Breeds in arctic regions (Færoes, Iceland, Scandinavia, north Russia, Siberia), winters in Palæarctic region south to Mediterranean countries, N.W. Africa, and Egypt, Black and Caspian Seas, Persian Gulf, rare India. Replaced by allied forms in far east and in N. America.

[NOTE.—A specimen found in Leadenhall Market, and said to have been taken in Lincs., formed the subject of Donovan's description and figure of *Nyroca collaris*, the AMERICAN RING-NECKED DUCK (*Anas collaris* Donovan, *Brit. Birds*, VI, 1809, pl. 147). The bird is an inhabitant of North America, from British Columbia to northern California, and from Alberta south to Dakota and Wisconsin : in winter south to Porto Rico and Guatemala.]

Genus BUCEPHALA Baird.

BUCEPHALA Baird, B. N. America, p. 795 (1860—As type named *B. albeola*).

Differs from *Nyroca* chiefly by bill, which is shorter than head, height at base greater than width, narrower in front than at base, nail mostly wider than in *Nyroca* ; nostril much nearer tip, fore-part much in front of middle of bill. Tail rounded, 16 rather stiff rectrices. Feathers of crown and nape in *B. clangula* and *islandica* slightly, in *albeola* much elongated, in latter also feathers on sides of head. 3 species northern portions of Palæarctic and Nearctic regions.

BUCEPHALA CLANGULA

315. *Bucephala clangula clangula* (L.)—THE GOLDENEYE.

ANAS CLANGULA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Europe. Restricted typical locality ; Sweden).

Clangula glaucion (Linnæus), Yarrell, IV, p. 435 : Saunders, p. 451.

Nyroca clangula clangula (L.) Hand-List (1912), p. 141.

DESCRIPTION.—*Adult male. Winter and summer*.—Head and upper-part of neck all round black, crown, nape, cheeks and sides of neck glossed dark green, in some lights reddish-purple, purple gloss more pronounced in some than in others ; roundish white patch on lores ; rest of neck and part of upper-mantle white ; rest of mantle, inner

and lower scapulars, back, rump and upper-tail coverts black ; rest of scapulars white broadly bordered black on outer or both webs ; under-parts white, flank-feathers mostly with broad black border on outer web ; feathers around tibia and sometimes sides and lower part of vent ash-brown tipped white ; axillaries and under wing-coverts deep mouse-grey ; tail mouse-grey ; primaries black-brown, paler on inner webs ; outer secondaries black-brown often with a white spot towards tip, succeeding ones usually with more or less white on inner web, middle ones white, one next innermost usually with black-brown mark on inner web, innermost and coverts black ; all primary-coverts, bastard-wing and lesser coverts black or black-brown ; outer greater coverts black or black-brown, remainder white sometimes tipped dusky-black ; median coverts white, inner ones and inner lesser coverts black tipped white. This plumage is acquired by body-moult Sept. to Dec.

Adult male. Eclipse.—Like adult female but easily distinguished by white wing-coverts. Head and neck all round, mantle, scapulars, tail-coverts, upper-breast, sides of body, flanks but apparently not rest of body-feathers are moulted first, followed by wings and tail in July and Aug. Fore-head, crown, cheeks, chin, throat and upper-part of neck as in adult female but paler brown, sepia rather than bistre-brown ; lores black-brown ; nape dark ash-brown ; mantle brown-black as female, feathers tipped ash-brown or dark ash-grey ; scapulars black-brown or sepia tipped ash-brown or ash-grey, some short scapulars edged ash-white ; rest of upper-parts as female ; lower-neck and sides of neck ash-brown ; upper-breast and sides of body dark ash-grey, feathers tipped yellowish-white ; flanks as scapulars ; under tail-coverts ash-brown, broadly tipped white, lower ones white marked ash-brown ; remaining under-parts as adult male in winter-summer.

Adult female. Winter and summer.—Head and neck all round bistre-brown ; nape ashy, feathers tipped whitish ; lower-neck, mantle and scapulars brown-black, feathers edged dark grey, scapulars mostly edged white or greyish-white ; back and rump black ; upper tail-coverts black, when fresh with dark grey bloom ; fore-neck with white collar ; upper-breast, sides of body and flanks deep grey, feathers broadly edged white and often with one web more or less white ; feathers around tibia, sides of vent and sometimes feathers across vent and lateral under tail-coverts deep mouse-

The Goldeneye (*Bucephala c. clangula*). Adult male.

grey edged white ; rest of under-parts white ; axillaries, under wing-coverts and tail as male ; wing as male, but middle greater coverts with broad black tips forming a wing-bar ; lower series of median coverts black tipped white, upper series mostly white shaded ash-grey towards base (amount of white varies considerably individually) ; lesser-coverts and bend of wing blackish-grey more or less shaded deep grey towards tip, some tipped white. This plumage is acquired by a complete body-moult Aug. to Dec.

Adult female. Eclipse.—Feathers of head and neck all round, mantle, scapulars, upper and under tail-coverts, upper-breast,

The Goldeneye. Adult female.

sides of body and flanks followed by wings and tail are moulted July and Aug. Feathers of back and rump and of rest of under-parts are apparently only moulted once. Coloration as in winter-summer but head and upper-part of neck sepia ; nape and rest of neck dark ash-brown with no white collar ; scapulars black-brown, edged dark ash-brown not white ; upper-breast dark ash-brown, feathers tipped buff-white ; sides of body and flanks dark ash-brown, feathers

tipped brownish-white or greyish-white.

Nestling.—Down of crown, lores, cheeks and centre of nape, rest of upper-parts, sides of body and back of thighs sepia or black-brown ; a white bar across wing, a white patch on either side of centre of back, another on either side of rump and one above thighs ; rest of cheeks, sides of neck, chin, throat and fore-neck white (in some a dusky spot on chin) ; rest of under-parts white, upper-breast suffused dusky-brown, sometimes a brown patch on either side of vent.

Juvenile. Male.—Distinguished from adult female by larger size. In coloration more like adult female eclipse than winter and summer but comparison with latter is here made as it is more generally known. Head and upper-part of neck sepia (not bistre), rest of neck all round dark ash-brown ; feathers of mantle browner, with narrower grey edges ; scapulars black-brown or sepia tipped buff-brown ; upper-breast, sides of body and flanks dark ash-brown, feathers mostly tipped buff or buff-brown ; sides of vent and feathers across vent as female but ash-brown ; rest of under-parts as female ; tail as female but tips square and shafts projecting ; wing as female but white on greater coverts usually more extensive and black-brown tips usually narrower forming an ill-defined (in some obsolete) wing-bar ; lower series of median coverts black, some more or less shaded pale greyish-white towards tip, upper series pale mouse-grey or pale greyish-white, some tipped white (occasionally

with sub-terminal dusky-brown markings) forming light patch on wing, varying considerably in extent and whiteness individually; lesser coverts as female but lighter, tips narrower.

Juvenile. Female.—As juvenile male but greater coverts usually more broadly tipped black as in adult female, median coverts usually with less white, upper series blackish-grey or mouse-grey, more or less shaded pale grey or pale greyish-white towards tip, forming a light patch on wing varying in extent individually. N.B.—Juvenile males may usually be distinguished from juvenile females (apart from their larger size) by more extensive light patch on wing, median coverts of which are whiter but in some males these are indistinguishable from those of some females.

First winter. Male.—Head, neck, mantle and scapulars as adult winter-summer female, but scapulars without or with only a few whitish tips; new feathers of upper-breast, sides of body and flanks as adult female; rest of plumage as juvenile. This plumage is assumed in Sept. and Oct. by a partial body-moult and is usually worn only for a short time (though backward birds in first winter plumage may occur in March). *First summer.*—In forward males, no dividing line can be drawn between these plumages; black feathers glossed green appear on head; lores intermixed with white, in some loreal patch almost as much developed as in adults; lower-neck with a white collar intermixed on nape with white feathers tipped ash-brown; new feathers of mantle black narrowly edged deep grey; new scapulars white with outer or both webs narrowly edged black, some blackish-grey with one or both webs (some centre only) shaded silvery-grey or white; fore-neck and upper-breast white; sides of body and flanks intermixed with white feathers with outer webs black-brown (some mottled dusky) some white narrowly bordered black as in adult male, or white more or less marked deep ash-grey; rest of body-feathers as adult female; tail as adult male; wing as juvenile. Some body-feathers (apparently not back, rump, lower-breast, belly or vent) and tail are moulted from Sept. onwards, but apparently not wings; in less forward males only some of above plumage is acquired.

First winter and summer. Female.—As adult female, but distinguished by juvenile median coverts; scapulars with dark grey, not white, tips (some sometimes faintly edged greyish-white); white collar on fore-neck apparently never such a clean white as in adult female, feathers mostly with ash-brown bases, moult apparently as male.

First eclipse. Male and female.—Moult and coloration apparently as in adults; only to be distinguished from adults when juvenile wing-coverts have not been shed.

Measurements and structure.—♂ wing 207–227 mm., tail, 77–90, tarsus 34–38, bill from feathers 31–36 (12 measured). ♀ wing 197–210, bill 28–31. Primaries: 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 10–12 mm. shorter, 5th 22–26 shorter, 6th 35–39 shorter; 2nd

emarginated inner, 3rd slightly outer webs. Innermost secondaries comparatively short and pointed at tip, equal to or shorter than 6th or 7th primary. Scapulars with square tips, long ones slightly pointed (appear not to differ in shape in eclipse). Tail rounded, 16 stiff feathers of moderate length. Bill shorter than head, higher than broad at base, gradually depressed, decreasing in breadth towards tip which is rounded; nail, small, narrow, oblong and decurved. Feathers of hinder-crown considerably elongated, most pronounced in adult male, giving head a characteristically triangular appearance.

Soft parts.—Bill (ad. ♂) bluish-black, (ad. ♀) as male but a yellow patch at tip of upper and under mandible surrounding nail, nail and tip of lower mandible bluish-black, (juv. ♂ Oct.) dusky brown-black suffused dull orange, brightest behind nasal opening and on intercrural space, (juv. ♀) bluish-black with no yellow patch which makes its appearance sometimes as early as Dec.; legs and feet (ad. ♂) pale orange, webs greyish-brown, (ad. ♀) brownish-yellow, (juv. ♀) similar to adults but duller; iris (ad. and juv. ♂) bright yellow; (ad. and juv. ♀) dull yellow.

CHARACTERS AND ALLIED FORMS.—In *B. c. americana* (N. America) male but not always female is larger. Adult males of *B. islandica* (Iceland, Greenland, N. America) are easily distinguished by large crescentic white patch on lores, bifid tips of scapulars and flank-feathers and other differences; juvenile and 1st winter males have median and lesser coverts darker, sometimes a few median coverts with grey or greyish-white tips but apparently never tipped white as in many *B. c. clangula*; adult female has upper series of median coverts with white tips narrower than in adult female *B. c. clangula*; 1st winter females have median and lesser coverts more or less uniform black-brown, a few median coverts with grey or greyish-white tips; wing longer than in *B. c. clangula*, viz., ad. ♂ 235–245, ad. ♀ 210–223, juv. and 1st winter ♂ 222–235, first winter ♀ 209–215. Skull rises sharply from base of bill in ad. and juv. ♂ instead of sloping gradually as in *B. c. clangula*, this character hardly perceptible in most females. From other British ducks adult male Goldeneye is distinguished by white eye-spot and black and white plumage, adult female and juveniles have head and neck uniform bistre-brown with no white marks as in female and juvenile *B. albeola*.

FIELD-CHARACTERS.—Male looks vivid black and white, characteristic circular white patch beneath eye usually visible without aid of glasses. When bird is excited, neck is stretched upwards and head-feathers puffed out, which gives head a peculiar and very characteristic “swollen” appearance. Usually in twos and threes; less frequently in small parties of six or eight. Feeds close to shore, in 1–2 fathoms. Average duration of dive $25\frac{1}{2}$ seconds (170 dives timed). (C. E. Alford.)

BREEDING-HABITS.—Haunts banks of wooded streams and lakes.

Nest.—In natural hole of tree or old Black Woodpecker's hole : will take readily to nesting-boxes. No nest-material except pale greyish down smaller than that of Goosander and Sheld-Duck (feather from nest, see *Br. Birds*, II, Pl. 2). *Eggs*.—7 to 15 : green with tinge of blue but never so blue as those of Barrow's Goldeneye. Average of 100 eggs, 61.7×44.8 . Max. : 68×43.7 and 61×47 . Min. : 57.6×44 and 62×41.1 mm. *Breeding-season*.—From mid-April in Germany to May and early June according to latitude in Scandinavia. *Incubation*.—By female alone. Period (in confinement) 20 days. Single brooded.

Food.—Almost entirely animal : mollusca, both fresh and salt water (*Limnæa peregra*, *L. stagnalis*, *Littorina littorea*, *Neritina fluvialis*, *Rissoa labiosa*, *Lacuna quadrifasciata*, *Physa*, *Montacuta*, etc.) ; small fish (including small trout and young eels) ; crustacea (*Idotea*, *Cypris*, sandhoppers, shrimps, small crabs, etc.) ; earth-worms ; insects, especially water-beetles (*Helophorus*, *Dytiscus*, etc.) and neuroptera larvæ (*Phryganeidae*) and larvæ of Odonata. Small quantities of algæ also recorded, and Thompson found seeds and remains of aquatic plants in birds from fresh water. Stomach of one from coast was full of corn.

DISTRIBUTION.—*British Isles*.—Passage-migrant and winter-visitor (mid-Sept.—mid-Nov. to end March—early June). Generally distributed round coasts, in estuaries, and less frequently in lakes and rivers. Frequently seen in summer in Scotland, but no proof of breeding.

DISTRIBUTION.—*Abroad*.—Northern Palæarctic region, breeding in arctic and subarctic portions, on migration and in winter south to Mediterranean and Caspian region, Mesopotamia, north India, China and Japan. Rare Iceland, casual Azores. Replaced by very closely-allied race in North America.

[NOTE.—An immature male Goldeneye shot on the Alde, Suffolk, Feb. 1, 1908, and thought to be a specimen of BARROW'S GOLDENEYE, *Bucephala islandica* (Gm.) (F. M. Ogilvie, *Bull. B.O.C.*, XXIII, p. 63), was afterwards shown to be *B. c. clangula* (W. R. Ogilvie-Grant, *op. c.*, XXXI, p. 18, *cf. Brit. B.*, VI, p. 272). Two adult males were also said to have been shot in Shetland, March 18, 1913 (*Brit. B.*, VII, p. 21).]

BUCEPHALA ALBEOLA

316. *Bucephala albeola* (L.)—THE BUFFEL-HEADED DUCK.

ANAS ALBEOLA Linnæus, *Syst. Nat.*, ed. x, i, p. 124 (1758—America. Typical locality ; Newfoundland).

Clangula albeola (Linnæus), Yarrell, IV, p. 442 : Saunders, p. 453.

Nyroca albeola (L.) Hand-List (1912), p. 142.

DESCRIPTION.—*Adult male*. *Winter and summer*.—Fore-part of crown, lores, part of cheeks and chin metallic-green, in some lights blue-green, tinged violet or reddish-purple ; hinder-crown, rest of neck, throat and fore-neck amethyst, in some lights violet or bronze-purple ; broad white band from back of eye encircling occiput ;

nape metallic blue-green, where bordering side of neck dull green with bronze sheen ; lower-neck encircled by a white collar ; mantle, inner and long scapulars, back and rump black ; short scapulars white, outer webs mostly narrowly edged black towards tip, some with inner web black ; upper tail-coverts and sides of rump light ash-grey (in some shading to white at tip) tail-coverts with darker shafts ; under-parts white, in some belly and vent suffused pale ash-brown ; lower flank-feathers narrowly bordered black on outer webs ; axillaries white marked dusky, some dusky-brown ; under wing-coverts white and dusky-brown ; tail mouse-grey ; primaries and outer secondaries black-brown paler on inner webs, some secondaries marked white, middle ones mostly white, innermost and their coverts black ; all primary-coverts and bastard-wing black-brown ; outer greater coverts black or black-brown, rest white ; median coverts white ; inner median and lesser coverts black-brown edged white. Very little material in moult examined.

Adult male. Eclipse.—(Not examined.)

Adult female. Winter and summer.—Head and neck all round, except nape, black-brown ; in some chin, throat, fore-neck and

The Buffel-headed Duck (*Bucephala albeola*). Adult male.

sides of neck lighter (sooty-brown rather than black-brown), feathers of fore-neck sometimes with ill-concealed white bases ; a white oblong or roundish patch (feathers sometimes tipped dusky) extends from below eye to nape ; nape sooty-brown or light brown shading to dusky black-brown of mantle and scapulars, in some scapulars and some feathers of mantle fringed brownish-grey ; back, rump and upper tail-coverts black-brown, lower upper tail-coverts dark ash-brown ; upper-breast ashy-white, feathers with long white fringes ; sides of body and flanks ash-grey or drab-grey (in some feathers narrowly tipped light buff), flank-feathers sometimes edged dark-grey on outer web ; lower-belly and vent ash-white, feathers tipped white ; feathers around tibia and under tail-

coverts drab-grey or ash-grey; remaining under-parts white; axillaries, under wing-coverts and tail as male; wing as male but wing-coverts black-brown, middle greater coverts in some with a spot of white on outer web or with both webs more or less white tipped black-brown, in others uniform black-brown. Very little moulting material examined.

Adult female. Eclipse.—(Not examined.)

Nestling.—Upper-parts, lores and crown to below eye dark bistre-brown, whitish bar across wing and patch on side of back and on side of rump; rest of cheeks, sides of neck, chin and throat white; upper-breast, sides of body and under tail-coverts greyish-brown or dusky-brown; under-parts greyish-white.

Juvenile. Male.—Apparently as adult female but larger and white patch on head usually larger. *Female.*—Apparently as adult

The Buffel-headed Duck. Adult female.

female, but white patch on sides of face smaller. Hardly any juveniles examined.

First winter and summer. Male.—Apparently assumes only a certain amount of adult plumage. One (March 31st, Tring Mus.) has white patch on head as in juvenile; some new blackish feathers on sides of neck and on crown and cheeks where they are glossed reddish-violet at tip; nape intermixed with new white feathers; a few new black feathers on mantle; lower-neck and upper-breast white and some new white feathers on sides of body and flanks. As in *B. c. clangula* there appears to be a partial first winter plumage; head and neck as in juvenile; some scapulars dark ash-grey with ash-white centres; upper tail-coverts ash-grey; new feathers of sides of body and flanks pale ash-grey, upper-breast intermixed with new white feathers; rest of plumage as juvenile in coloration but mantle and scapular feathers apparently freshly moulted in. Very little material examined. White feathers on nape, black feathers on mantle and white flank-feathers described in March bird are apparently only acquired by more advanced males.

Female.—Apparently not to be distinguished with certainty from adult.

Measurements and structure.—♂ wing 163–180 mm., tail 70–76, tarsus 30–33, bill from feathers 25–29 (12 measured). ♀ wing 150–163, bill 23–26. Primaries: 1st narrow, pointed and more than half longest primary-covert, 2nd and 3rd about equal and longest, 4th 5–9 mm. shorter, 5th 13–18 shorter, 6th 22–27 shorter; 2nd very slightly emarginated inner web, 3rd outer web. Innermost secondaries equal or shorter than 5th to 7th primaries. Bill much smaller than in *B. c. clangula* and nostrils nearer base of bill. Feathers of hinder-crown and nape elongated in adult male. Other structure as in *B. c. clangula*.

Soft parts.—Bill (ad. ♂) bluish-plumbeous, dusky on nail and at base, (ad. ♀) dusky inclining to plumbeous at end and along commissure; legs and feet (ad. ♂) pinkish or lilaceous-white, (ad. ♀) dilute lilac-pink, joints and webs darker; iris very dark brown.

CHARACTERS.—No subspecies. Adult male distinguished from other British ducks by small size, metallic blue-green and amethyst-purple head and neck, broad white band across occiput and pied plumage; females and juvenile male by small size, dark brown head and neck with oblong white patch on sides of head.

FIELD-CHARACTERS.—At distance male looks vivid black and white; female brownish, with white marks on head. Both sexes identified by large white patch from eye to nape. In adult drake this patch shows vividly, but in duck less distinctly, and without aid of glasses bird might be mistaken for female Harlequin, and possibly female Long-tailed Duck. Harlequin, however, has two distinct white patches between eyes and base of bill; whilst female Long-tail looks much larger and appears whiter at all seasons. Usually in flocks of 10 or 15. Dives in 1–2 fathoms. Average duration of dive exactly 23 seconds (181 dives timed). (C. E. Alford.)

BREEDING-HABITS.—Haunts wooded lakes and swamps with dead trees near water. *Nest*.—In natural hole in trunk of tree or old Woodpecker's hole, occasionally even in gopher burrow where no tree-site available. No nesting material except light grey down and a few feathers. *Eggs*.—Usually 7 or 8 but occasionally up to 10 or even 12, and sometimes as few as 2 only, perhaps second layings; colour creamy like old ivory, smooth and hard. Average of 24 eggs, 51.6×36.8. Max.: 55×37 and 51.4×37.7. Min.: 49.4×35.9 and 51×35.5 mm. *Breeding-season*.—Latter half May and early June; sometimes early May. *Incubation*.—By female. Period unknown. Single brooded.

FOOD.—Probably chiefly animal. Stark records small red worms; Hatch mussels, small fish fry, minnows, etc; Millais water-beetles and small freshwater snails. Saunders also includes leeches, grasses and aquatic plants, and shrimps.

DISTRIBUTION.—*Great Britain.*—Three. Adult male Yarmouth (Norfolk) about 1830 (*Birds Norfolk*, III, p. 222); one Bridlington (Yorks.) winter 1864–5 (Cordeaux, *Zool.*, 1865, p. 9659); female Tresco (Scilly Isles) Jan. 17, 1920 (H. Langton, *Bull. B.O.C.*, XL, p. 155). Others recorded, including two Aberdeen mentioned by Gray, not considered authentic (*cf. Fauna Tay Basin*, p. 243).

DISTRIBUTION.—*Abroad.*—North America, breeding as far north as the Yukon River, the lower Mackenzie and Great Slave Lake, and south to Montana, wintering from Aleutian Islands and British Columbia south to Lower California, Mexico and Florida. Casual in Hawaii, Greenland (twice), Newfoundland, Nova Scotia, Bermudas, Cuba, and Europe (Great Britain only).

Genus CLANGULA Leach.

CLANGULA Leach, Ross's Voy. of Discovery Baffins Land etc., App. p. XLVIII (1819—Monotype *Clangula glacialis* = *hyemalis*).

Bill shorter than head and shorter than tarsus, high at base, cutting edge of upper mandible ascending rapidly towards nail, which occupies whole tip of bill. Culmen straight, but nail slightly elevated. Nostrils close to feathers. Feathering advancing farthest on culmen, on sides of culmen forming straight line. Rectrices 14, exceptionally 16, tail strongly rounded, rectrices pointed, those of male greatly elongated. Sexes very different, summer and winter also. One species in arctic regions of northern hemisphere. Maritime Duck.

CLANGULA HYEMALIS

317. *Clangula hyemalis* (L.)—THE LONG-TAILED DUCK.

ANAS HYEMALIS Linnæus, Syst. Nat., ed. x, i, p. 126 (1758—N. Europe and America. Restricted typical locality; N. Sweden).

Harelda glacialis (Linnæus), Yarrell, iv, p. 446 : Saunders, p. 455.

DESCRIPTION.—*Adult male. Winter.*—Base of upper mandible and crown white, fore-part of crown more or less washed cream-buff; nape white; upper-mantle white (in some suffused palest grey); scapulars pallid mouse-grey, lower scapulars black-brown; sides of rump and lateral upper tail-coverts white, some tipped or with inner webs dusky-black; rest of upper-parts black or black-brown; lores, cheeks and eye-stripe drab-grey, round eye a circular white patch; sides of neck black-brown merging into snuff-brown; inter-cranial space dusky-brown; chin, throat, fore-neck and part of upper-breast white; rest of breast black-brown or dark sepia (feathers when fresh with faint white tips) with a convex outline sharply defining it from rest of under-parts which are white, sides of body and flanks suffused pallid mouse-grey; axillaries and under wing-coverts sepia; two central pairs of tail-feathers black-brown, shorter pair narrowly bordered white (sometimes with inner web or both webs more or less white), next pair more or less mouse-grey

edged white, remainder mostly white ; primaries and their coverts black-brown shading to hair-brown on inner webs ; secondaries hair-brown, outer webs tinged sepia which shades to warm sepia on inner secondaries, innermost black-brown with outer webs warm sepia ; greater coverts and bastard-wing black-brown or sepia ; median and lesser coverts black or brown-black, some lower median with faint warm sepia edges, some lesser, edged light sepia. This plumage is acquired by complete body-moult Aug. to Nov.

Adult male. Summer.—Feathers of head, neck, mantle, scapulars (sometimes some on back and rump), upper-breast and flanks are moulted Feb. to June but not rest of body-feathers (not brown area of breast), tail or wings. Sometimes many winter feathers are retained on head, neck, mantle, etc. Lores and cheeks as winter ; narrow line at base of upper mandible, fore-head, rest of

The Long-tailed Duck (*Clangula hyemalis*). Adult male, winter.

head and neck all round, and upper-breast black-brown or sepia ; feathers of upper-mantle and upper scapulars with triangular black centres and broad russet edges, long scapulars black-brown similarly edged (sometimes some edged white) ; rest of upper- and under-parts as winter, new flank-feathers suffused russet towards tip.

Adult male. Eclipse.—This plumage is acquired by a partial moult of head, neck, upper-mantle, scapulars, sides of body and flanks followed by wings and tail July and Aug. Some new black-brown feathers are acquired on crown and nape, also on upper-mantle, which with abrasion of russet edges of summer feathers causes upper-mantle to appear darker than in summer ; new scapulars brownish or sooty-brown, some uniform, others, especially longer ones, more or less shaded and broadly edged buff-brown ; sides of body and flanks with new drab feathers, drab-grey towards base ; rest of plumage that of worn summer. N.B.—Above description is of a male (E. L. Schiöler coll.) in a flightless condition with

tail-feathers worn but it is impossible to say whether the bird is fully adult or in its second year.

Adult female. Winter.—Fore-head dusky-brown, feathers with white bases (sometimes fore-head white); crown black-brown, feathers with ill-concealed white bases; nape white, sometimes some feathers tipped blackish; mantle and scapulars black-brown or sepia, feathers with russet, some with cinnamon-buff, edges; lower scapulars black-brown narrowly edged light buff; back, rump and upper tail-coverts black, feathers broadly tipped cinnamon-buff (back sometimes uniform); sides of rump white; upper tail-coverts black-brown (in some shaded cinnamon-buff and tipped greyish-white), outer webs of lateral ones white; lores and patch round eye white; whitish streak behind eye; on side of neck a patch of black-brown feathers with ill-concealed white bases and sometimes some tipped russet; chin, throat and rest of neck white, feathers of inter-crural space (and in some chin) dusky, those of throat sometimes tipped dusky; upper and sides of breast ash-brown, feathers suffused light cinnamon-buff towards tip; lower-breast ash-brown, feathers broadly fringed white; flanks white, sometimes suffused palest grey; rest of under-parts white; axillaries and under wing-coverts as male; central pair of tail-feathers black-brown faintly edged white, remainder more or less dusky-brown edged white, outer ones mostly white; wing as male but outer webs of secondaries (including innermost) usually not so richly coloured; greater coverts sepia or black-brown narrowly edged light or cinnamon-buff; median coverts black-brown or sepia tinged and with deep edges of cinnamon-buff and russet; coverts at bend of wing and lesser coverts brown-black. This plumage is acquired by complete moult July to Nov.

Adult female. Summer.—Some feathers of head, neck, mantle, scapulars, sometimes some of back and rump, some upper tail-coverts, upper-breast, some feathers of sides of body and flanks are moulted April and May but not rest of body-feathers, tail or wings. Fore-head and crown as winter; lores, and patch in front of eye continuous with patch on side of neck sepia or black-brown; chin and throat dusky-brown, feathers with ill-concealed white bases; patch round eye, streak behind eye and patch on sides of lower-neck whitish, feathers mostly tipped dusky; centre of nape sooty-brown; upper-mantle and scapulars brown-black, feathers of mantle with narrower edges of cinnamon-buff or russet (scapulars edged cinnamon-buff), whole tone of upper-parts darker and duller than in winter; upper and sides of breast hair-brown, feathers fringed yellowish-white or light greyish-olive; rest of body, tail and wings as winter. Upper-parts and wing-coverts become abraded and faded in late summer.

Adult female. Eclipse.—Examination of scanty material available reveals existence of traces of an eclipse plumage as in male but more material is required before anything more definite can be said.

Nestling.—Crown, cheeks, all upper-parts, sides of body and thighs black-brown, down with golden-brown tips ; (upper-parts with no light patches) ; cream spot on lores ; small white patch below and in some above eye ; small white streak (absent in some) extending from behind eye towards nape ; upper-breast dusky-brown ; remaining under-parts greyish-white, down with dusky-brown bases.

Juvenile. Male and female.—Easily distinguished from adult female by more uniform mantle, back and rump, feathers having no russet edges, and scapulars sepia shading to buff-brown at edge. Fore-head and crown black-brown ; nape and lower-neck drab ; upper-mantle drab or sooty-brown, feathers sometimes edged buff-brown ; scapulars sepia shading to buff-brown at edge and broadly tipped same ; rest of mantle, lower scapulars, back, rump, and central upper tail-coverts sooty-brown or brown-black (sometimes feathers edged buff-brown) ; sides of rump and lateral upper tail-coverts ashy-white, feathers tipped brown ; whitish patch usually on lores and another below eye ; streak above and behind eye more or less white, feathers tipped dusky ; cheeks, upper-part of sides of neck, chin, throat and fore-neck drab-brown, rest of side of neck white, in some suffused pale drab ; upper-breast pale drab-grey or sooty-brown, feathers edged buff ; sides of body and flanks pale drab-grey, feathers with buff-brown tips and faint dusky terminal lines ; remaining under-parts white, feathers when fresh with faint terminal dusky lines ; tail-feathers sepia narrowly edged white, outer ones dusky-brown (in some more or less whitish), broader than in adult and with square, instead of pointed, tips ; wing as in adult male but secondaries including innermost, light sepia or hair-brown (not rich warm sepia), innermost shorter than in adult and with rounded, instead of pointed, tips ; wing-coverts black-brown or sepia, greater and a few median tipped buff-brown.

First winter. Male.—A certain amount of grey plumage like that of adult winter is acquired but first winter males always distinguishable by retained juvenile body-feathers, and worn juvenile tail and wings. Crown, nape and upper-mantle as adult winter male, but intermixed with worn juvenile feathers ; juvenile scapulars intermixed with new pale grey ones, in some suffused russet at tip (long scapulars sometimes blackish-grey, outer webs bordered russet, inner white), longer ones usually shorter and less tapering than in adult ; new upper tail-coverts as adult ; remaining upper-parts as juvenile ; lores and cheeks white (in some drab-grey) intermixed with dusky-brown feathers ; patch on sides of neck black-brown, feathers with imperfectly concealed white bases ; chin dusky-brown (in some white) ; throat white intermixed sometimes with dusky-brown worn juvenile feathers ; upper-breast more or less intermixed with new black-brown or sepia feathers with white bases and in some tipped white ; new flank-feathers as adult ; remaining under-parts, tail and wings as juvenile ; occasionally two central pair of tail-feathers are moulted, new central

pair as in adult male but much shorter, next pair black-brown edged white and pointed at tip but not long and tapering as in adult. Some feathers of head, neck, mantle, scapulars, rump, tail-coverts, upper-breast and flanks but not rest of body-feathers, not usually tail (very occasionally one or two central pairs) and not wings, are moulted Oct. to March. N.B.—Amount of 1st winter plumage assumed varies considerably individually; birds occur in Feb. still in full juvenile plumage with no signs of moult.

First summer. Male.—This plumage is acquired by a partial moult of head, neck, mantle, scapulars (in some back and rump), upper tail-coverts, upper-breast, sides of body and flanks from March to June but not rest of breast, belly, vent or under tail-coverts, not tail or wings. Sometimes few, if any, first summer feathers are acquired. Most advanced males have crown, nape, cheeks, and sides of neck as adult summer male; chin and throat sooty-brown, feathers with broad white imperfectly concealed bases and intermixed with worn white feathers; new feathers of mantle, scapulars, back, rump and upper tail-coverts as in adult but new long scapulars shorter; upper-parts usually intermixed with feathers of juvenile or 1st winter; new feathers of upper-breast black-brown, sometimes with imperfectly concealed white bases, breast never apparently so extensively black-brown as in adult male; feathers of sides of body and flanks as 1st winter; rest of under-parts as juvenile; tail and wing as juvenile, occasionally two central pairs of tail-feathers new (see 1st winter plumage).

First eclipse. Male.—(Not examined.)

Second winter and summer. Male.—As adult, but long pair of central tail-feathers considerably shorter.

First winter. Female.—Like juvenile, but easily distinguished by broad grey edges to scapulars. Head and neck as adult; new feathers of upper-mantle black-brown edged at sides light grey; new scapulars with sepia or black-brown centres, more or less concealed by broad grey edges (in some an odd scapular suffused russet towards tip); new feathers at sides of upper-breast with paler dusky centres and pale grey tips, those of rest of upper-breast white; new feathers of sides of body and flanks white, in some suffused palest grey; rest of body-plumage, tail and wing as in juvenile. Most feathers of head, neck, mantle and scapulars, some upper tail-coverts, some feathers of upper-breast, sides of body and flanks, but apparently not back and rump and not rest of under-parts, tail or wings are moulted Oct. to March. N.B.—Moult into first winter is often very partial.

First summer. Female.—Easily distinguished from adult summer female by retained juvenile body-feathers, worn juvenile tail and wings and darker upper-parts with hardly any indication of cinnamon-buff edges. In some many feathers of upper-parts, including back, rump and upper tail-coverts, head, lower-neck, sides of body and flanks, but not tail or wings are moulted April and May. As in male, birds in moult occur from Oct. to June and

it is impossible to separate the moult into 1st winter plumage from that into 1st summer. Like 1st winter but nape, sides of neck, throat and lower-neck intermixed with black-brown feathers with whitish bases; new feathers of mantle and scapulars black-brown with dusky-brown bases, some scapulars bordered buff-brown on outer web; rest of plumage as in 1st winter, wings and tail as juvenile.

Second winter. Female.—Birds with feathers of upper-mantle with one or both webs at sides more or less pale grey tipped cinnamon-buff and scapulars with grey not russet edges (some scapulars are shaded russet centrally) may be second winter females, but more material is required to make certain. The same differences apply to a possible second summer plumage.

Measurements and structure.—♂ wing 219–236 mm., tail 199–246, tarsus 32–35, bill from feathers 26–29 (12 measured). ♀ wing 202–210, bill 23–28. Primaries: 1st narrow, pointed and more than half longest primary-covert, 2nd and 3rd usually equal and longest, 2nd sometimes 3–4 mm. shorter, 4th 9–13 shorter, 5th 21–30 shorter, 6th 35–45 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries of moderate length, pointed at tip and shorter than 6th or 7th primary. Scapulars long, tapering to a point, almost reaching 4th primary; shorter in summer plumage; short and with square or slightly rounded tips in eclipse. Tail with 14 feathers, in adult ♂ central pair long and tapering exceeding next pair by 70–130 mm., next pair usually long and tapering but varying in shape and length individually but considerably exceeding rest, which are pointed and gradually decrease in length to outermost. Bill small, much shorter than head, about same height and breadth at base, gradually depressed and narrowed towards end, which is rounded; nail large and decurved; cutting edge of upper mandible with basal half nearly straight then suddenly rising to nail; feathering at base of bill forming a nearly straight oblique line advancing furthest forward on fore-head and with hardly any re-entrant angle.

Soft parts.—Bill (ad. ♂) basal half black, terminal portion orange-yellow, nail bluish-grey, (ad. ♀) greyish-black, (juv. ♂) blue-grey; legs and feet (ad. ♂) light bluish-grey, webs dusky, claws black, (ad. ♀) greenish-grey, webs dusky, (juv. ♂) pale grey, webs nearly black; iris (ad. ♂) bright carmine, (ad. ♀) yellow, (juv. ♂) brown.

CHARACTERS.—No subspecies. Distinguished in all plumages by small bill and brown speculum.

FIELD-CHARACTERS.—Drake easily identified. Though generally supposed to carry tail erect—i.e. perpendicular—when on surface, have watched many individuals swimming with tail horizontal, and even dragging in water, when quite undisturbed. Plumage of duck varies considerably at all seasons, and may be confused with females of Harlequin and Buffel-head, as explained under those species.

Usually keeps well away from shore. Most noisy of all sea-ducks, its curious guttural call, constantly repeated and audible from far out at sea, betraying its identity even before bird itself becomes visible. Duration of dive usually from 30–40 seconds. (C. E. Alford.)

BREEDING-HABITS.—Breeds on islets in lakes, or near shores of lakes and rivers. *Nest.*—Sheltered by heather or low bushes and growing vegetation, lined with small-sized light-centred dark down (feathers from nest, see *Brit. Birds*, II, Pl. 2). *Eggs.*—Usually 6–8, occasionally 9 to 10, greenish-grey or light greyish-olive. Average of 130 eggs, 53.3×38 . Max.: 59.5×40 and 57.5×40.5 . Min.: 47.2×35 and 48.3×34.8 mm. *Breeding-season.*—Early June to July. *Incubation.*—By female only. Period said to last $3\frac{1}{2}$ weeks. Single brooded.

FOOD.—Mainly animal; especially mollusca (*Cardium*, *Buccinum*, *Lacuna*, *Tellina*, *Patella*, *Mytilus*, *Cyclope*, *Littorina*, etc.); also crustacea (shrimps, small crabs, sandhoppers, etc.), pteropoda, and some vegetable matter (algæ, roots, mosses, etc.), and occasionally grain from wrecks. In summer freshwater insects and their larvæ, including diptera (*Chironomidæ*, etc.), hemiptera (*Corixa*). Small red worms also recorded.

DISTRIBUTION.—*British Isles.*—Winter-visitor (end Sept.—end Oct. to March-May, occasionally summer, and possibly a few resident). Regular visitor east coast Great Britain, occasional south and west coasts England and Wales. On most of west side Scotland and in Hebrides as well as Orkneys and Shetlands very common. In Ireland somewhat irregular, and chiefly visits north and west coasts. On inland waters rare vagrant. Eggs apparently of this species taken several times Shetlands; breeding reported and eggs taken summer 1911, Orkneys (O. V. Aplin, *Zool.*, 1911, p. 432; cf. *Brit. B.*, v, p. 203; VI, pp. 128, 199, 263; VII, p. 205), and some evidence of previous nesting Orkneys.

DISTRIBUTION.—*Abroad.*—Northern Hemisphere. Breeding in arctic regions (in Europe, Iceland, Færoes, Spitsbergen, N. Scandinavia, N. Russia and adjacent islands, also N. Asia and N. America), wintering further southwards to Black and Caspian Seas, and (in small numbers) Mediterranean, in Asia to Lake Baikal, Japan, China, in America in northern United States and on Great Lakes, and as far south as Gulf of Mexico. Casual Azores, Madeira and Switzerland.

Genus HISTRIONICUS Less.

HISTRIONICUS Lesson, Manuel d'Orn. II, p. 415 (1828—Type expressly mentioned "*Anas histrionica* L.").

Bill about half as long as head, shorter than tarsus, very narrow, much tapering towards tip. Nail occupying entire tip of bill and extending far back on culmen, often without distinct

demarcation-line. Nostrils in basal half of bill. Tail rather long, much graduated and pointed, 14 rectrices. Sexes very different. One species.

HISTRIONICUS HISTRIONICUS

318. *Histrionicus histrionicus histrionicus* (L.)—THE HARLEQUIN-DUCK.

ANAS HISTRIONICA Linnæus, Syst. Nat., ed. x, i, p. 127 (1758—America. Typical locality ; Newfoundland).

Cosmonetta histrionica (Linnæus), Yarrell, iv, p. 452 : Saunders, p. 457.

DESCRIPTION.—*Adult male. Winter and summer.*—A band of black glossed deep blue from base of upper mandible along centre of crown to nape ; triangular white or cream patch on lores (outlined with blackish-plumbeous at side next eye) extending on to fore-head and continued on crown as narrow streak running parallel

The Harlequin-Duck (*Histrionicus h. histrionicus*). Adult male.

for a short way with black mesial band ; from fore-head to nape on either side of black mesial band, a cinnamon-rufous streak ; narrow white streak under eye, often ill-defined ; small white auricular spot, and on sides of neck an oval white patch, both usually outlined blackish-plumbeous ; chin and throat blackish-plumbeous, rest of head and neck dark plumbeous ; narrow white collar outlined black encircles lower-neck, in some incomplete on breast, broadest on upper-mantle where it almost meets ; from side of upper-mantle to upper-breast patch of white broadly outlined black ; mantle and upper scapulars dark plumbeous, feathers with olive-brown bases sometimes imperfectly concealed ; rest of scapulars more or less white bordered or tipped dark plumbeous, lower ones dark greyish-plumbeous ; feathers of back and rump olive-brown shaded plum-

beous towards tip ; rump and upper tail-coverts plumbeous-black ; on either side of rump at base of tail small white spot ; upper-breast dark plumbeous, sides of lower-belly and flanks chestnut (sometimes some flank-feathers vermiculated black-brown) ; feathers of rest of breast, belly and vent hair-brown edged dark plumbeous ; under tail-coverts plumbeous-black ; axillaries and under wing-coverts hair-brown, coverts edged dark plumbeous ; tail black or black-brown, usually with grey bloom ; primaries and coverts dark brown, paler on inner webs ; secondaries dark brown all except first three with outer webs steel-blue, in some lights violet-purple, two innermost next speculum white bordered black on outer web, inner web more or less dark greyish-plumbeous ; rest dark greyish-plumbeous, one usually with a white streak along shaft ; bastard-wing and rest of primary-coverts sooty-brown edged plumbeous ; greater coverts sooty-brown, some central ones with broad white mark or band towards tip preceded by band of steel-blue or violet-purple, innermost dark greyish-plumbeous ; median and lesser coverts as mantle, sometimes one or two median coverts with a round or oval white patch towards tip. This plumage is acquired by a moult of body-feathers and innermost secondaries but apparently not tail, from Sept. onwards.

Adult male. Eclipse.—The body-feathers are first moulted, followed by wings and tail July to Dec. (sometimes some winter-summer feathers are retained). Might be confused with 1st winter male, but has under-parts hair-brown. Fore-head, crown, nape and sides of neck sooty-black or sooty-brown, feathers of centre of crown and sides of neck tipped blackish-plumbeous ; feathers of white loreal patch, patch under eye and auricular patch, tipped dusky ; oval white patch on side of neck, white collar and patch across shoulder absent ; rest of upper-parts sooty-brown or brown-black, feathers more or less tipped dark plumbeous ; scapulars mostly sooty-brown tinged blackish-plumbeous ; chin whitish, feathers tipped dusky ; throat and fore-neck sooty-brown, in some tipped blackish-plumbeous, feathers with imperfectly concealed ash-brown bases ; sides of body, flanks and under tail-coverts hair-brown or sooty-brown, in some tipped olive-brown, sometimes some feathers of sides of body and flanks suffused chestnut towards tip and vermiculated black-brown ; rest of under-parts hair-brown, feathers with imperfectly concealed light bases, in some more or less tipped blackish-plumbeous ; new innermost secondaries not so broad at tip as in winter-summer and white of outer web bordered brown-black all round.

Adult female. Eclipse.—Upper-part of lores and chin dusky-brown, small white patch on either side of fore-head above eye, large one below eye, another on auricular region, feathers of all mostly tipped dusky ; throat and fore-neck drab-brown or hair-brown, feathers of fore-neck bordering upper-breast tipped golden-brown ; rest of head, neck and upper-parts sepia or black-brown ; feathers of mantle, back and rump edged blackish-plumbeous when

fresh, scapulars warmer sepia edged buff-brown or cinnamon-brown, lower scapulars edged blackish-plumbeous; upper tail-coverts sepia or blackish-plumbeous edged cinnamon-brown; upper-breast, sides of body, flanks, vent and under tail-coverts sepia or drab-brown, tinged buff-brown at tips of feathers; flanks and under tail-coverts in some edged cinnamon-brown; feathers of rest of breast and belly whitish more or less mottled, tipped or barred hair-brown or drab-brown; axillaries and under wing-coverts sepia, some coverts sometimes tipped white; tail black-brown or sepia; primaries, secondaries and bastard-wing black-brown with blackish-plumbeous gloss, inner webs paler shading to dusky-brown; wing-coverts black-brown shading to blackish-plumbeous at tip, one or two greater coverts occasionally with brownish-white spot towards tip. This plumage is acquired by complete moult July to Dec.

The Harlequin-Duck. Adult female.

Adult female. Summer.—The body-feathers appear to be more or less completely moulted, but not tail or wings, April and May. Very like eclipse but upper-parts lacking sepia tone and more approaching clove-brown, feathers narrowly edged plumbeous olive-grey.

Nestling.—Crown to below eye and centre of nape and whole of upper-parts, sides of body and uropygial tuft black-brown, long down-filaments tinged buff-brown; small white patch from front of eye to fore-head, another on lores and one below eye; small brownish-white spot on wing and another on side of back behind wing, both somewhat indistinct; white spot on either side of centre of back above thigh not always well-defined; rest of under-parts white tinged greyish on throat and sides of body.

Juvenile. Male and female.—Like adult female eclipse but upper-parts lighter, more olive-brown, wing-coverts blackish olive-brown, instead of black-brown shading to blackish-plumbeous. Nape and scapulars olive-brown; upper tail-coverts olive-brown shading to buff-brown; crown and mantle sepia, feathers shading to olive-brown or buff-brown at tip; back and rump blackish olive-brown; lores dusky-brown; patch above eye, another below eye

(which does not usually extend on to lores) and small one on auricular region white ; sides of neck light sepia or olive-brown ; chin and throat dusky-brown ; sides of body, vent and under tail-coverts pale ash-brown or hair-brown, feathers tipped buff-white or buff-brown ; flanks hair-brown shading to buff-brown ; feathers of upper-breast ash-brown with broad subterminal drab-brown bars and fringed white or buff ; remaining under-parts ashy-white, feathers mostly with subterminal dusky-brown bars ; tail-feathers as adult female but with square tips and shafts projecting ; wing as adult female but primaries and secondaries duller and browner with less blackish-plumbeous gloss ; innermost secondaries shorter

The Harlequin-Duck. Tips of tail feathers : on left of juvenile with down adhering, in centre same with down detached, on right of adult.

and narrower and wing-coverts blackish olive-brown ; in some edged dark buff-brown.

First winter. Male.—Traces of a first winter plumage are acquired ; scapulars dark plumbeous with no white, feathers of sides of body and flanks dark plumbeous with drab-brown bases, some flank-feathers suffused chestnut towards tip ; head duller than in first summer, central streak dark plumbeous, no cinnamon-rufous on crown, area around and behind eye bordering crown, and nape olive-brown tinged plumbeous ; chin and throat olive-brown tinged blackish-plumbeous ; sides of neck as in first summer but duller. N.B.—Whether feathers of head are subsequently moulted in assumption of first summer or whether in some they are retained, I am unable to decide owing to lack of material.

First summer. Male.—Easily distinguished from adult by duller upper-parts, retained juvenile feathers of breast and belly and dull speculum. Feathers of white patch at base of upper mandible and white streak on crown more or less tipped dusky-brown ; a small white patch below eye, feathers tipped dusky and a white patch on auricular region as in adult ; median blue-black band along crown duller ; cinnamon-rufous streak ill-defined or absent ; head and neck all round usually duller plumbeous than in adult ; oval white patch on sides of neck smaller, feathers tipped

dusky ; white collar absent or incomplete, in some merely indicated at sides of neck and much narrower than in adult ; new mantle feathers as in adult, scapulars with less white ; back and rump as in juvenile ; new upper tail-coverts and small white patch at root of tail as in adult ; horizontal patch of white across shoulder usually narrower and often ill-defined ; new feathers of under-parts and tail as in adult ; wing as juvenile but sometimes new innermost secondaries and median coverts as adult are acquired (innermost secondaries as in adult eclipse). Most feathers of head and neck, some of mantle, scapulars, and upper tail-coverts, some of upper-breast, sides of body and flanks and under tail-coverts, in some all tail-feathers or central pair only, sometimes not tail, sometimes innermost secondaries and occasionally some median coverts are moulted from Oct. onwards. Only very forward birds fully acquire this plumage.

First eclipse. Male.—As adult eclipse and only to be distinguished when some juvenile body-feathers are retained on under-parts or by juvenile wing, when not moulted.

First winter. Female.—Feathers of head and neck, some of mantle, scapulars, occasionally an upper tail-covert, in some a few feathers of upper-breast, sides of body and flanks, sometimes some under tail-coverts, some or all tail-feathers are moulted from Oct. onwards, but not apparently back and rump, lower-breast, belly or vent and not wings in material examined. New body-feathers and tail as adult eclipse female ; owing to presence of retained juvenile feathers upper-parts are browner, with less blackish-plumbeous sheen than in adult female ; lower-breast, belly and vent as juvenile ; wing as juvenile but innermost secondaries shorter and narrower and wing-coverts browner.

First summer. Female.—Some birds may acquire a few feathers of summer dress, but all those examined had still retained juvenile lower-breast and belly ; one (22/6/17, Schiöler coll.) was in full body-moult into 1st eclipse but still had some retained juvenile feathers on breast and belly, wing considerably worn and abraded.

Measurements and structure.—♂ wing 200–209 mm., tail 88–107, tarsus 34–37, bill from feathers 25–28 (12 measured). ♀ wing 190–197, bill 24–26. Primaries : 1st narrow, pointed and about three-fourths longest primary-covert, 2nd and 3rd about equal and longest, 4th 6–8 mm. shorter, 5th 17–20 shorter, 6th 29–35 shorter ; 3rd and 4th emarginated outer and 2nd very slightly inner, webs. Innermost secondaries short, longest shorter than 8th primary, tips slightly pointed. Scapulars of medium length and tapering to a point, in eclipse plumage with square or slightly rounded tips. Tail graduated, pointed, rather long, 14 stiff tapering feathers. Bill shorter than head, tapering, of nearly same height and breadth at base, frontal angle short and blunt, dorsal line straight and sloping to middle then nearly straight, at end decurved, nail large ; a slight membranous lobe at edges of maxilla overhanging rictus ; lamellæ entirely hidden.

Soft parts.—Bill (♂ ad.) bluish lead-grey, nail paler, (♀ ad.) duller; legs and feet (♂ ad.) pale bluish, webs dusky, claws whitish, (♀ ad.) dull bluish-grey; iris (ad. ♂) reddish-brown, (ad. ♀) brown.

CHARACTERS AND ALLIED FORMS.—*H. h. pacificus* (N.E. Siberia to western N. America) has stronger bill, higher at base and usually broader, but females cannot always be distinguished with certainty. Dark plumbeous upper-parts, head and body with numerous white patches and steel-blue speculum distinguish adult males, brown of adult female and juveniles with white marks on head and small size distinguish them from other British ducks.

FIELD-CHARACTERS.—Drake easily identified; vivid white streaks on neck and breast, and chestnut flanks, showing conspicuously even in poor light. Duck easily confused with females of Long-tailed and Buffel-headed Ducks. From these it may be distinguished by having two distinct white patches between eyes and base of bill. Apart from plumage, following points are aids: shortness of bill (equally noticeable, however, in Long-tailed Duck), extreme buoyancy, habit of keeping apart from other species, and—most characteristic—manner of swimming, either so closely abreast that flank of each individual touches that of its neighbour, or in step-like formation, manœuvre executed with wonderful precision and at once distinguishes species. Always in small parties, seldom exceeding eight individuals. Frequently utters low piping whistle when feeding or about to take wing. Dives in about two fathoms and has its favourite feeding-grounds, usually off end of particular ledge of rock. Duration of dive seldom exceeds 28 seconds. (C. E. Alford.)

BREEDING-HABITS.—Somewhat sociable, several pairs nesting together. *Nest*.—Usually on island in stream, in hollow, sheltered under brushwood, rocks, etc., and lined with greyish down. *Eggs*.—5 to 10, smooth, creamy or cinnamon-buff. Average of 60 eggs, 57.6×41.7 . Max.: 61×42.5 and 59×44 . Min.: 52×39 and 54×38.7 mm. *Breeding-season*.—Rather late, from mid-June to mid-July in Iceland. *Incubation*.—By female only. Period stated as $3\frac{1}{2}$ weeks. Single brooded.

FOOD.—In Iceland mainly larvæ of Ephemeridæ and Phryganeidæ during summer; also mollusca (*Littorina*), crustacea and spawn. Millais also records worms, small fish, insects. Faber mentions *Nerita* and *Cancer pulex*. In Alaska mussels (*Mytilus edulis*).

DISTRIBUTION.—*Great Britain*.—Very rare vagrant. Male found dead Filey (Yorks.) autumn 1862. Two young males obtained, out of three seen, Farne Isles (Northumberland) Dec. 2, 1886 (J. G. Tuck, *Zool.*, 1887, p. 70, H. Saunders, *P.Z.S.*, 1887, p. 319), a third obtained (G. Bolam, *Birds Northumberland*, etc., p. 401) is an adult male and date of its capture is rather uncertain (W. Percy *in litt.*). Has possibly occurred Scotland, while others recorded are doubtfully authentic (Saunders, p. 457).

DISTRIBUTION.—*Abroad.*—Northern Hemisphere, breeding in Iceland and Greenland (according to Sabanaëff in the Ural and government of Yaroslav), also in north-eastern N. America. In winter south to Lake Baikal and middle United States of America. Casual in Scandinavia, north Russia, Germany, Switzerland, Tyrol, Italy. Replaced by very closely allied subspecies in north-east Siberia to Pribilof and Aleutian Isles and western N. America, wintering to Japan and in America to California.

Genus POLYSTICTA Eyt.

POLYSTICTA Eyton, Cat. Brit. B., p. 58 (1836—Monotype *P. stelleri*).*

In style of coloration more like *Somateria*, but bill entirely different. Nail as in *Histrionicus*, also ill-defined, but bill longer than in latter, at least as long as tarsus, almost of equal width, not tapering. Cutting edge of upper mandible not straight and distal half with soft-skinned edge, in dried skins generally folded inwards. Tail also 14 rectrices. In male feathers of head shorter and somewhat scale-like, on nape a brush-like sort of crest. Inner secondaries in male greatly modified. Sexes very different. One species, arctic regions of Northern Hemisphere.

POLYSTICTA STELLERI

319. *Polysticta stelleri* (Pall.)—STELLER'S EIDER.

ANAS STELLERI Pallas, Spicilegia Zool., fasc. vi, p. 35, pl. 5 (1769—Kamtschatka).

Somateria stelleri (Pallas), Yarrell, iv, p. 468: Saunders, p. 463.

DESCRIPTION.—*Adult male. Winter and summer.*—Head and upper-neck silky-white; across hinder-crown patch of light emerald-green with small black patch glossed violet-purple on either side; lores and fore-head more or less suffused pale emerald-green; irregular black patch round eye; chin, throat, collar encircling lower-neck, centre of upper-mantle, rest of mantle, back, rump and upper tail-coverts black more or less glossed violet-purple or blue-black, chin and throat in some duller; sides of upper-mantle white, some feathers bordering centre of mantle vermiculated blackish or with inner webs more or less black; short upper scapulars mostly white, some with inner webs more or less black, some with violet-purple shaft-streaks, long tapering ones with broad outer web violet-purple, in some lights sapphire-blue, narrow inner web white, lower scapulars sepia or ash-brown more or less glossed violet-purple with irregular white shaft-streaks, and narrowly edged white, some with one web more or less white; below black collar, fore-neck encircled by narrow white collar continuous with sides of upper-mantle; upper-breast cinnamon-buff deepening to orange-cinnamon

* Frequently *Polysticta* has been rejected on account of the prior *Polisticta* 1836, but American authors accept it, though they reject *Bucephala* because of the older name *Bucephalus*!

and tawny on lower-breast ; a purplish-black patch on sides of breast ; sides of body and flanks cinnamon-buff shading to light buff ; centre of breast sepia shading to black-brown on belly, vent and under tail-coverts ; axillaries and under wing-coverts white ; tail-feathers sepia, when fresh glossed violet-purple or blue-black, outermost pair in some with small white mark towards tip ; primaries sepia shading to black-brown on outer webs and tips, inner primaries sometimes edged white ; secondaries sepia with broad white tips, paler and shading to white on inner webs, all except outer one with outer webs glossed violet-purple or sapphire-blue, innermost with inner webs mostly white and with white shaft-streaks ; primary-coverts sepia ; bastard-wing and rest of primary-coverts sepia more or less edged white, rest of wing-coverts white. Very little moulting material examined. N.B.—There is considerable individual variation in colour of under-parts. *Eclipse*.—(Not examined.)

Adult female. Winter and summer.—Crown and nape dark sepia or black-brown, feathers with more or less concealed pink-buff

Steller's Eider (*Polysticta stelleri*).—A. Adult female.

B. Adult male bill from below.

bars ; mantle, back and rump brown-black more or less barred pink-cinnamon, feathers of mantle edged same ; scapulars black-brown narrowly edged cinnamon-brown, lower ones with outer webs glossed blue-black ; upper tail-coverts brown-black narrowly edged cinnamon-brown ; lores, cheeks and sides of neck pink-buff, feathers tipped and barred sepia ; chin, throat and fore-neck paler, feathers more or less barred and tipped dusky and with whitish bases imperfectly concealed ; feathers of upper-breast with broad brown-black V-shaped marks and bars and broad tawny fringes ; sides of body and flanks sepia or black-brown, feathers edged tawny and with occasional pink-buff bars ; rest of breast, belly, vent and under tail-coverts warm sepia or brown-black, feathers sometimes more or less edged tawny ; axillaries, under wing-coverts and tail as male but coverts at edge and bend of wing with sepia centres and

edged white; tail apparently without gloss; wing as male but speculum less developed, outer secondaries sepia with no steel-blue gloss, innermost secondaries with inner webs sepia and more or less frosted with silvery-grey towards tip or with shaft-streaks of same; greater coverts sepia, middle ones (in some outer ones) tipped white and sometimes with a terminal sepia marking; median and inner greater coverts sepia or black-brown more or less faintly edged cinnamon-brown; lesser coverts same but edged or barred buff. *Eclipse*.—(Not examined.)

Nestling.—Upper-parts and sides of body dark brown; lores lighter; line above and below eye whitish, behind eye a narrow buff-white line; under-parts grey-brown, darker on sides of face, fore-neck and under tail-coverts, lighter on chin; frontal and loreal feathering as in adult.

Juvenile. Male and female.—Like adult female but upper-parts with narrower and paler edges, under-parts much lighter. Crown sepia, feathers more or less barred and tipped light buff; nape dark ash-brown; rest of upper-parts black-brown, feathers narrowly tipped buff, some with terminal black-brown tips; sides of face and neck, chin, throat and fore-neck buff; feathers more or less spotted and tipped dusky-brown and with ill-concealed ash-white bases; rest of under-parts ash-white, feathers with broad subterminal sepia bars and edged cinnamon-buff or pink-cinnamon, in some with narrow terminal dusky lines; tail as in adult; wing as in adult female but violet-purple speculum ill-defined, outer and most of middle secondaries (in some all) black-brown or sepia lacking violet-purple gloss, secondaries with much narrower white tips than in adult female and innermost without or with only an indication of, silvery-grey shaft-streaks; greater coverts with narrower white tips; median and lesser as in adult but with light or warm buff edges.

First winter. Female.—(Male not examined.) Apparently like adult female but nape as juvenile but apparently darker, new feathers of mantle as juvenile but more broadly edged pink-buff; new upper tail-coverts brown-black; fore-neck as juvenile; wing as juvenile. Feathers of head, mantle, scapulars, rump and upper tail-coverts and all under-parts, tail but not wings, are moulted in autumn and winter. N.B.—In the one bird examined (Nov.) feathers of neck all round appeared to be those of juvenile but doubtless would be renewed eventually.

Measurements and structure.—♂ wing 209–217 mm., tail 80–90, tarsus 34–37, bill from feathers 36–40 (12 measured). ♀ wing 210–215, bill 37–40. Primaries: 1st narrow, pointed and little more than half longest primary-covert, 2nd longest, 3rd equal or 2–5 mm. shorter, 4th 8–12 shorter, 5th 19–25 shorter, 6th 30–36 shorter; 3rd emarginated outer, 2nd slightly inner webs. Innermost secondaries only slightly longer than secondaries, falcate or sickle-shaped in both sexes but not in juvenile, longest shorter than 7th or 8th primaries. Scapulars long, tapering and falcate in male. Tail

cuneate with 14 stiff, pointed feathers. Bill slightly higher than broad at base, compressed and tapering towards tip (which is not decurved) with a broad depressed and indistinctly defined nail; maxillary tomium convex basally and sinuated terminally, edges of maxilla turned inwards against, and partially enclosing, lower mandible. Feathers of head in male soft and silky, those on hinder-crown slightly elongated to form a tuft.

Soft parts.—Bill (ad. ♂) blue-grey, (ad. ♀) dusky-blue; legs and feet (ad. ♂) blue-grey, claws yellowish-grey, (ad. ♀) dusky-olive; iris dark brown.

CHARACTERS.—No subspecies. Adults distinguished by violet-purple or sapphire-blue speculum bordered above and below with white, and falcate innermost secondaries; in all plumages shape of bill (see structure) and absence of frontal angles are good diagnostic characters.

BREEDING-HABITS.—Little definite recorded. Breeds in hollow in moss and grass of tundra. *Nest*.—Sometimes concealed by overhanging grass of tussocks or deep cup in moss, well lined with down, which is dark sooty-brown. *Eggs*.—6 to 9, pale greenish-grey. Average size of 22 eggs, 61.4×41 . Max. : 65×42.5 . Min. : 55.5×40.5 and 62.5×38 mm. *Breeding-season*.—End June in Alaska but early July on the Boganida. *Incubation*.—By female. Period not ascertained. Single brooded.

FOOD.—Almost entirely animal; chiefly mollusca (*Littorina*, *Lacuna*, *Trophon*, *Margarita*, *Pleustes*, *Anonyx*, *Podocerus*, *Buccinum*, *Mytilus*, etc.), and crustacea (Gammaridæ, crabs, etc.). Millais also includes fish-spawn, young fish, and possibly some vegetable matter.

DISTRIBUTION.—*England*.—Two. Nearly adult male Caistor (Norfolk) Feb. 10, 1830 (Yarrell, *Proc. Z. Soc.*, 1831, p. 35). Young male off Filey Brigg (Yorks.) Aug. 15, 1845 (R. J. Bell, *Zool.*, 1846, p. 1249).

DISTRIBUTION.—*Abroad*.—Arctic and sub-arctic coasts of Northern Hemisphere, breeding in arctic regions (erroneously stated to have nested on Varanger Fjord, east of North Cape and at Petschenka, but certain in east Siberia, east of Taimyr Peninsula, and Arctic Ocean near Bering Sea east of Alaska); in winter sparingly in various parts of northern Europe (Scandinavia, Heligoland, N.E. Germany, Denmark, France), more numerous on coasts of Kamtschatka to Kurile Islands, Aleutian Islands and Greenland, once in Quebec.

Genus SOMATERIA Leach.

SOMATERIA Leach, Ross's Voy. Discovery Baffin's Land, etc., App. p. xlvi (1819—Type by subsequent designation of Gray 1840, *S. mollissima*).

Lobe of hind-toe very wide (more than half length of toe). Bill almost straight, about as long as head, high at base, nail occupying whole width of tip of bill. Nostrils about in middle of

bill. Feathering of fore-head extending in a point to culmen, that of sides of head reaching in a long point to nearly middle of bill. Inner secondaries in male elongated, sickle-shaped. Tail short, rounded, 14, sometimes 16 rectrices. 3rd primary longest. Large birds, sexes very different, inhabitants of sea-coasts. 2 species, one in several subspecies. Northern shores.

SOMATERIA MOLLISSIMA

320. *Somateria mollissima mollissima* (L.)—THE COMMON EIDER.

ANAS MOLLISSIMA Linnæus, Syst. Nat., ed. x, i, p. 124 (1758—N. Europe).

Somateria mollissima (Linnæus), Yarrell, iv, p. 457; Saunders, p. 459.

Somateria mollissima britannica Millais, Brit. Diving Ducks, II, p. 2 (1913—British Isles).

DESCRIPTION.—*Adult male.* Winter and summer.—Crown to eye and band along top of loreal feathering black glossed violet-purple; cream-white mesial streak down crown, in some tinged pale green;

The Common Eider (*Somateria m. mollissima*). Bill of adult female from above and side to show frontal and loreal feathering.

upper-part of nape and patch on side of neck emerald-green, intersected by white streak on side of neck; rest of head, neck, mantle, scapulars, back and sides of rump white (in some mantle and scapulars cream), occasionally a black V-shaped mark on chin and throat, some feathers of back with imperfectly concealed ash-brown bases; centre of rump and upper tail-coverts black; upper-breast pale pinkish-cream, feathers bordering lower-breast tipped black; sides of body, flanks and under tail-coverts black; remaining under-parts brown-

black; axillaries white sometimes mottled dusky; under wing-coverts white; primaries and secondaries black-brown, inner webs paler, secondary next innermost with inner web and tip mostly white and next with irregular white patch towards tip; innermost secondaries and coverts white; all primary-coverts and bastard-wing sepia, latter tipped white; greater coverts as secondaries, one next innermost white mottled dusky and tipped black; median and lesser coverts white. This plumage is acquired by a body-moult Aug. to Dec. N.B.—When fresh some feathers of nape and upper-breast have black-brown tips; in summer emerald-green of head and pink of upper-breast are more or less faded.

Adult male. Eclipse.—The body-feathers, but not lower-breast, belly, vent nor back (usually sides of rump) are first moulted June to Aug. While in eclipse back, lower-breast, belly, vent, tail and wings are renewed, moult of these areas in their later stages synchronising with assumption of winter plumage but sometimes moult of lower-breast, belly and vent does not appear to start before commencement of post-eclipse moult. Fore-head, crown, lores, cheeks and sides of upper-neck brown-black or dark sepia (feathers of fore-head sometimes more or less barred or tipped buff, those of rest of head more or less narrowly tipped white); irregular buff or white streak through eye, feathers narrowly streaked or barred and tipped brown-black; black streak from upper-side of lores to eye; chin, throat and rest of neck sooty-brown or light sepia, feathers with imperfectly concealed brownish-white bases; mantle and scapulars sooty-brown or light sepia, some feathers of centre of mantle sometimes with distal halves more or less white and broadly tipped black, scapulars sometimes with outer webs or centres of feathers towards tip more or less white; back as adult winter-summer; rump brown-black; sides of rump and upper tail-coverts sooty-brown; feathers of upper-breast bordering lower-neck sooty-brown, sometimes tipped buff and often with irregular white central marking, rest of feathers with distal halves white, broadly tipped black, some with terminal buff markings and barred blackish; sides of body, flanks and under tail-coverts sooty-brown; rest of under-parts as adult winter-summer. N.B.—Sometimes some worn white feathers are retained on head, neck, mantle and scapulars.

Adult female. Winter and summer.—Fore-head and crown streaked black-brown, feathers edged pink-cinnamon or cinnamon-buff; nape, cheeks, side of neck, chin, throat and fore-neck warm buff or pink-cinnamon, more or less narrowly streaked black-brown, in some a light buff streak, feathers narrowly streaked black-brown, through eye; rest of upper-parts brown-black, feathers edged cinnamon-buff or tawny, scapulars notched and with broad edges of same; upper-breast, sides of body, flanks and under tail-coverts cinnamon-buff or pink-buff with black-brown bars more or less concealed on upper-breast, broader and more numerous on sides of body and flanks; rest of under-parts sooty-brown or drab-brown, feathers with imperfectly concealed pale drab bases (sometimes with darker bars and irregularly barred and tipped buff); axillaries white, sometimes mottled dusky-brown; under wing-coverts pale sepia more or less tipped white, some ashy-white; tail, primaries and their coverts as male; secondaries warm sepia, paler on inner webs, outer webs narrowly tipped white, innermost secondaries edged tawny (sometimes notched brown-black on outer webs); greater coverts as secondaries but white tips more extensive; primary-coverts pale sepia narrowly tipped buff; innermost greater, median and lesser coverts as mantle but lesser and innermost median with narrower buff edges. This plumage is acquired

by a body-moult Sept. to March. N.B.—Some feathers of head and neck may be renewed in spring but otherwise no moult.

Adult female. Eclipse.—Feathers of head, neck, mantle, scapulars, some of back, rump and upper tail-coverts and upper-breast are first moulted followed by wings, tail and rest of body-feathers in Aug. and Sept. Both wings are shed together as in male. Upper-parts especially head are much darker than in winter and summer. Crown brown-black ; nape ash-brown, feathers more or less edged buff ; mantle, scapulars and new feathers of back and rump and upper-breast with paler and narrower edges than in winter-summer ; cheeks and sides of neck thickly streaked black-brown ; chin and throat ashy-white or buffish narrowly streaked black-brown ; sides of body and flanks dark ash-brown ; under tail-coverts paler, tipped light or pink-buff and with a subterminal black-brown bar or shading.

Nestling.—Crown, nape, upper-parts and sides of body sepia or black-brown, long down filaments tinged buff-brown at tip ; broad buff eye-stripe from lores to hinder-crown, below which a black-brown streak encircling eye and continued to nape (these streaks in some obsolete) ; lores and cheeks sepia ; chin and throat brownish-white, in some a white streak on either side of chin ; remaining under-parts brownish-white darker on upper-breast, dusky-brown on belly and vent. Loral and frontal feathering as adult.

Juvenile. Male.—Easily distinguished from adult female by darker upper-parts, feathers with narrower buff edges, and under-parts hair-brown, feathers narrowly tipped buff. Crown black-brown, feathers of fore-head edged buff ; broad whitish band from point of frontal angle above eye to hinder-crown, feathers narrowly streaked black-brown ; nape hair-brown or dark ash-brown ; rest of upper-parts black-brown, feathers more or less shading to blackish subterminally and edged light or warm buff, edges narrower and less defined on back ; feathers of sides of rump barred buff and blackish ; cheeks and sides of neck dark hair-brown or dark ash-brown (chin, throat and fore-neck paler) narrowly streaked black-brown or dusky-brown, streaks sometimes ill-defined ; feathers of upper-breast barred towards tips black-brown and whitish or buff ; sides of body, flanks and under tail-coverts sepia, feathers barred black-brown (in some barred buff) and tipped buff ; remaining under-parts hair-brown or sooty-brown, feathers with ill-concealed light drab bases and tipped light or warm buff ; axillaries and under wing-coverts as adult female ; tail as adult female but tips square and shafts projecting ; wing as adult female but secondaries black-brown, inner webs hair-brown, white tips absent or at most ill-defined, innermost secondaries black-brown, sometimes narrowly edged buff ; wing-coverts hair-brown mostly tipped warm or light buff, sometimes shaded or barred black-brown towards tips.

Juvenile. Female.—As male but secondaries lighter, innermost shorter and less sickle shaped, feathers of back and rump often with broader buff edges.

First winter. Male.—Fore-head and crown snuff-brown or buff-brown with black bars more or less concealed, feathers of mesial streak (from centre of crown to nape) heavily barred black with a bluish sheen ; nape black-brown, feathers more or less tipped buff ; from top of lores through eye light buff or whitish streak, feathers tipped or streaked blackish ; rest of loreal feathering, cheeks and sides of neck brown-black, some feathers tipped and barred buff ; new black-brown scapulars more or less edged snuff-brown are acquired ; chin, throat and fore-neck sooty-brown, feathers with ill-concealed ashy-brown bases ; rest of plumage as in juvenile. Feathers of head, neck and some body-feathers are moulted from Sept. *First summer.*—Acquires a certain amount of white plumage of adult from which easily distinguished by retained juvenile under-parts and wing-coverts. First winter and first summer plumage are not definitely separable moult being more or less continuous. Fore-head and crown as first winter ; from top of lores above eye to hinder-crown, a broad blackish streak glossed bluish, some feathers tipped buff ; in some sides of hinder-crown white suffused emerald, feathers tipped blackish or buff ; nape and new feathers of mantle and scapulars white, some tipped or mottled blackish ; new feathers of rump blackish, sides of rump sometimes intermixed with white ; upper and under tail-coverts black ; lores dusky-brown ; cheeks, sides of neck, chin, throat and fore-neck more or less white, feathers tipped blackish or dusky-brown, patch on sides of neck sometimes suffused palest emerald ; upper-breast white or pale pinkish-cream, feathers sometimes more or less narrowly tipped blackish and buff ; new feathers of sides of body and flanks brown-black, some narrowly tipped snuff-brown ; rest of under-parts as juvenile but more or less intermixed with new brown-black feathers ; tail as adult ; wing as juvenile. The body-feathers, not all feathers of mantle, scapulars, back or rump, usually few feathers of under-parts, in some all tail, in some central pair only, but not wings are moulted from Sept. onwards. There is considerable individual variation in amount of 1st summer plumage acquired.

First eclipse. Male.—Moult as in adult but usually less complete. Like adult male and only to be distinguished by retained juvenile feathers and juvenile wing.

Second winter and summer. Male.—As adult winter but feathers of head and neck more or less tipped or barred at tip blackish or cinnamon-buff ; feathers of mantle and scapulars more or less tipped blackish ; some scapulars mottled black-brown towards tip ; centre of back and rump usually black-brown, sides of rump sooty-brown, in some intermixed with white, in others more or less white, feathers tipped dusky-brown ; large white patch on sides of lower-rump, some feathers tipped or mottled blackish ; rest of body-plumage as adult, but some feathers of throat, fore-neck and upper-breast narrowly tipped blackish ; under wing-coverts white, those at edge of wing sepia ; tail as adult ; remiges as adult but secondaries in some narrowly tipped white,

one next innermost as preceding ones, sometimes with a small white mark towards tip, but never with so much white as in adult ; innermost secondaries narrower than in adult and only slightly sickle-shaped with outer or both webs white, distal halves black-brown, in some inner webs sepia (amount of white varies individually) ; greater coverts as secondaries, amount of white on innermost variable ; median coverts white more or less tipped and mottled brown-black ; lesser coverts and sometimes innermost median and those at edge of wing sepia (sometimes some innermost median and lesser coverts mottled white) ; rest of wing as in adult. This plumage is acquired by a body-moult from July onwards. N.B.—Blackish edges to feathers of head, upper and under-parts are more or less lost by abrasion.

Second eclipse. Male.—Moult as in adult eclipse. Plumage as in adult but distinguished from adult and first eclipse (before remiges are shed) by black-brown innermost secondaries more or less marked white, blackish tips (when not too abraded) to median coverts and faded brown lesser coverts.

Third winter and summer. Male.—As adult winter but back and rump as in 2nd winter (but centre of rump intermixed with whitish feathers with ash-brown bases), white sickle-shaped innermost secondaries and coverts with brownish tips, some inner, greater and median coverts mottled brownish ; coverts at edge and bend of wing brown ; under wing-coverts white those at edge and bend of wing brownish some tipped white.

Third eclipse. Male.—In this and subsequent plumages as adult.

First winter and summer. Female.—Upper-parts resemble adult female eclipse more than winter and summer, from which it differs by crown being darker, feathers not so broadly edged buff ; nape dark ash-brown, some feathers edged buff ; new feathers of mantle, scapulars, sides of body and flanks sepia shading to brown-black at tip and edged cinnamon-buff or ochraceous-tawny, edges much narrower than in adult ; back and rump as juvenile ; new upper tail-coverts brown-black with subterminal ochraceous-tawny bars ; new feathers of sides of rump as adult ; cheeks and sides of neck brown-buff rather more heavily streaked black-brown or dusky-brown than in adult ; chin and throat ashy-white narrowly streaked dusky-brown or black-brown ; new feathers of rest of under-parts as adult winter-summer. Most body-feathers, not usually all those of mantle or scapulars, sometimes some of back and rump, in some all, in others only a few upper and under tail-coverts, not usually lower-breast, belly or vent but in some most of under-parts, sometimes central pair, or all tail-feathers but not wings are moulted Nov. to April or later. In some moult is very incomplete.

First eclipse. Female.—Moult and coloration apparently as in adult eclipse and only to be distinguished when some worn juvenile body-feathers are retained and by worn juvenile wing when not

moulted. Only one examined. *Second winter and summer*.—Like that of adult but white tips to secondaries and greater coverts narrower. Molt as adult. Second eclipse not examined but in third winter is not to be distinguished with certainty from adult.

Measurements and structure.—♂ wing 280–298 mm., tail 84–95, tarsus 45–52, bill from point of feathers on culmen 49–56, from point of frontal angle 68–77 (12 measured). ♀ wing 266–295, bill from point of feathers on culmen 44–56. Primaries: 1st narrow, pointed and about two-thirds longest primary-covert, 3rd longest, 2nd 2–8 mm. shorter, 4th 8–11 shorter, 5th 20–26 shorter, 6th 35–42 shorter; 2nd emarginated inner, 3rd outer webs. Innermost secondaries falcate, moderately long, tapering to a point, longest shorter than 6th or 7th primaries. Long lower scapulars stiff, tips of outer webs emarginated in ad. ♂ and in some ad. ♀, rest of scapulars softish more or less pointed at tip, in eclipse square. Tail short, rounded with 14 stiff, pointed feathers. Bill nearly as long as head, higher than broad at base, depressed towards end where considerably narrowed but rounded, nail large, elliptical, convex and moderately decurved, with a thick grooved edge; maxillary tomium regular and nearly straight; lamellæ completely concealed. Feathers of fore-head continued to a narrow point on culmen about half-way between base of frontal angle and nostril separating the backward processes or frontal angles of maxilla; loreal feathering extending to about middle of nostril opening.

Soft parts.—Bill (ad. ♂) basal part of upper mandible oil-green, rest bluish-grey tinged green, nail greyish-yellow, nail and tip of lower mandible pale greenish-grey, rest bluish-grey tinged green, (ad. ♀) greenish-dusky, nail of upper mandible bluish-horn, that of lower purplish; legs and feet (ad. ♂) oil-green, membranes and soles pale greenish-brown, claws pale brown, (ad. ♀) greenish-dusky, (juv. ♂) lead-grey; iris rich brown.

CHARACTERS AND ALLIED FORMS.—*S. m. norvegica* (Norway east to Russian Lapland) has steeper and less sloping fore-head, in adult male frontal angles usually narrower and more pointed, adult females less brilliant in colour; *S. m. færoensis* (Færoes) is smaller with much smaller bill; *S. m. borealis* (Greenland (possibly Iceland), Ellesmere-land, to north-west Hudson Bay and S. Ungava) has bill in adult male smaller and in spring bright orange-yellow, sickle-shaped innermost secondaries as a rule longer; *S. m. dresseri* (S. Ungava to south-east Maine and southern half Hudson Bay) has frontal angles broader than in *S. m. mollissima* and green of head usually extending below black almost to bill, an indistinct black V on chin (but this also occurs sometimes in *S. m. mollissima*), colour of bill as in *S. m. borealis*; *S. m. v-nigrum* (N.E. Siberia, Alaska) has always in adult male a large black V-shaped mark on chin. *S. m. mollissima* is distinguished in all plumages from other British ducks by its large size and characteristic frontal angles of bill. For distinctions of *S. spectabilis* see under that species.

FIELD-CHARACTERS.—Essentially maritime and frequenter of rocky coasts and islands, even in nesting season. Black under-parts, tail and crown contrasted strongly with white upper-parts and set off by rosy breast and green patches on sides of head and nape mark male at once. Ruddy brown black-barred female differs from Mallard and other surface-feeders in her size, heavy build and habit of diving, whilst at close quarters fore-head sloping gradually to bill and wedge of feathers on each side of upper mandible may be made out. In flight, which is sluggish and just clear of the waves, bulky form and short thick neck are very noticeable. Call a hoarse grating “kr-r-r-r” is like that of so many other ducks. Love notes of male are a mourning “wow, wouw, wouw,” and in autumn I have heard a chorus of dove-like cooing notes and hoarse quacks uttered by packs comprised of both sexes.

BREEDING-HABITS.—In British Isles nests on islands, links and coast, but usually near the sea, though in Iceland it also breeds on islands in rivers. *Nest.*—Hollow among growing vegetation or sheltered by rocks, plentifully lined with brownish-grey down (feathers from nest, see *Brit. Birds*, II, Pl. 2). *Eggs.*—Usually 4 to 6, but 8 and 9 on record. Larger numbers possibly represent joint nests. Colour greenish-grey to exceptionally bright green and even deep blue, frequently marked with oil spots. Average of 77 British eggs, 77.16×50.7 . Max. : 86×50 and 79.7×53.5 . Min. : 71.2×50.3 and 75.6×47.5 mm. *Breeding-season.*—End May and early June. *Incubation.*—By female alone. Period 27–28 days. Single brooded.

FOOD.—Almost entirely animal ; chiefly mollusca, especially mussel (*Mytilus edulis*), frequently periwinkles, razor-shells (up to 8 and even 10 inches long), limpets ; *Venus*, *Cardium*, *Nerita* and *Buccinum* also recorded. Crustacea also freely eaten (small crabs) and barnacles. Also sea-urchins (*Echinus*), star-fish, occasionally small fish, seaweeds (*Ulvaceæ*), beetles (*Hydradephaga* and *Geodephaga*) and entrails of fish thrown overboard.

DISTRIBUTION.—*Great Britain.*—Resident and winter-visitor. Breeds coast of Northumberland, Holy Isle and Farne Isles ; along east coast Scotland, in Orkneys, Shetlands, O. and many I. Hebrides, parts of Argyll coast, and in recent years northwards on west coast. As a winter-visitor uncommon or rare on west and south coasts Great Britain, but lately increased in parts of west Scotland ; on east coast regular, becoming more abundant from Northumberland northwards. *Ireland.*—Found breeding on island off co. Donegal in 1912 (H. W. Robinson, *Brit. B.*, VI, pp. 106, 166), and has bred regularly since and is now well established in this district. Otherwise rare vagrant to all provinces, most frequent in north.

DISTRIBUTION.—*Abroad.*—Breeds in north-western Palæarctic region east to shores of Kara Sea and south to Sylt and (casually) Vlieland and Terschelling Islands, also one pair Bretagne (France). In winter along coasts of Europe, occasionally to south Europe and

Azores. Replaced by closely-allied forms in North America, Greenland, Færoes, Spitsbergen, and north-east Asia.*

[NOTE.—An Eider shot at Graemsay (Orkneys) Dec. 14, 1904, and said to have been a Pacific Eider, *Somateria mollissima v-nigrum* Gray (*Bull. B.O.C.*, xv, p. 32 : *Zool.*, 1905, pp. 74, 142, 143 : *Ann. S.N.H.*, 1905, p. 183), was subsequently proved to be a variety of the Common Eider, *Somateria m. mollissima* (cf. *Bull. B.O.C.*, xix, p. 80 : *Brit. B.*, i, pp. 15, 69, 125, 158.)]

SOMATERIA SPECTABILIS

321. *Somateria spectabilis* (L.)—THE KING-EIDER.

ANAS SPECTABILIS Linnæus, *Syst. Nat.*, ed. x, i, p. 123 (1758—Canada, Sweden).

Somateria spectabilis (Linnæus), Yarrell, iv, p. 463 : Saunders, p. 461.

DESCRIPTION.—*Adult male. Winter and summer.*—Feathers bordering upper mandible, frontal feathering, eyelids, patch below and behind eye and broad V-shaped mark on throat black ; fore-head and crown pearl-grey deepening to gull-grey on nape and upper-part of sides of neck, sometimes bordered on nape by dark slate line ; white eye-stripe continued on to side of neck (sometimes obsolete) ; patch of emerald-green on cheeks narrowing to streak behind eye ; lower-nape, centre of upper-mantle, chin, and throat white, lower-mantle same but feathers with ash-brown bases often imperfectly concealed ; sides of upper-mantle and upper-breast vinaceous-buff or pink-buff, feathers bordering lower-breast more or less tipped black ; scapulars, back, centre of rump and upper tail-coverts dull black ; large patch on side of rump white, some feathers tipped black ; lower-breast, belly and vent brown-black, feathers with ill-concealed drab-brown bases ; rest of under-parts black ; axillaries white ; under wing-coverts mostly white ; tail-feathers sepia ; primaries and their coverts and bastard-wing brown-black shading to drab-brown on inner webs ; secondaries with outer webs black, inner webs sepia, outer ones narrowly tipped white, innermost with light brown shaft-streak ; greater coverts as secondaries, in some with small white spot at tip ; median and lower lesser coverts white, some narrowly tipped blackish ; rest of wing-coverts including innermost median, brown-black or sepia, latter and some lesser tipped white ; amount of white on wings variable, in some coverts at edge and bend of wing and most lesser coverts white. This plumage is acquired by a body-moult Sept. to Jan. N.B.—When fresh, feathers of upper-mantle and upper-breast have blackish edges.

Adult male. Eclipse.—Moult apparently identical with that of *S. m. mollissima* takes place July and Aug. and coloration almost identical but scapulars uniform brown-black without any white markings ; lores and cheeks lighter than in *S. m. mollissima*, feathers

* Judging from material in British collections the supposed differences of the Norwegian form are by no means constant.—E.H.

buff broadly tipped black-brown; chin and throat dusky-white, feathers mostly tipped ash-brown; rest of neck as in *S. m. mollissima*; feathers of upper-breast mostly sooty-brown with an oval white marking or pear-shaped drop towards tip, more or less barred black-brown (in some these feathers more or less ashy-white barred black-brown) with buff tips, sparsely intermixed with feathers with distal halves white (in *S. m. mollissima* these latter feathers are abundant). N.B.—Sometimes worn winter feathers are retained on mantle and upper-breast.

Adult female. Winter and summer.—Somewhat like adult *S. m. mollissima* but crown and nape more narrowly streaked black, feathers edged redder tawny; sides of face, sides of neck and lower-nape tawny or cinnamon-buff more or less narrowly streaked black-brown; chin and throat paler, faintly streaked dusky-brown; rest of upper-parts as in *S. m. mollissima* but feathers edged redder tawny or chestnut (in some paler), scapulars with irregular tawny markings; upper-breast, flanks, sides of body, sides of vent and under tail-coverts reddish-tawny, feathers with dusky bases and irregular U- or V-shaped brown-black markings; rest of breast, belly and vent uniform sooty-brown, feathers with imperfectly concealed pale drab bases, sometimes tipped buff-brown and sometimes barred black-brown especially on vent; axillaries, under wing-coverts and tail as in *S. m. mollissima*; wing as in *S. m. mollissima* but innermost secondaries and coverts in some bordered on outer webs chestnut-brown instead of tawny, median and lesser coverts as mantle. This plumage is acquired by complete body-moult Nov. to March. By late summer plumage becomes considerably paler by fading and wear.

The King-Eider (*Somateria spectabilis*). Bill of adult female to show frontal and lateral feathering.

Adult female. Eclipse.—Most feathers of head, neck, mantle and scapulars (some of back, rump and upper tail-coverts), upper-breast, sides of body and flanks, apparently not rest of under-parts are moulted first followed by wings and tail in Aug. and Sept. Feathers of upper-parts with paler edges than in winter and summer. Crown and upper-part of nape heavily streaked brown-black, rest of nape ash-brown, feathers more or less edged buff; feathers of mantle and scapulars edged cinnamon-buff, new feathers of back and upper tail-coverts as mantle but tips narrower, tail-coverts with irregular blackish subterminal bars; new feathers of upper-breast paler; sides of body and flanks as scapulars.

Nestling.—Upper-parts and sides of body as in *S. m. mollissima*

but lighter ; cheeks lighter, line through eye indistinct ; chin, throat and under-parts pale ashy-white ; down of upper-breast dusky-brown towards base ; loral and frontal feathering as in adult female.

Juvenile. Male.—Like juvenile *S. m. mollissima* but head and neck lighter, upper-parts and wing-coverts more broadly edged deeper buff, under-parts lighter. Crown heavily streaked black-brown, feathers edged light buff ; sides of face same but streaks narrower ; nape ash-brown, feathers tipped light buff ; upper-parts as in *S. m. mollissima* but lighter, feathers more broadly edged warm or cinnamon-buff ; chin, throat, sides of neck and fore-neck ashy-white suffused light buff and more or less spotted or streaked dusky ; upper-breast, sides of body and flanks and under tail-coverts pale ashy with subterminal bars or shadings of sepia or dusky and tipped warm buff ; rest of under-parts ash-brown or drab, feathers more or less barred dusky or black-brown and mostly shading to buff at tips ; tail-feathers as in adult female but mostly edged warm buff at tip ; wing as in adult female but secondaries black-brown or sepia, paler on inner webs, in some whitish tips faintly indicated, innermost and coverts edged cinnamon-buff ; greater coverts as secondaries, in some tipped buff-white or more or less edged buff ; rest of wing-coverts as upper-parts but bastard coverts at edge and bend of wing, innermost median and lesser coverts only faintly edged buff. *Female.*—As male but speculum lighter, back and rump in some more broadly edged buff.

First winter. Male.—Feathers of crown and upper-part of nape bistre-brown or snuff-brown more or less barred blackish at tip ; loral feathering and cheeks black-brown, more or less tipped and barred lighter brown ; nape, sides of neck, chin, throat and fore-neck blackish, feathers with whitish bases ill-concealed on throat ; a black V more or less distinct on chin and throat ; a few new scapulars and flank-feathers tipped buff-brown are also acquired. Moulting, which is confined to head, neck, sometimes scapulars, and flanks, commences in Nov. *First summer.*—No line can be drawn between these plumages. Distinguished from *S. m. mollissima* in similar plumage by black scapulars and different juvenile under-parts. Feathers of crown, upper-part of nape and sides of neck as first winter ; in some crown and upper-part of nape more or less intermixed with pearl-grey feathers, rest of nape white, feathers tipped blackish ; new feathers of upper-mantle white, more or less broadly tipped black, those of mantle, scapulars, sides of body, flanks, upper and under tail-coverts black as in adult, sides of rump intermixed with white feathers ; a black patch under eye ; cheeks as in first winter, sometimes intermixed with whitish feathers tipped blackish, sometimes tinged green in front of eye ; lower part of loral feathering and chin whitish ; an irregular and ill-defined brown-black V-shaped mark on chin and throat, feathers tipped white or buff ; throat and fore-neck white, feathers tipped dusky-brown or blackish ; rest of sides of neck as nape ; upper-

breast cream-buff, feathers tipped blackish ; belly sometimes with some new sooty-black feathers ; rest of plumage as juvenile but sometimes central pair and exceptionally all tail-feathers are renewed and like adult. Some juvenile body-feathers, only a few odd feathers on lower-breast, belly and vent, sometimes central pair of tail-feathers but not all those of mantle and scapulars, not back, rump or wing are moulted Nov. to May.

First eclipse. Male.—Some feathers of head, nape, mantle, scapulars, patch on sides of rump, upper tail-coverts, cheeks (in some apparently chin and throat), most of upper-breast, sides of body, flanks, sometimes under tail-coverts but not all feathers of mantle and not back, rump, lower-breast, belly, vent, tail or wings are moulted in Aug. Plumage as adult eclipse but some juvenile body-feathers retained especially on under-parts. Nape lighter than in adult, ash-brown instead of sooty-brown ; lores and cheeks buff, feathers with narrower and fewer black-brown tips ; chin, throat, fore-neck and sides of neck ashy-white, feathers tipped buff ; scapulars, sides of body and flanks brown-black as adult but with narrow buff tips, new under tail-coverts blackish barred buff ; feathers of upper-breast mostly whitish with dusky-brown bases, tipped buff and more or less barred black-brown.

Second winter and summer. Male.—As adult winter but gull-grey feathers of occiput with dusky-brown tips when fresh ; feathers of cheeks, sides of neck, nape, mantle and upper-breast more or less tipped blackish (subsequently lost by abrasion) ; wing as adult but lesser coverts brown-black, median with less white and mostly tipped blackish and sometimes uniform sepia, two or three only marked with white (amount of white on wing-coverts varies individually). This plumage is acquired by a body-moult Sept. to Jan. *Second eclipse.*—Not examined but probably as adult eclipse.

Third winter and summer.—Apparently as adult.

First winter. Female.—A certain amount of adult plumage is acquired ; easily distinguished from adult by retained juvenile body-feathers and wings. Sometimes crown and nape as adult but edges of feathers duller and streaks narrower ; new scapulars with narrower and duller reddish-tawny edges ; new feathers of upper-breast, sides of body, flanks and new under tail-coverts edged duller tawny. Birds occur in May, which, except for some feathers of head and scapulars, are still in juvenile plumage. Some body-feathers, not all those of mantle, not back (in some a few odd feathers), some feathers of rump, not lower-breast, belly, vent or tail-coverts, not usually tail (sometimes central pair) and not wings are moulted Nov. to May.

First eclipse. Female.—Moult as in adult female but some feathers of breast, belly and vent appear to be moulted. Only to be distinguished from adult eclipse by retained juvenile feathers of under-parts and retained juvenile wing when not moulted. In the one bird examined (20/8/17 ♀ in coll. E. L. Schiöler) cheeks, chin

and throat appeared not to have been moulted, both wings were in a flightless condition.

Second winter and summer. Female.—Like that of adult but if a series is compared upper-parts less brilliant, white tips to secondaries and greater coverts narrower, in some secondaries faintly edged ash-grey instead of white. Moults presumably as in adult. *Second eclipse.*—Not examined. Probably as adult.

Measurements and structure.—♂ wing 275–288 mm., tail 79–86, tarsus 42–47, bill from frontal feathering on culmen 28–34 (12 measured). ♀ wing 260–282, bill 30–35. Primaries: 1st narrow, pointed and a little more than half longest primary-covert, 3rd longest, 2nd 1–6 mm. shorter, 4th 8–11 shorter, 5th 22–30 shorter, 6th 39–47 shorter. Feathers of mantle and scapulars in female with somewhat pointed or rounded tips not square as in female *S. m. mollissima*. Long stiff scapulars with outer webs more deeply emarginated than in *S. m. mollissima*, in ad. ♀ less emarginated than in ♂. Base of upper mandible in adult ♂ spread out on each side into a shield or lobe, which commences to develop about Feb., becomes enormous during breeding-season then subsides and is absent in eclipse plumage and in winter; absent in females and immature males. Frontal feathering extends almost to nostrils and loreal only about half-way. Other structure as in *S. m. mollissima* but bill smaller.

Soft parts.—Bill (ad. ♂) flesh-coloured, sides of upper mandible and soft frontal lobes bright orange, (ad. ♀ and first winter ♂) pale greenish-grey, nail in ad. ♀ bluish-grey tinged yellow; legs and feet (ad. ♂) dull orange, webs dusky, claws brown-black, (ad. ♀) dull greenish-grey, (first winter ♂) dull ochre; iris (ad. ♂) bright yellow, (ad. ♀ and first winter ♂) dull yellow.

CHARACTERS.—No subspecies. Distinguished from *S. m. mollissima*: adult males by pearl-grey crown, black scapulars and innermost secondaries and broad V-shaped mark on throat, and females and immature males by frontal and loreal feathering (see structure).

BREEDING-HABITS.—Occasionally a few pairs found breeding among colonies of Common Eider, but most nests are to be found scattered over the tundra. *Nest.*—Generally near fresh water, where vegetation gives some cover, lined down, which is considerably darker than that of Common Eider. *Eggs.*—4 to 6 or 7; like those of Common Eider, but smaller. Average of 67 eggs, 66.4×44.1 . Max.: 74.6×49.4 and 73.5×50 . Min.: 61.3×45 and 62.5×41.5 mm. *Breeding-season.*—Latter half June and early July. *Incubation.*—By female alone. Period unknown. Single brooded.

FOOD.—Mainly mollusca and crustacea except during breeding-season when vegetable matter and larvæ of diptera are also taken. Mollusca recorded include *Buccinum*, *Macra*, *Mya*, *Pecten*, *Cyprina*, *Mytilus*, *Trophon*, *Turritella*, *Modiolaria*, etc.; crustacea (*Carcinus*, *Portunus*, shrimps, etc.). Also *Echinus*.

DISTRIBUTION.—*British Isles*.—Very rare vagrant. *England*.—Three obtained (Jan., 1888, Nov., 1890) Norfolk, one (Aug., 1846) Yorks., two (Nov., 1873, April, 1885) (and others seen) Farne Isles (Northumberland), one (Nov., 1915) Kent. *Scotland*.—Examples obtained and satisfactorily identified coast of Haddington, Firth of Forth, Fife (June, 1899), and Firth of Tay (several obtained winter 1879–80). Several recorded Shetlands (last Feb., 1899, June 29, 1910), one Fair Isle (1910) and several Orkneys (last Feb., 1906). Recorded as seen off Jura and Islay. *Ireland*.—Dublin (one), Down (two), Mayo (one), and Rathlin Island (one), (last Down, Nov., 1897).

DISTRIBUTION.—*Abroad*.—Northern portion of Northern Hemisphere, breeding on shores of Arctic Ocean (Greenland, Spitsbergen, Novaya Zemlia, arctic Siberia and America); in winter casually to France, Italy (4 times) and several parts of northern Europe, in America rarely and accidentally to Georgia, California, and Iowa. Casual Pribilof Islands.

Genus OIDEMIA Flem.

OIDEMIA Fleming, *Philosophy of Zool.*, II, p. 260 (1822—Type by subsequent designation, Gray, 1840, *O. nigra*).

Structurally nearest to *Nyroca* and *Bucephala* but windpipe different (as also in some species of same genus). Bill rather wide, a little shorter than head, tip compressed, serrations coarse, nail occupying whole tip of bill. Nostrils behind middle of bill. Males with knob at base of culmen, swollen in adults. Feathering extending more or less on to upper mandible, but not in points, different in each species. 14 to 16 rectrices, tail cuneiform, more or less stiff. Males black, females dark brown. Eggs brownish, not greenish. 3 species, 2 of which in several subspecies, northern portions of Northern Hemisphere.

Key to species of genus OIDEMIA.

1	{	Plumage black	2	
		Plumage brown	3	
	{	Entirely black		<i>O. nigra</i> , ♂ ad., p. 369
		With white wing-speculum and small		
2	{	white spot under eyes		<i>O. fusca</i> , ♂ ad., p. 373
		With white patches on head and hind-		
		neck		<i>O. perspicillata</i> , ♂ ad., p. 376
3	{	With white wing-speculum		<i>O. fusca</i> ♀ and juv., p. 374
		Without white wing-speculum	4	
	{	Sides of head and neck pale greyish-		
		brown		<i>O. nigra</i> , ♀ and juv., p. 370
4	{	Sides of head and neck dark brown with		
		pale spots on lores and ear-coverts		<i>O. perspicillata</i> , ♀ and juv., p. 377

OIDEMIA NIGRA

322. *Oidemia nigra nigra* (L.)—THE COMMON SCOTER.

ANAS NIGRA Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—Lapland and England).

Oidemia nigra (Linnæus), Yarrell, iv, p. 472 ; Saunders, p. 465.

DESCRIPTION.—*Adult male. Winter.*—Entire body-plumage and tail black ; head, nape, sides of neck and upper-parts glossed dull violaceous ; feathers at base of upper mandible black without violaceous gloss, soft and downy in structure ; those of rest of head and neck (not chin or throat) pointed at tip giving a characteristically “crimped” appearance, less pronounced on nape ; centre of breast, belly and vent rather a brownish-black, dusky-brown bases of feathers not being completely concealed ; primaries brown-black, inner webs pale dusky-brown shading almost to white at

The Common Scoter (*Oidemia n. nigra*). 2nd primaries of A. ♂ adult, B. ♂ juv.

utmost base ; secondaries black, inner webs brown-black or dusky-brown, innermost black ; primary-coverts, bastard-wing and greater coverts brown-black, remaining coverts as upper-parts. This plumage is acquired by a body-moult from Sept. to March. *Summer.*—There appears to be a partial moult involving feathers of head and neck and a few of body in April. Coloration as winter.

Adult male. Eclipse.—No birds moulting into eclipse have been examined ; some feathers of head, neck and under-parts appear to be moulted, followed by wing and tail in Sept.-Oct. Crown, nape, sides of face and sides of neck duller black with less bluish gloss than winter and feathers square at tip and thus with little indication of “crimping” on head and neck ; breast, belly and vent browner than winter, feathers sooty-brown or drab-brown shading to black-brown at tip and with ash-brown bases ; feathers of sides of body and flanks sooty-brown shading to black at tip ; rest of plumage as winter.*

* I am indebted to Mr. E. Lehn Schjölér for first showing me the eclipse plumage of *O. n. nigra* and above description is taken from three flightless specimens (one Sept. and two Oct.) in his collection.

Adult female. Winter and summer.—Crown to below eye and top of nape black-brown; centre of nape dusky-brown; feathers of rest of upper-parts black-brown, broadly fringed olive-brown or cinnamon-brown; lores dusky-brown; cheeks, sides of neck, chin and throat brownish-white or whitish-drab, most feathers tipped dusky-brown; remaining under-parts light sepia or drab deepening to dark sepia or black-brown on upper-breast, sides of body, flanks, vent and under tail-coverts; feathers of breast, sides of body and flanks usually with olive-brown, cinnamon-brown or yellowish-white edges, those of lower-breast, belly and vent narrowly tipped darker (sometimes some feathers edged yellowish-white or greyish-white); tail black-brown; primaries sepia, outer ones with outer webs and tips darker brown, inner webs as male; secondaries sepia darker on outer webs, innermost black-brown; wing-coverts sepia or olive-brown shaded buff-brown or grey-brown towards tip and with faint terminal dusky-brown tips. Moults as male. Insufficient spring material examined to determine whether there is a spring moult or not. Abrasion and fading of edges of feathers of upper-parts gives a characteristically barred appearance in June and late summer.

Nestling.—Lores, crown down to eye, centre of nape, and rest of upper-parts uniform black-brown; upper-mantle, sides of body and flanks light sepia rather than black-brown; a tiny whitish mark below eye not always well-defined; chin and throat whitish; band across fore-neck dusky-brown; remaining under-parts greyish-white; down of sides of neck, belly and vent more or less tipped dusky-brown.

Juvenile. Male and female.—Very like adult female but upper-parts lighter and under-parts ashy-white, feathers with dusky-brown bars or spots. Crown to level of eye and top of nape black-brown or dark sepia; centre of nape dusky-brown; remaining upper-parts sooty-brown or sepia, lighter on scapulars, feathers mostly, especially scapulars, fringed buff-brown; cheeks, sides of neck, chin and throat cream-buff or ash-white, feathers mostly tipped dusky-brown; fore-neck, sides of body and flanks dusky-brown or light sepia, feathers tipped buff-brown; feathers of centre of breast and belly ashy-white with dusky-brown bars or spots; vent and under tail-coverts dusky-brown, feathers of vent mostly edged white; axillaries and under wing-coverts as adult female; tail as adult female but with square tips; coloration of wing as adult female but see under "structure."

First winter and summer. Male.—New feathers of head and neck black as adult male but duller, ash-brown bases more or less exposed; new feathers of upper-parts, sides of body and flanks black, sometimes those of flanks black-brown tipped buff-brown; new feathers of breast, belly and vent drab-brown or sooty-brown; new tail as adult but less tapering at tip; wing as juvenile. Some feathers of head, neck, mantle, scapulars, an odd feather of rump, some upper tail-coverts, some feathers of upper-breast, sides of

body, flanks and under tail-coverts, sometimes some feathers of rest of under-parts and sometimes some tail-feathers are moulted from Dec. onwards. Amount of black plumage acquired varies considerably individually.

First eclipse. Male.—(Not examined.)

Second winter and summer. Male.—Apparently as adult male but birds with under-parts browner than others may possibly be 2nd year males.

First winter and summer. Female.—Moult as in male. New body-feathers as adult female, new tail-feathers narrower, wing as juvenile.

Measurements and structure.—♂ wing 228–242 mm., tail 80–100, tarsus 40.5–43, bill from feathers 45–49 (12 measured). ♀ wing 220–229, bill 42–46. Primaries : 1st narrow, pointed and less than half longest primary-covert, 3rd longest, 4th equal or 2–4 mm. shorter, 2nd 6–10 shorter, 5th 11–15 shorter, 6th 25–30 shorter. Emargination : ad. ♂, 2nd deeply emarginated inner web, 3rd very slightly both webs ; ad. ♀, 2nd not nearly so deeply as in ♂, 3rd very slightly outer web ; juv. ♂, 2nd emarginated but not deeply as in ad. ♂, narrower and more tapering towards point than in ad. ♀ ; juv. ♀, 2nd hardly distinguishable from that of ad. ♀. Innermost secondaries tapering to a point and longest shorter than 4th to 6th primaries. Scapulars more or less pointed at tip. Tail graduated and acuminate, 16 stiff, pointed feathers, central pair longest. Bill nearly as long as head, higher than broad at base, depressed and flattened towards tip which is rounded ; upper mandible in ad. ♂ with well-developed knob usually absent in female and juvenile but in some females more or less developed ; in forward young males developed by April ; nail large and broadly elliptical. Feathers at base of bill form a nearly straight oblique line from fore-head to rictus advancing scarcely if at all on fore-head. Round base of upper-mandible in ad. ♂ a curious band of short down-like feathers.

Soft parts.—Bill (ad. ♂) black, middle portion between and around nostrils from knob to nail yellow or orange, (ad. ♀) greenish-black (in some with a narrow band between nostrils extending almost to nail orange-yellow) and nostril openings yellow, (juv. ♂)* black with only a slight touch of reddish-yellow round nostrils (Millais), (juv. ♀) lead-coloured ; legs and feet (ad. ♂) brown-black, webs blackish, (ad. ♀) olive-brown, webs blackish ; iris brown.

CHARACTERS AND ALLIED FORMS.—Adult male of *O. n. americana* (N. America) has nail arched and decidedly hooked and colour of bill different, females and immature males have nail more convex than in *O. n. nigra* (less marked in very young birds), adult female with small yellow patch on culmen between nostrils. Uniform

* Some young males by Jan. have ridge of culmen almost to nail and area round nostrils yellow.

black wing, sooty-brown in females and young birds, and acuminate tail distinguish *O. n. nigra* from allied species.

FIELD-CHARACTERS.—Except in nesting season seldom seen on inland waters, but from autumn to spring common on most parts of coast, where some remain during summer. Scattered birds in small parties may be seen diving for food usually at some distance from shore and these pack at times in immense flocks. Despite its heavy build is very buoyant, riding lightly on water in roughest weather or taking short flights with rapid wing-beats just clear of waves. Male is unmistakable; plumage entirely black, relieved only by patch of apricot yellow on bill; short pointed tail elevated like Pintail's when bird is swimming. Grey cheeks coupled with her bulky build identify the brown female. Call a hoarse "kr-r-r-r" similar to that of many diving ducks. Male has a double note "tuk-tuk" (second syllable strongly accented), which when uttered by many birds in chorus comes in from the sea as a pleasing murmur. In autumn I have heard this chorus punctuated by a tittering cry. Cordeaux mentions another note, a soft, musical whistle "peu-peu-peu" like the call of a Wader.

BREEDING-HABITS.—Haunts lakes on moors or tundra. *Nest.*—Generally near water or on island, well lined with sooty-brown down, showing indistinct light centres (feathers from nest see *Brit. Birds*, II, Pl. 2), mixed with lichens, moss, etc., in hollow among heather. *Eggs.*—Usually 5 to 8, but 9-10 on record, creamy to buff. Average of 100 eggs, 65.2×44.9 . Max. : 72×44.3 and 64.1×47.5 . Min. : 59×42.5 and 60.9×42 mm. *Breeding-season.*—Usually early June; occasionally late May in Scotland. *Incubation.*—By female alone. Period 4 weeks; once 32 days. Single brooded.

FOOD.—At sea mainly mollusca, especially mussels (*Mytilus edulis*), also *Cardium*, *Solen*, *Margarita*, etc. On freshwater besides mollusca (*Anodonta*, etc.), worms, insects and small fish, and roots of waterplants (*Potamogeton*, etc.). Grain and beans washed out of wrecks also recorded and small crustacea (sandhoppers and shrimps).

DISTRIBUTION.—*British Isles.*—Resident, passage-migrant and winter-visitor (early Sept.—end Oct. to end April—early June). Breeds Caithness, Sutherland, Cromarty, and parts of Ross and Inverness, also in 1921 near Loch Tummel (Perths.), said to have bred Tiree, 1897, bred Shetland, 1911, and one pair has bred in a lough in Ireland since 1905 (probably 1904) (cf. *Brit. B.*, II, pp. 39, 86, 134; III, p. 197; IV, p. 154; V, p. 79), 17 pairs 1918, 7 pairs 1919 (*op. c.*, XII, p. 215; XIII, p. 87), has also bred on another Irish lough. Common winter-visitor (young birds often remaining through summer) east and south coasts Great Britain, but in Orkneys, Shetlands, O.-Hebrides and west coast generally, less plentiful, though usually very common Morecambe

Bay and Solway. In Ireland regular visitor to northern half, but scarce elsewhere. On inland waters infrequent.

DISTRIBUTION.—*Abroad.*—Breeding from Iceland through north Europe and west Siberia to Taimyr Peninsula, from about lat. 74° to Polar Circle (bred Spitsbergen 1905). On passage and in winter on shores of Europe, occasionally as far south as Spain, Portugal, the Mediterranean, Black and Caspian Seas, Cyprus and Palestine, Azores, Madeira, Canaries, Marocco, and Rio de Oro on west coast of the Sahara. Replaced by a closely-allied race in North America and north-east Siberia.

OIDEMIA FUSCA

323. *Oidemia fusca fusca* (L.)—THE VELVET-SCOTER.

ANAS FUSCA Linnæus, Syst. Nat., ed. x, i, p. 123 (1758—"Habitat in Oceano Europæo." Restricted typical locality: Swedish coast).
Edemia fusca (Linnæus), Yarrell, iv, p. 476; Saunders, p. 467.

DESCRIPTION.—*Adult male. Winter.*—Head, nape and sides of neck black glossed dull violet-purple or dull green; immediately below eye a small crescentic white patch; upper-parts black glossed dull green; chin, throat and fore-neck brown-black; under-parts black, centre of breast and belly brown-black, drab-brown feather-bases imperfectly concealed; axillaries black-brown; under wing-coverts same more or less tipped white; tail black glossed dull green; primaries black glossed dull green, inner webs dusky-brown tipped black; secondaries white, first with outer web black-brown, succeeding ones sometimes more or less edged black-brown on outer webs, rest sometimes with a small dusky mark at tip of inner webs, one next innermost marked black-brown on inner web, innermost and all wing-coverts as upper-parts, greater coverts broadly tipped white, lesser coverts bordering edge of wing brown-black. This plumage is acquired by a body-moult Aug. to March. *Summer.*—There appears to be a partial moult in spring involving head and neck and some feathers of body.

Adult male. Eclipse.—Head and neck, some feathers of mantle and scapulars and apparently most of under-parts are moulted first, followed by wings and tail in Aug. Very little material in moult has been examined, and only one (Aug. 12, 1917) in full eclipse plumage, this bird being in the collection of Mr. E. L. Schiöler, to whom I am much indebted for permission to give the following description. Crown, nape, cheeks, sides of neck, chin and throat brown-black with no violet-purple gloss, feathers (except crown) with ill-concealed black-brown bases; white patch under eye as in winter-summer; mantle and scapulars intermixed with black-brown feathers; feathers of sides of body and flanks black-brown shading to brownish-white at base; breast, belly and vent browner than in winter-summer; new black winter-summer feathers coming in on upper and under-parts, new tail-feathers short and in quill,

five worn tail-feathers still remaining ; wings short and in quill and bird in flightless condition. Bill as in winter-summer plumage.

Adult female. Winter and summer.—Head and neck black-brown or sooty-brown ; between eye and base of upper mandible a small patch of white, feathers tipped black-brown ; a larger patch on side of neck behind eye (these patches less distinct in fresh plumage) ; remaining upper-parts black-brown or sooty-brown, feathers with lighter edges ; under-parts sooty-brown, upper-breast, sides of body and flanks with lighter brown edges ; feathers of centre of breast more or less edged white at sides, sometimes many feathers white with a spot or central marking of sooty-brown ; tail black-brown ; wing as male but outer webs and tips of primaries and their coverts, bastard-wing, outer web of outer secondaries and innermost secondaries black-brown (sometimes as black as in male) ; greater coverts sepia or black-brown, outer ones sometimes broadly tipped white ; median and lesser coverts sooty-brown or black-brown with lighter brown edges. Moults apparently as male, birds with both wings flightless occur in Aug., Oct., and even Nov. No spring material examined ; in late summer owing to abrasion of edges of feathers upper-parts have a characteristically barred appearance ; whitish patch on lores and below eye very distinct owing to abrasion of black-brown tips, that on lores sometimes continuous with patch below eye. Amount of white on under-parts varies considerably, in some under-parts are almost uniform, in others plentifully intermixed with white.

Nesting.—Like that of *O. n. nigra*, a tiny white spot on lores not always present ; cheeks, sides of neck, chin and throat purer white ; band across fore-neck dusky-brown.

Juvenile. Male and female.—Like adult female but upper-parts lighter and browner, feathers of under-parts narrowly tipped white. Nape, mantle and scapulars usually lighter than in adult female ; cheeks, sides of neck, chin and throat sooty-brown, feathers with imperfectly concealed ash-brown bases ; large white patch on lores and another below and behind eye, feathers mostly tipped brown ; amount of white varies individually ; fore-neck and upper-breast, sides of body and flanks, vent and under tail-coverts light sepia, darker on fore-neck ; feathers of upper-breast, sides of body and flanks edged buff-brown or whitish ; feathers of lower-breast and belly sooty-brown or drab-brown edged white, edges narrower and less pronounced on belly ; tail as adult female, but tips square with bare shaft projecting ; wing as adult female, but sometimes innermost secondaries, median and lesser coverts lighter and browner.

First winter and summer. Male.—New feathers of upper and under-parts black as in adult ; most advanced birds examined have lores a mixture of new black and worn whitish feathers, no white patch below eye, this area black with a few worn whitish feathers. Some feathers of head, neck, mantle, scapulars, upper-breast, sides of body and flanks, sometimes some tail-feathers are

moulted from Dec. onwards. *Female*.—A certain amount of adult plumage is acquired ; most advanced bird examined had feathers of lores worn and abraded, white patch below eye merely indicated by exposed white bases of new black-tipped feathers ; new feathers like those of adult coming in on head, scapulars, upper and under tail-coverts, upper-breast, sides of body and flanks ; juvenile tail and wings worn.

First eclipse. Male.—(Not examined.)

Second winter and summer. Male.—Birds with brown-black under-parts may be 2nd year birds.

Measurements and structure.—♂ wing 269–293 mm., tail 76–87, tarsus 42–47, bill from feathers 43–49 (12 measured). ♀ wing 251–260, bill 38–42 (5 measured). Primaries : 1st narrow, pointed and more than half longest primary-covert, 2nd longest, 3rd equal or 2–5 mm. shorter, 4th 10–18 shorter, 5th 24–35 shorter, 6th 40–50 shorter. Primaries not emarginated. Innermost secondaries somewhat pointed at tip, longest shorter than 6th or 7th primaries. Tail graduated, wedge-shaped, 14 stiff, pointed feathers, central pair considerably exceeding outermost pair in length. Bill very broad at tip with a moderate protuberance at base of maxilla ; feathers extend slightly forward on to upper mandible but do not form prominent angles, loreal slightly exceeds frontal feathering ; sides of maxilla in ad. ♂ much swollen near rictus. Other structure as in *O. n. nigra* but no down-like feathers at base of upper mandible.

Soft parts.—Bill (ad. ♂) protuberance at base, nostrils and band at lateral base and margin of bill and a streak on each side from nostrils to nail black, sides rich orange, nail and part of ridge behind nail reddish flesh colour, basal half of lower mandible black, rest lake-red, (ad. ♀) entirely dusky, (juv. ♂) slate-black, nail brownish, (juv. ♀) greenish-black ; legs and feet (ad. ♂) deep red, webs dusky-black, (♀) as male but duller, (1st winter ♂) reddish-ochre, webs sepia, (juv. ♀) orange-pink, webs blackish ; iris (ad. ♂) greyish-white with an external dusky ring, (ad. ♀ and juv. ♂ and ♀) brown.

CHARACTERS AND ALLIED FORMS.—Adult male of *O. f. stejnegeri* (N.E. Asia) has shorter and differently coloured bill with prominent projecting knob at base, anterior outline concave—nostrils broad and almost round, ♀ and young have also shorter bill and loreal feathering extends almost to nostrils ; *O. f. deglandi* (N. America) like male *O. f. stejnegeri* but knob less high, anterior outline not concave, sides of belly and flanks brown, frontal feathering extends as far forward as loreal feathering which reaches almost to nostrils. *O. f. fusca* is distinguished by white speculum from other British Scoters.

FIELD-CHARACTERS.—In form and habits very like Common Scoter, but rather larger and readily distinguished by white wing-bar, evident in swimming bird and very conspicuous in flight. Male, too, has a white mark which nearly encircles eye, whilst female has

a large white patch before and a smaller one behind eye, and in both sexes feet are orange-red which show as birds dive.

BREEDING-HABITS.—Breeds on tundra and near lakes inland. *Nest.*—Sometimes deep in cracks in peat, at other times in marshes sheltered by grass tussocks or bushes, lined with dark brown down with indistinct pale centres (feathers from nest see *Brit. Birds*, II, Pl. 2). *Eggs.*—5 to 8, occasionally 9 to 11, creamy-white. Average of 130 eggs, 71.1×48.2 . Max. : 77×48.5 and 71.2×51.5 . Min. : 64.3×46.9 and 68.3×44.8 mm. *Breeding-season.*—From mid-June onwards. *Incubation.*—By female. Period unknown. Single brooded.

FOOD.—Chiefly marine mollusca, including *Mytilus edulis* (commonly), *Solen*, *Buccinum*, *Cardium*, *Macra*, *Tellina* and *Donax*; also crustacea (small crabs, etc.) and according to Naumann, on freshwater also insects, worms, small fish, and tubers, buds, roots, etc., of water-plants and water-snails.

DISTRIBUTION.—*British Isles.*—Passage-migrant and winter-visitor (mid-Sept.—mid-Oct. to end April—end May). Regular, but not abundant, east coast Great Britain, not infrequent south coast, scarce western side. Common Orkneys, but rare Shetlands and uncommon O. Hebrides. Rare visitor Ireland. Very rare vagrant inland waters. Said to have nested Scotland, but no proof. Some individuals stay throughout summer.

DISTRIBUTION.—*Abroad.*—Breeds in Scandinavia, Finland, Lapland, north Russia, Novaya Zemlia, Siberia eastwards to Yenisei. In winter south to Switzerland, temperate Europe generally, Spain and Morocco, Mediterranean, Egypt, N. Persia, and Turkestan. Casual Færoes and Greenland. Replaced by allied races in eastern Siberia and N. America.

OIDEMIA PERSPICILLATA

324. *Oidemia perspicillata* (L.)—THE SURF-SCOTER.

ANAS PERSPICILLATA Linnæus, Syst. Nat., ed. x, i, p. 125 (1758—Canaç'a).
Edemia perspicillata (Linnæus), Yarrell, iv, p. 481; Saunders, p. 469.

DESCRIPTION.—*Adult male. Winter.*—Upper-parts black with dull greenish gloss on hinder-crown; white patch across fore-head from eye to eye reaching forward beyond lateral base of bill; white line below eye, not always present; long triangular-shaped patch of white on centre of nape, apex pointing towards mantle; this patch thickly intermixed with short black feathers completely concealed by long white ones; chin, throat and fore-neck brown-black; feathers of lower-breast, belly and vent tipped black, with ill-concealed drab-brown bases; rest of under-parts black; axillaries brown; under wing-coverts same, more or less tipped black, those covering primaries ash-grey edged brown; tail-feathers black or black-brown; primaries and their coverts and secondaries

brown-black, inner webs drab-brown, brown-black at tip, innermost secondaries black, inner webs black-brown ; rest of primary-coverts and bastard-wing black-brown ; rest of wing-coverts black. This plumage is acquired by complete moult Aug. to Dec. *Summer*.—There appears to be a partial spring moult involving feathers of head, neck, some body-feathers, occasionally tail-feathers but not wings. Coloration as in winter. *Eclipse*.—I have examined only one male with wings short and in quill and am unable to distinguish an eclipse plumage ; at one time during the moult, the white nuchal patch is absent owing to shedding of white feathers and consequent exposure of the short black feathers beneath.

Adult female. Winter and summer.—Fore-head, crown down to eye and upper part of nape black-brown ; sometimes a distinct white nuchal patch (often ill-defined or absent), intermixed with short dark brown feathers completely concealed by long white feathers as in male ; rest of nape and upper-mantle sepia ; remaining upper-parts sepia or black-brown, some of upper tail-coverts and feathers of rump tipped black ; irregular whitish patch on lores, another in auricular region, feathers of both with dusky-brown tips, which are subsequently lost by abrasion ; chin dusky-brown, feathers with ill-concealed white bases ; remaining under-parts warm sepia or dusky-brown, feathers of breast, belly and flanks sometimes tipped white, in others flank-feathers more or less black-brown towards tip ; axillaries and under wing-coverts sepia, some of latter edged white ; under primary-coverts as in male ; tail-feathers black-brown or sepia ; primaries, secondaries and their coverts and bastard-wing black-brown or warm sepia, inner webs drab-brown shading to black-brown or warm sepia at tips of primaries ; innermost secondaries brown-black or warm sepia, inner webs sepia or drab-brown, rest of wing-coverts sepia. Moult as in male. One April female examined was in full body and tail moult. Coloration in summer apparently as in winter but more material required for examination. In late summer feathers of upper-parts have edges worn and faded giving upper-parts a barred appearance.

Nestling.—(Not examined.)

Juvenile. Male and female.—Like adult female, but never with a white nuchal patch, white patch on lores and auricular region often ill-defined ; feathers of breast and belly lighter than in adult female, being pale dusky-brown broadly tipped white, sometimes breast and belly more or less white ; feathers of upper-breast, sides of body and flanks more or less edged buff-brown which fades to buff-white ; tail and wings as in adult female, but tips of tail-feathers square with bare shaft projecting.

First winter and summer. Male.—A varying amount of black plumage of adult is acquired ; sometimes head, neck, upper-mantle, scapular region, rump, upper and under tail-coverts, fore-part of body and sides of body and flanks are black ; crown black with no white patch ; nape with white triangular patch. A vary-

ing amount of body-feathers, tail, but not wings, are moulted from Nov. to April, but apparently juvenile feathers are retained on mantle and under-parts. *Female*.—A certain amount of adult plumage is acquired, but juvenile feathers of lower-breast, portions of mantle and wings are retained. Moults as in male.

Second winter and summer. Male.—Birds with under-parts browner than others may be in their 2nd year.

Measurements and structure.—♂ wing 240–256 mm., tail 75–84, tarsus 40–43, bill from feathers on culmen 34–37 (12 measured). ♀ wing 223–235, bill 35–38. Primaries : 1st narrow, pointed and about two-thirds longest primary-covert, 3rd longest, 2nd about as long, 4th 8–12 mm. shorter, 5th 22–26 shorter, 6th 34–40 shorter ; 2nd slightly emarginated on inner web in ad. ♂, ad. ♀ has 2nd broader than in ♂ and less emarginated, juv. ♀ 2nd slightly narrower than in adults. Innermost secondaries pointed at tip and longest longer than 6th or 7th primaries ; long scapulars pointed at tip. Tail cuneate with 14 stiff, pointed feathers. Bill about same height and breadth at base, depressed and flattened towards tip where it is narrower but rounded ; upper mandible in ad. ♂ with a basal protuberance with convex and descending outline, lateral base bulging with basal outline convex, in ad. ♀ culmen not appreciably elevated at base, bulge at lateral base of bill scarcely marked ; in juv. ♂ and ♀ there is no basal protuberance, and lateral bulge is hardly apparent, but in juv. ♂ it commences to develop in winter ; nail large, broad but narrowed terminally. Feathers on fore-head extending in a broad stripe nearly or quite as far as posterior end of nostril, but those of lores not advancing beyond rictus.

Soft parts.—Bill (ad. ♂) upper mandible with square black patch at base margined orange except in front, where there is a patch of bluish-white extending to near nostrils, basal protuberance deep reddish-orange lighter towards nail, shading to rich yellow towards margins, nail dingy greyish-yellow, lower mandible flesh-coloured, (ad. ♀) greenish-black, black spot at lateral base slightly if at all indicated ; legs and feet (ad. ♂) orange-red, webs dusky tinged green, claws black, (ad. ♀) yellow-orange, webs greyish-dusky, claws black, (juv. ♂ Nov.) dull orange, darker at joints and back of tarsi ; iris (ad. ♂ and ♀) yellowish-white, (juv. ♂) brown.

CHARACTERS.—No subspecies. Black wing of adult male, black-brown in female and immature birds, absence of white speculum together with frontal feathering which extends forward considerably along culmen (loral feathering not extending beyond rictus) distinguish this species in all plumages.

FIELD-CHARACTERS.—Adult drake at once identified by conspicuous white patch on nape. Plumage of duck varies greatly. When nape-patch shows clearly no further clue needed but often this is quite invisible in female, even through binoculars, and bird may then easily be confused with females Common and Velvet-Scoters and female Scaup. Though Common Scoter is smaller, size is always

difficult to estimate, whilst white wing-bar, which would at once denote Velvet-Scoter, is not always visible in that bird. Under such circumstances it would be no easy matter, even for one familiar with these three species, to identify females at distance. Chief cause of confusion with Scaup is explained under that species. Keeps well away from shore and feeds both by day and night, usually in 3-5 fathoms. In flocks of 20-40 individuals, but sometimes in many hundreds. (C. E. Alford.)

BREEDING-HABITS.—Little recorded. *Nest.*—Of dead vegetation, lined dry grass and down in tussock on marsh, or on small island. *Eggs.*—Usually 5 to 7, occasionally 8, variously described as creamy and greenish-buff. Material scanty: one set averages 64.4×43.9 mm. Others are smaller, averaging (5) 58.7×41.1 . *Breeding-season.*—June. *Incubation.*—Apparently by female. Period unknown. Single brooded.

FOOD.—Chiefly marine mollusca especially mussels, but also razor-shells (*Solen*), scallops (*Pecten*), sea-clams (*Spisula*), *Nucula*, etc. Fish also said to be taken.

DISTRIBUTION.—*British Isles.*—Rare vagrant. Most frequent Orkneys, where occasional examples, usually young, not infrequently seen and six recorded obtained. Several recorded seen elsewhere, including one Kent, Jan., 1914, and following obtained: O. Hebrides (one), Firth of Forth (one or two), Cumberland (one), Lancs. (one), Scilly Isles (two), Cornwall (two), Devon (three), Dorset (two). Six Ireland.

DISTRIBUTION.—*Abroad.*—Breeds in northern North America; non-breeding birds in summer on coast of Lower California, in Greenland and on northern coasts of United States; in winter south to Lower California, Carolina, Florida. Casual in Bermudas and Jamaica. Also (apparently breeding) on shores of Bering Sea, and (according to Palmén) in extreme north-east of Siberia. A number of occurrences on record from Færoes, Lapland, Finland, Scandinavia, Heligoland, Belgium, France.

Genus *MERGUS* (L.)

MERGUS Linnaeus, Syst. Nat., ed. x, i, p. 129 (1758—Type by subsequent designation, Gray, 1840, *M. merganser*).

Differ from Ducks, Geese, and Swans by the narrow, slenderer bill, in which the upper mandible does not overlap the lower. There are no lamellæ, but on the edges of both mandibles are saw-like sharp teeth, directed slightly backwards. Nail large, occupying whole tip, sharply decurved. Nostrils large and open slightly beyond middle of mandible. Feet large, hind-toe broadly lobed, outer toe weaker than inner. Both sexes with more or less elongated head- or neck-feathers, forming more or less crests. Tail rounded to almost cuneiform. Rectrices 16-18. Sexes different. 7 species,

one with several subspecies. Europe, America, Asia, one with reduced wings and similarly coloured sexes on Auckland Islands south of New Zealand has been generically separated.

Key to species of genus MERGUS.

1	{	Entire head and upper-neck black with or without green gloss 2	<i>M. cucullatus</i> , ♂ ad., p. 393
		Head and neck black with exception of middle of crest which is white 3	
		Upper-part of head rufous or brown 3	
		Head and neck white with exception of large black spot in front of eyes and on sides of occiput 3	
2	{	Under-parts from neck uniform white or salmon-colour 4	<i>M. merganser</i> , ♂ ad., p. 380
		Jugulum ferruginous spotted with black 4	
3	{	All upper wing-coverts grey or brown 4	<i>M. albellus</i> , ♀, p. 390
		Median upper wing-coverts white 4	
4	{	Sides of neck rufous 5	<i>M. cucullatus</i> , ♀, p. 394
		Sides of neck brownish-grey 5	
5	{	Upper-parts ash-grey 5	<i>M. merganser</i> , ♀, p. 381
		Upper-parts brown-grey 5	

MERGUS MERGANSER

325. *Mergus merganser merganser* L.—THE GOOSANDER.

MERGUS MERGANSER Linnaeus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality: Sweden).

Mergus merganser Linnaeus, Yarrell, iv, p. 488; Saunders, p. 471.

DESCRIPTION.—*Adult male.* *Winter and summer.*—Crown, nape and sides of neck bottle-green, in some lights tinged amethyst (occipital feathers considerably elongated); fore-part of crown, lores, cheeks, chin, throat and fore-neck dull black, all except chin and throat glossed greenish; lower-neck, upper-mantle and outer scapulars bordering wing white, when fresh suffused pale salmon-colour, some feathers bordering lower-mantle vermiculated ash-brown and some tipped black; rest of mantle and most scapulars black, lower

The Goosander (*Mergus m. merganser*).
Bill of adult male.

scapulars black-brown or sepia; back and rump ash-grey, feathers with dark shafts and more or less tipped or vermiculated white, vermiculations most pronounced at side of rump; patch on either side at root of tail white, feathers finely vermiculated brown; upper tail-coverts ash-grey with central shaft-streaks or shadings of ash-brown; remaining under-parts white (in life suffused pale salmon colour), sometimes some flank-feathers and some upper tail-coverts faintly vermiculated dusky-brown; axillaries and under wing-coverts white, those covering primaries

ash-grey ; tail-feathers ash-grey, more or less shading to ash-brown at edges ; primaries black-brown or sepia paler on inner webs and shading to white towards base ; outer secondaries with outer webs black-brown, inner webs brownish-white, inner secondaries white in some marked or vermiculated dusky-brown, innermost white with one or both webs narrowly bordered black, innermost one sometimes suffused dark ash-grey on inner web, short ones black-brown more or less suffused dark grey ; primary-coverts, bastard-wing, coverts at edge and bend of wing, and outer greater coverts black-brown (sometimes one or two of latter vermiculated white) ; rest of greater coverts white, innermost sepia with grey bloom ; median and some lesser coverts white, rest of lesser and inner median black-brown tipped white. This plumage is acquired by a moult of body-feathers and innermost secondaries from Sept. to Dec.

Adult male. Eclipse.—The body-feathers (not all those of back and rump or tail-coverts, nor apparently lower-breast, belly, vent or under tail-coverts) are moulted first, followed by tail and wings in Aug. and Sept. Like adult female but easily distinguished by white wing-coverts. Feathers of lores, crown, crest and part of nape as juvenile, but crest longer (though shorter than in adult female) ; mantle sepia or dusky-brown, feathers edged bluish-grey, intermixed with feathers with black centres tipped bluish-grey ; a whitish streak not always distinct from lower side of upper mandible to eye ; cheeks, sides of neck and fore-neck paler than in adult female and not such a reddish-cinnamon ; a narrow white streak down centre of neck to upper-breast ; remaining under-parts as adult female ; sides of body and flanks more plentifully intermixed with white feathers vermiculated ash-grey ; and tipped or subterminally barred same ; tail worn and faded ; innermost secondaries shorter than in adult winter with inner webs dark ash-grey, outer webs greyish-white suffused pale ash-grey and narrowly bordered blackish-grey.

Adult female. Winter and summer.—Crown and elongated feathers of occipital region snuff-brown, feathers of crown mostly with blackish shafts ; feathers of lores black-brown edged snuff-brown, sometimes a small whitish patch below eye ; chin white ; upper-throat white merging into reddish cinnamon-brown of lower-throat ; rest of head and neck reddish cinnamon-brown ; lower part of nape ash-grey, feathers tipped white ; mantle, scapulars and upper tail-coverts bluish ash-grey, feathers with dark shafts and often shaded brownish-grey centrally ; back and rump as mantle but lighter, feathers of sides of rump tipped white ; feathers of lower-neck with pale ashy-grey centres more or less concealed by broad cream-white tips ; sides of body and flanks ash-grey, feathers with white tips, those bordering breast and belly with inner or both webs white irregularly barred, marked and vermiculated ash-grey ; remaining under-parts in life yellowish-salmon colour ; sometimes feathers of vent spotted ash-grey ; sometimes most of under tail-

coverts with V-shaped marks and long under tail-coverts more or less vermiculated ash-grey ; axillaries, under wing-coverts and tail as male ; wing as male but innermost secondaries and coverts as scapulars but lighter, outer webs faintly edged blackish-grey ; greater coverts as male but some with dusky-brown or ash-grey tips ; median and lesser coverts as mantle but lighter, with dark shafts and faintly tipped brownish-grey. This plumage is acquired by complete moult in autumn. Hardly any birds in moult examined and none with wings in quill, one (March) was moulting some body-feathers but more material is required to determine if there is more than one moult.

Nestling.—Crown to below eye and centre of nape hair-brown tinged tawny ; remaining upper-parts, sides of body and back of thighs hair-brown or grey-brown (usually darker on back and rump), down with buff-brown tips ; a white patch on wing, another on either side of back above thighs and continuous with white of under-parts (sometimes a small white patch on either side of back, a little below wing), another on either side of rump ; black-brown streak from above lores to eye ; above eye small whitish patch tinged tawny ; streak of same from lores to below eye ; rest of cheeks, sides of neck and rest of nape more or less suffused tawny ; remaining under-parts white.

Juvenile. Male and female.—Like adult female but feathers of fore-head streaked sepia (edges of feathers lighter) ; rest of crown, crest and nape buff-brown suffused greyish olive-brown, crest much shorter and less abundant than in adult female ; from lores to eye, a faint buff streak, feathers more or less streaked sepia ; whole tone of upper-parts (especially scapulars) browner, not such a blue-grey as in adult female, feathers of lower-nape without white tips ; a white streak down centre of throat some feathers suffused reddish cinnamon-brown ; sides of fore-neck as in adult female ; lower-neck and sides of breast ash-grey or ash-brown, feathers tipped white ; sides of body and flanks as adult (sometimes browner) ; long under tail-coverts palest ash-grey more or less tipped white ; rest of under-parts white ; tail-feathers as adult but structure juvenile ; wing as adult female but in most juvenile males median coverts bordering bastard-wing more or less suffused pale greyish-white, innermost secondaries in juvenile male longer than in juvenile female, and sometimes those next speculum paler grey than in adult or juvenile female.

First winter. Male.—Like adult female in coloration but distinguished by black-brown mantle feathers tipped bluish ash-grey and by pure white fore-neck bordering upper-breast. Like adult female but sides of lower-nape white ; sides of upper-mantle and upper-breast white, feathers more or less edged and vermiculated ash-grey ; some new feathers of mantle and scapulars black-brown tipped bluish ash-grey, some scapulars with pale ashy-white centres or shadings, others with outer webs greyish-white and inner webs ash-grey ; ash-grey feathers vermiculated whitish usually make

their appearance at sides of root of tail ; sometimes an irregular blackish streak through eye ; chin and throat sometimes more or less spotted blackish ; feathers bordering reddish-brown lower-throat tipped black or black-brown forming an irregular semi-circular ring (often incomplete) ; rest of fore-neck white ; feathers of sides of body and flanks as adult female but plentifully intermixed with white feathers vermiculated grey ; rest of plumage, tail and wings as adult female, but sometimes new innermost secondaries are acquired with outer webs (or both webs) greyish-white narrowly bordered blackish-grey, and inner webs grey. Most of the juvenile body-feathers (usually breast, belly and vent), tail and occasionally some innermost secondaries are moulted from Sept. onwards ; sometimes many juvenile feathers are retained. *First summer*.—By March, sometimes even January, black feathers tipped ash-grey appear on mantle ; some white and some black scapulars and some white flank feathers, with outer webs and tips more or less vermiculated ash-grey, are also acquired.

First eclipse. Male.—As adult eclipse but easily distinguished by ash-grey wing-coverts ; feathers of sides of body and flanks apparently with fewer vermiculated ash-grey and white feathers.

First winter and summer. Female.—As adult female but crest shorter and less abundant, under-parts whiter and innermost secondaries when not moulted worn and faded. Moult as in male, subsequent plumages like adult.

Measurements and structure.—♂ wing 283–295 mm., tail 104–115, tarsus 46–50, bill from point of frontal feathering 55–61 (12 measured). ♀ wing 250–267, bill 45–51. Primaries : 1st narrow, pointed and about $\frac{2}{3}$ longest primary-covert, 3rd longest, 2nd as long or 2–7 mm. shorter, 4th 11–17 shorter, 5th 26–33 shorter, 6th 43–54 shorter ; 2nd slightly emarginated inner web, 3rd outer web. Innermost secondaries long and tapering, longest shorter than 4th to 6th primary ; in eclipse shorter ; scapulars long and tapering to a point ; in eclipse short with square tips. Tail slightly rounded, 18 stiff feathers slightly rounded at tip. Bill about length of head, nearly straight or slightly re-arcuate, of greater height than breadth at base, tapering to middle beyond which slender and cylindrical, upper mandible with dorsal line somewhat concave to middle then straight and slightly ascending to nail ; a faint groove along side of upper mandible from nasal opening to nail ; nail abruptly decurved ; serrations acute and directed backwards, frontal feathering usually extends beyond loreal feathering but often equal. Nostrils situated about middle of bill. Feathers of occiput in ♂ elongated, in ♀ and eclipse ♂ considerably elongated forming a well-developed crest, in juv. ♂ and ♀ crest short, in first winter ♂ and ♀ crest shorter than in adult female.

Soft parts.—Bill (ad. ♂) bright vermilion, nail black, ridge of upper mandible dusky ; (ad. ♀) as ♂ but duller ; (juv. ♂) dark reddish-brown shading to yellow on tomia ; lower mandible pale

yellow (Millais); legs and feet (ad. ♂) bright vermilion, (ad. ♀) duller, (juv.) yellow, webs and feet dusky-grey; iris (ad.) carmine.

CHARACTERS AND ALLIED FORMS.—*M. m. orientalis* (Afghanistan, Himalaya) is smaller; *M. m. americanus* (N. America) has in ad. ♂, black bases of white greater coverts exposed forming a wing-bar; ♀ and young have upper-parts darker. *M. m. merganser* is distinguished from other British Mergansers by its large size; green head without long crest, of adult male, uniform white under-parts (in life salmon-pink) and in ad. ♀ and young birds bluish-grey upper-parts distinguish it from *M. serrator* in all plumages.

FIELD-CHARACTERS.—Bottle-green crested head and tapering blood-red bill, black back and white wings and breast identify male on water, whilst on the wing the long fusiform body and pinkish suffusion of under-parts are further guides. Female has reddish-brown head and neck with graduated mane-like crest, grey back and white under-parts. An expert diver and swims quickly on surface, low in water, with its level back often awash and long neck erect. Rises with difficulty, but when well on the wing flight is very rapid. Call, a hoarse “kar-r-r,” and male utters a soft low croaking note during courtship.

BREEDING-HABITS.—Haunts both wooded shores of rivers and lakes and also treeless districts. *Nest*.—Often in hole of tree, but also at times in hollow in peat or among rocks and has bred in nesting-boxes. Down, large greyish-white, very like that of Sheld-Duck, but feathers of latter characteristic (see *Brit. Birds*, II, Plates 1 and 2). *Eggs*.—7 to 13, but sometimes joint clutches of much larger dimensions recorded; smooth, creamy-white. Average of 125 eggs, 68.3×47.1 . Max.: 74.5×47.5 and 70×49 . Min.: 63×45 and 68×41 mm. *Breeding-season*.—From latter half April onward in Scotland; but later in Iceland and Scandinavia. *Incubation*.—By female. Period about four weeks. Single brooded.

FOOD.—Almost entirely fish, including trout, young salmon, barbel, roach, dace, perch, bleak, etc. Collett also records *Muræna* and remains of frog, and Hartert caterpillars, cockchafers and burying beetles. Although as a rule only small fish are taken a barbel 12 in. long has been found in gullet.

DISTRIBUTION.—*British Isles*.—Resident and winter-visitor (end Sept.—end Oct. to end March—early May). Breeds Sutherland, Ross, Moray area, Tay area, and parts Argyll. Elsewhere winter-visitor to estuaries and inland waters, but rare Orkneys and Shetlands; very rare O. Hebrides, and somewhat irregular and uncommon south England, Wales and Ireland.

DISTRIBUTION.—*Abroad*.—From Iceland and north Europe (south to Switzerland and Germany) to Kamtschatka. In winter south to Mediterranean and N. Africa, Japan and China. Replaced by allied forms in N. America, and central Asia, the latter race wintering in India.

MERGUS SERRATOR

326. *Mergus serrator* L.—THE RED-BREASTED MERGANSER.

MERGUS SERRATOR Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality : Sweden).

Mergus serrator Linnæus, Yarrell, iv, p. 494 ; Saunders, p. 473.

DESCRIPTION.—*Adult male. Winter and summer.*—Head and upper-part of neck all round black, sides of face and neck glossed green ; small whitish patch below eye ; blackish streak down centre of nape ; rest of neck white ; mantle and inner scapulars black ; sides of upper-mantle pink-cinnamon, feathers irregularly marked or vermiculated black ; patch of feathers on either side of mantle with large white centres outlined in black ; outer scapulars white

The Red-breasted Merganser (*Mergus serrator*). Adult female.

some marked or vermiculated black ; back and rump vermiculated black and white ; upper tail-coverts olive-grey with sepia centres and more or less spotted or vermiculated white ; fore-neck and upper-breast pink-cinnamon broadly streaked and irregularly spotted black, merging on sides of breast with black of upper-mantle ; sides of belly and flanks coarsely vermiculated black and white ; remaining under-parts and axillaries white and under wing-coverts mostly white ; under primary-coverts pale grey ; tail-feathers ash-brown, sometimes faintly bordered or vermiculated white ; primaries brown-black, lighter on inner webs ; outer secondaries brown-black, paler on inner webs which are mostly marked white towards tip, inner secondaries white with imperfectly concealed black bases forming a wing-bar, innermost white with outer webs narrowly edged black, those next scapulars and their coverts black-brown ; outer greater coverts black-brown, lighter on inner webs, rest of greater coverts white with black bases forming a wing-bar ; median coverts white ; rest of wing-coverts black-brown. This plumage is acquired by a moult of body-feathers and some inner-most secondaries from Sept. to Jan.

Adult male. Eclipse.—The body-feathers, apparently not back but sometimes an odd feather, not lower-breast, belly, vent, or under tail-coverts, are moulted first, followed by wings and tail from May to Aug. Resembles adult female but distinguished at once by white wing-coverts. Upper-parts as adult female, but

crest shorter, mantle and scapulars darker, intermixed with brown-black feathers, with (or without) narrower buff-brown tips ; back as adult male ; rump intermixed with ash-brown feathers, some vermiculated white at tip ; cheeks and sides of neck, chin and throat as juvenile male ; fore-neck and upper-breast as adult female ; feathers of sides of body and flanks as adult female but intermixed with ash-brown feathers coarsely vermiculated whitish ; remaining under-parts as in winter-summer ; new innermost secondaries with outer webs white more broadly bordered black than in winter-summer, inner webs pale ash-grey ; innermost secondaries black-brown ; rest of wing as in winter-summer.*

Adult female. Winter and summer.—Fore-head, crown down to eye, and elongated occipital feathers snuff-brown, feathers of fore-part of crown with blackish shaft-streaks ; centre of nape ash-brown, feathers tipped snuff-brown ; rest of nape, cheeks and sides of neck pink-cinnamon or cinnamon ; remaining upper-parts dark ash-brown or black-brown (back, rump and upper tail-coverts lighter), feathers tipped or shaded pale olive-grey or buff-brown ; black patch varying in extent below and behind, and sometimes completely encircling, eye ; whitish patch immediately below eye ; whitish streak (feathers streaked dusky) from lores to eye ; below this a brownish streak merging with cinnamon-brown of sides of head ; chin, throat and fore-neck white more or less suffused pale pink-cinnamon, fore-neck sometimes spotted black ; sides of body and flanks ash-brown, feathers tipped buff-brown or white, some with inner webs more or less white, sometimes slightly vermiculated ash-brown ; thighs ash-brown tipped white ; remaining under-parts white, lower under tail-coverts with ash-brown centres ; tail-feathers as male but without vermiculations ; wing as male but innermost secondaries and coverts dark ash-brown or black-brown, inner webs paler, secondaries near speculum with grey bloom and more or less bordered blackish on outer webs, one next speculum with outer web white towards tip and broadly edged black ; white greater coverts with blackish bases hardly exposed, in some more or less tipped black-brown ; median and lesser coverts dark ash-brown, sometimes with more or less pronounced ash-grey bloom and faintly tipped buff-brown. This plumage is acquired by complete moult Aug. to Feb. *Summer.*—Very few spring and summer specimens examined ; all breeding birds lacked black area round eye, which apparently is only present in Nov.–March ; but more material is required before this can be decided.

Nestling.—Like that of *M. merganser* ; upper-parts sometimes rather richer brown.

* On sides of breast in front of wing there is sometimes a patch of ash-brown feathers shaded pink-cinnamon and more or less vermiculated or marked black-brown or white, and sides of body and flanks are sometimes intermixed with white feathers coarsely vermiculated black-brown ; these feathers are subsequently shed and may belong to eclipse plumage or may be acquired during moult from eclipse to winter-summer.

Juvenile. Male.—Like adult female, but crest shorter ; forehead, crown and nape buff-brown more or less suffused greyish olive-brown, feathers with black-brown shaft-streaks ; upper-parts greyer, feathers dark ash-grey with light grey edges and darker shafts ; no black round eye and whitish streak from loreal feathering to eye absent or merely indicated by indefinite buff streak ; cheeks and sides of neck paler pink-cinnamon ; fore-neck and upper-breast pale ash-brown, feathers tipped white ; sides of body and flanks and some feathers of vent and some under tail-coverts pale ash-brown, feathers mostly with ash-white tips ; remaining under-parts white ; tail as adult female but tips square ; wing as adult female but outer web of secondary next speculum sometimes suffused pale grey instead of white. Juvenile male distinguished from juvenile female by its larger size. *Female.*—As male but innermost secondaries shorter, dark ash-brown and more or less edged blackish on outer webs, and without or with little indication of grey bloom as in adult female and juvenile male.

First winter. Male.—Very like adult female, but no black round eye ; some flank-feathers more or less coarsely vermiculated dark ash-brown and white. Crown, crest and upper-parts as adult female ; dark ash-brown feathers at sides of root of tail often more or less vermiculated whitish ; no black round eye ; indistinct buff streak from lores to eye ; indistinct brownish streak through eye ; sides of neck, chin and throat as adult female but throat without any black ; at sides of upper-mantle some dark ash-brown feathers shaded light pink-cinnamon towards centre, sometimes more or less vermiculated or bordered blackish, sometimes one web more or less white ; remaining under-parts as juvenile but sides of body and flanks as adult female, flanks usually intermixed with dark ash-brown feathers with one web coarsely vermiculated ash-brown and white ; tail-feathers mostly new and like those of adult female ; wing as juvenile. Birds in this plumage occur in Dec., Jan. and Feb. The juvenile body-feathers (all feathers of back and rump ?), tail, sometimes some innermost secondaries are moulted from Oct. onwards but not rest of wings. Sometimes some juvenile body-feathers are retained. *First summer.*—By Jan. or Feb. forward young males commence to acquire blackish feathers on crown, round eye and on chin and throat ; new black feathers (sometimes tipped dark ash-brown) appear on mantle and scapulars ; white scapulars, or ash-brown scapulars with one web more or less white are acquired ; new upper tail-coverts dark ash-grey some with indications of whitish vermiculations ; upper-breast as adult male but streaks narrower ; sides of body and flanks intermixed with white feathers coarsely vermiculated dark ash-brown ; patch across shoulder more clearly indicated ; new innermost secondaries when acquired have outer or both webs pale ash-white (one next speculum almost white) bordered with black, inner webs pale mouse-grey.

First winter and summer. Female.—As adult female, but crest

shorter and less abundant ; usually no black round eye but exceptionally an indication ; wing as adult, but more worn and abraded. Moults as in male.

First eclipse. *Male*.—Apparently as adult eclipse but distinguished by juvenile wing-coverts until they are shed.

Measurements and structure.—♂ wing 244–259 mm., tail 79–88, tarsus 40–45, bill from point of frontal feathering 53–62 (12 measured). ♀ wing 217–230, bill 48–55. Primaries : 1st narrow, pointed and rather more than half longest primary-covert, 2nd longest, 3rd equal or 2–4 mm. shorter, 4th 11–15 shorter, 5th 24–31 shorter, 6th 40–45 shorter. Innermost secondaries long and tapering, longest shorter than 6th or 7th primary ; in eclipse shorter and less tapering ; scapulars long and tapering, in eclipse shorter and with square tips. Tail slightly rounded, 18, occasionally 20, stiff feathers. Bill as in *M. m. merganser* but less re-arcuate, upper mandible with dorsal line gently declinate to middle. Nostrils near base of bill. Loral feathering extending further forward on bill than frontal. Well developed occipital crest, longest in ♂, rudimentary in juv. ♂ and ♀, shorter in first winter ♂ and ♀ than in adult ♀. Other structure as in *M. m. merganser*.

Soft parts.—Bill (ad. ♂) deep carmine, culmen and nail black, (ad. ♀) as male but duller, (juv. and first winter ♂) upper mandible reddish-horn, under orange-red ; legs and feet (ad. ♂) deep vermilion, (ad. ♀) paler, (juv.) brownish-yellow, webs dull brown, (first winter ♂) orange-red, webs dusky ; iris (ad. ♂) carmine, (ad. ♀) duller, (first winter ♂) yellow.

CHARACTERS.—No subspecies. For differences of *M. m. merganser* see under that species. Distinguished from *M. albellus* and *M. cucullatus* by having distal halves of secondaries white.

FIELD-CHARACTERS.—Of very similar form and habits to Goosander, but much smaller and seldom seen on freshwater out of breeding-season. Male differs from Goosander in having double crest, longest in upper part, chestnut breast-band, black and white shoulder-patch, and lacks rosy blush on under-parts. Females are more alike, but Merganser looks smaller, instead of considerably larger, than a Mallard. Her back is brown rather than grey, and white wing-patch is larger and divided by a more distinct black line. Call, a hoarse “kar-r-r” like Goosander’s, but male utters a soft cooing note, and female when disturbed a harsh “quark.”

BREEDING-HABITS.—Haunts sea-coast as well as lakes and rivers inland. *Nest*.—Well hidden, sheltered by briars, heather or long grass, sometimes in hollow on grassy cliff, or in burrow, among loose stones, etc. Down plentiful, greyish-drab with light centres (feathers from nest see *Brit. Birds*, II, Pl. 2). *Eggs*.—Usually 7 to 10, but 11 to 16 on record ; greenish-buff to stone-drab. Average of 100 eggs, 65.2×44.6. Max. : 70.7×44.7 and 64.5×47.3. Min. : 60.4×42.5 and 65×40.3 mm. *Breeding-season*.—Last week May

and early June in Scotland ; second layings recorded as late as August. *Incubation*.—By female only. Period about 4 weeks. Single brooded.

Food.—Mainly fish of many species (small salmon and trout, eel, sand-smelt, stickleback, blenny, roach, gudgeon, plaice, dace, small pike and coal-fish, etc.) ; also crustacea (small crabs, shrimps, etc.), and Millais records in summer, insects, including cockchafers, larvæ of dragonfly and caterpillars, as well as earthworms.

DISTRIBUTION.—*British Isles*.—Resident, passage-migrant and winter-visitor (early Sept.—end Oct. to mid-March—mid-May). Breeds commonly Bute, Dumbarton, Argyll. and Tay area, and northwards both on salt and fresh waters, as well as Hebrides, Orkneys and Shetlands, and many parts Ireland. Elsewhere common winter-visitor, chiefly coasts and infrequently inland waters.

DISTRIBUTION.—*Abroad*.—Breeds in northern portions of Northern Hemisphere (Greenland, Iceland, Færoes, Scandinavia and north Russia, south to Denmark and north-east Germany), south in winter to north Africa, Black and Caspian Seas, Sind, China and Japan, in America to Lower California and Florida. Casual in Bermudas, Cuba, Hawaiian and Pribilof Isles, Madeira and Azores.

MERGUS ALBELLUS

327. *Mergus albellus* L.—THE SMEW.

MERGUS ALBELLUS Linnæus, Syst. Nat., ed. x, i, p. 129 (1758—Europe. Restricted typical locality : Mediterranean, near Smyrna ; from the first quotation : Hasselquist's Journey, p. 268).

Mergus albellus Linnæus, Yarrell, iv, p. 499 ; Saunders, p. 475.

DESCRIPTION.—*Adult male*. *Winter*.—Head, including part of crest and neck all round white ; irregular patch of black glossed dull green on lores encircling eye ; dark green streak on side of hinder-crown, elongated feathers of which contribute to occipital crest ; upper-mantle white ; semi-circular narrow black band extending across mantle on to breast, another in front of wing ; rest of mantle black ; scapulars mostly white, long ones with outer webs narrowly bordered black, lower scapulars dark ash-grey, sometimes narrowly edged white ; back and rump black-brown, sometimes patch on either side of lower-rump dark ash-brown more or less vermiculated ashy-white ; lower-rump and upper tail-coverts dark ash-brown ; sides of body and flanks white finely vermiculated dusky-brown ; remaining under-parts including

The Smew (*Mergus albellus*). Adult female.

axillaries white ; under wing-coverts white, those at edge of wing dark ash-brown ; tail-feathers dark ash-grey ; primaries sepia, outer webs black-brown ; secondaries sepia broadly tipped white, outer webs black, secondary next innermost with outer web white, narrowly bordered black, innermost ash-grey, sometimes shading to sepia on inner web, sometimes with outer web narrowly bordered white ; primary-coverts and bastard-wing as primaries ; greater coverts as secondaries but inner ones with outer or both webs white ; median coverts white ; rest of wing-coverts blackish-grey or black-brown, those at bend of wing and often lesser coverts more or less tipped white. The body-feathers and innermost secondaries are moulted from autumn to Dec.

Adult male. Eclipse.—The body-feathers (all ?) are first moulted followed by wings and tail in autumn. Very like adult female but easily distinguished by larger size, black on mantle and larger white patch on median coverts. Head and neck as adult female, but crown and crest tinged buff-brown ; no black patch on lores or encircling eye, these areas cinnamon-brown ; centre of upper-mantle intermixed with blackish feathers ; small patch at sides of lower-rump dark ash-brown more or less vermiculated ashy-white as in winter ; under-parts as female ; wing as winter but new innermost secondaries with inner webs sepia, outer webs faintly bordered blackish-grey. (Only one examined.)

Adult female. Winter and summer.—Fore-head, crown, region behind eye and centre of nape cinnamon-brown (sometimes region behind eye, crest and nape russet) ; lores and region below eye brown-black, merging below eye with cinnamon-brown of cheeks ; nape bordering mantle mouse-grey more or less suffused buff-brown ; mantle, back, rump and upper tail-coverts blackish mouse-grey, feathers mostly with deep grey edges ; scapulars dark ash-brown more or less suffused buff-brown at tip, many with deep grey tips ; upper and sides of breast ash-grey or ash-brown more or less concealed by long white tips of feathers ; sides of body and flanks mouse-grey, feathers more or less tipped greyish-white or greyish-buff, some vermiculated white towards base, remaining under-parts white ; tail as male ; wing as male, but innermost secondaries sepia or black-brown, outer webs sometimes more or less frosted dark grey ; secondaries and greater coverts usually with narrower white tips and white patch on median coverts much less extensive. This plumage is acquired by complete moult in autumn and winter ; very little moulting material examined. *Summer.*—Only a few birds examined ; none in moult. Coloration apparently as winter.

Nestling.—(Not examined.)

Juvenile. Male and female.—Like adult female but easily distinguished by ash-brown tips to white wing-coverts ; head and nape rather paler cinnamon-brown ; no black patch on lores or encircling eye, these areas cinnamon-brown ; upper-breast pale ash-brown, feathers tipped white ; sides of body and flanks dark ash-brown,

feathers more or less tipped ashy-white ; vent sometimes intermixed with ash-brown feathers ; under tail-coverts sometimes barred and marked ash-brown ; tail as female but structure juvenile ; wing as adult female, but secondaries and greater coverts usually with rather broader white tips ; white median coverts more or less suffused and tipped ash-brown, amount of white on median coverts varies individually. Juvenile males may be distinguished from juvenile and adult females by their larger size ; juvenile females have innermost secondaries shorter and darker than in juvenile males, one next speculum without indication of greyish frosting as in juvenile male.

First winter. Male.—Like adult female in coloration but occipital feathers shorter, less elongated ; no black patch on lores or encircling eye, these areas cinnamon-brown sometimes intermixed with brown-black ; remaining upper-parts as adult female but scapulars with lighter mouse-grey centres ; sides of body and flanks intermixed with white feathers vermiculated and tipped mouse-grey ; remaining under-parts and tail as adult female ; wing as juvenile. Most of the body-feathers (back and rump ?), not always all feathers of breast, belly and vent, tail, in some innermost secondaries, but not rest of wings are moulted from Nov. onwards. *First summer.*—Forward young males acquire some white feathers on crown, lores and patch below eye are mostly black ; black bands across breast and in front of wing in adult male, indicated by white feathers vermiculated ash-brown and with subterminal blackish bars ; scapulars mostly white with ash-brown centres or tips, some white with outer webs bordered blackish as in adult male.

First winter. Female.—As adult female but lores and cheeks cinnamon-brown instead of black ; white median coverts more or less suffused and tipped ash-brown. The juvenile body-feathers (all feathers of back and rump and all under-parts ?), tail, not innermost secondaries in birds examined (though in one May specimen one innermost secondary seems new) are moulted but not rest of wings. N.B.—Sometimes some juvenile feathers, especially on under-parts, are retained. *First summer.*—Apparently as first winter and probably no moult but little material available.

Measurements and structure.—♂ wing 192–205 mm., tail 71–76, tarsus 30–32, bill from point of frontal feathering 28–30 (12 measured). ♀ wing 178–186, bill 25–28. Primaries : 1st narrow, pointed and about half longest primary-covert, 2nd and 3rd about equal and longest, 4th 8–11 mm. shorter, 5th 19–23 shorter, 6th 31–38 shorter. Innermost secondaries of moderate length tapering to an obtuse point, longest shorter than 6th to 8th primaries. Scapulars of moderate length and with slightly rounded tips, in eclipse plumage shorter. Tail with 16 feathers. Bill rather shorter than head, considerably higher than broad at base, rather stout compared with *M. merganser* ; upper mandible with dorsal line declinate nearly to nail, groove on side of upper mandible absent ; serrations numerous, fine and conical. Nostrils

large, oval and situated near middle of maxilla. Head of adult male with a frontal and occipital crest, ad. ♀ with an occipital crest, juv. ♂ and ♀ crest rudimentary. Other structure as in *M. m. merganser*.

Soft parts.—Bill (ad. ♂) plumbeous, nail greyish-white, (ad. ♀) dark lead-grey tinged greenish laterally, nail whitish; legs and feet (ad. ♂) plumbeous, (ad. ♀) paler and tinged green; iris (ad. ♂) bright red (ad. ♀) red.

CHARACTERS.—No subspecies. Short stout bill, small size, black-brown secondaries tipped white distinguish this species in all plumages from other British Mergansers.

FIELD-CHARACTERS.—Mostly maritime. Adult male, seldom seen on inland waters, attracts attention when swimming by purity of its white plumage, and black marks on head and narrow bifurcated lines on sides of breast are discernible only at comparatively close quarters. In flight black on back and wings gives a boldly pied appearance. Female quite as characteristic, pure white cheeks and chin, reddish-chestnut and slightly crested crown and grey back identify her at once on the water, whilst a large white lozenge-shaped wing-patch shows in flight. Habits very like those of other "Saw-bills," but noiseless flight accomplished by very quick wing-beats is even more rapid. The hoarse grating call is similar to the "kar-r-r" of its congeners.

BREEDING-HABITS.—Haunts wooded streams and lakes. *Nest*.—In natural holes of trees near water; also frequently in nesting-boxes. Down pale grey. *Eggs*.—6 to 9, exceptionally 10; warm cream-colour, very like Wigeon's eggs but surface smoother, and heavier. Average of 107 eggs, 52.4×37.4 . Max. : 58×40.5 . Min. : 47.7×34 mm. *Breeding-season*.—Latter part May and June. *Incubation*.—By female. Period unknown. Single brooded.

FOOD.—Mainly animal, especially fish (including fluke, young salmon, trout, roach, gudgeon, minnows, eel (up to $11\frac{1}{2}$ in.), bleak, sand-smelt and sticklebacks), also small crustacea (fresh-water shrimps, sandhoppers and common shrimp); frogs; insects (water-beetles); freshwater mollusca, and occasionally vegetable matter.

DISTRIBUTION.—*British Isles*.—Winter-visitor (mid-Sept. onwards to end March—early May). Not uncommon east coast Great Britain, tolerably regular south coast, but scarce west coasts, except in some I. Hebrides, where not uncommon. Rare O. Hebrides, Orkneys and Shetlands. Rare, but probably annual, visitor Ireland. Occurs on fresh waters as well as on coast.

DISTRIBUTION.—*Abroad*.—Northern Palæarctic region, from north of Baltic to Bering Sea in summer and said to breed in Ufa (Russia), on Volga and in Dobrogea. In winter south to north-west Africa, Mediterranean generally, Black and Caspian Seas, north India, China, and Japan. Casual Egypt.

MERGUS CUCULLATUS

328. *Mergus cucullatus* L.—THE AMERICAN HOODED MERGANSER.

MERGUS CUCULLATUS Linnaeus, Syst. Nat., ed. x, i, p. 129 (1758—America).

Mergus cucullatus Linnaeus, Yarrell, iv, p. 509; Saunders, p. 477.

DESCRIPTION.—*Adult male. Winter and summer.*—Fore-head, crown and top part of crest dark fuliginous-brown merging with black of rest of head; semi-circular occipital crest chiefly white, broadly tipped black, white extending from a little way behind eye; rest of head and neck black; cheeks and sides of neck glossed dark green; centre of mantle, back and rump black-brown (sometimes upper-mantle black) merging to black at sides of mantle; broad crescent-shaped band of black extending from upper-mantle to

The Hooded Merganser (*Mergus cucullatus*.) Adult female.

breast and separating two white semi-circular bands extending from breast on to mantle, a narrow black crescent-shaped band in front of wing; scapulars black; lower-rump and upper tail-coverts sepia more or less with a dark grey bloom and narrowly edged buff-brown; sides of breast light pink-cinnamon deepening to cinnamon on sides of belly and flanks, feathers finely vermiculated black-brown, vermiculations coarser on flanks; under-parts white, sides of vent and under tail-coverts more or less mottled or vermiculated sepia; axillaries and under wing-coverts white, coverts at edge of wing more or less sepia; tail-feathers sepia with an ash-grey bloom and more or less narrowly edged brownish-white; primaries and secondaries sepia, primaries paler on inner webs, middle secondaries with distal halves more or less edged with white on both webs, imperfectly concealed basal halves with outer webs black or black-brown forming a wing-bar, one next innermost with a broad white streak on outer web along shaft, rest of web black, innermost secondaries black with broad white shaft-streaks (merely indicated on innermost); all primary-coverts and bastard-

wing as primaries ; greater coverts black-brown, middle ones with outer webs black and broadly tipped white (breadth of white tip varies individually) ; median coverts drab-grey, innermost black-brown ; lesser coverts sepia or black-brown, those at edge of wing more or less edged drab-grey. No moulting examples examined.

Adult male. Eclipse.—(Not examined.)

Adult female. Winter and summer.—Fore-head and crown buff-brown shading to dark hair-brown on hinder-crown ; occipital crest cinnamon or cinnamon-brown, paler (sometimes more or less shading to white) towards tip ; chin and throat white sometimes feathers faintly spotted or tipped hair-brown ; rest of head and neck all round hair-brown ; mantle and scapulars black-brown, feathers shading to olive-brown towards tip ; remaining upper-parts as male ; upper and sides of breast and sides of belly hair-brown, feathers with ashy-white or buff-brown tips ; remaining under-parts and tail as male ; wing as male, but innermost secondaries not so long and tapering and with narrower white shaft-streaks, absent on inner ones, inner webs black-brown ; median coverts hair-brown with lighter edges.

Nestling.—Crown down to eye (nape ?) and upper part of mantle sepia ; remaining upper-parts black-brown ; a small white patch across wing, another on either side of centre of back and at base of uropygial tuft ; sides of face buffish-white, chin, throat and rest of neck white ; fore-neck and upper-breast dingy brownish, sides of body sepia ; remaining under-parts dingy white.

Juvenile. Male.—(Not examined.)

Juvenile. Female.—As adult female but crest shorter, upper-parts lighter, dark sepia rather than black-brown ; feathers at sides of upper-mantle, some scapulars, feathers of sides of body and flanks margined with buff-brown ; wing as adult female but innermost secondaries with inner webs sepia and with less pronounced white shaft-streaks ; middle greater coverts with less white which is confined to an oval marking on outer webs.

First winter. Male.—Like adult female, but at sides of upper-mantle extending on to breast a patch of black intermixed with hair-brown feathers, vermiculated ashy-white at tip, this patch separating two whitish patches, feathers more or less freckled dusky extending from upper-breast on to upper-mantle ; feathers in front of wing more or less tipped black ; some scapulars brown-black, rest of upper-parts as adult female ; cheeks, chin and throat intermixed with blackish feathers ; upper-breast bordering fore-neck white, feathers more or less mottled dusky-brown towards tip ; sides of body and flanks hair-brown more or less coarsely vermiculated pinkish-cinnamon ; rest of under-parts and new tail-feathers as adult male ; wing as juvenile. Most of the body-feathers, some (all ?) tail-feathers, apparently some innermost secondaries but not rest of wings are moulted from Sept. onwards. Very little material examined.

First winter. Female.—Apparently as adult female but distinguished by juvenile wing. No moulting material examined.

Measurements and structure.—♂ wing 195–201 mm., tail 80–93, tarsus 29–31, bill from point of frontal feathering 38–41 (12 measured). ♀ wing 184–198, bill 35–39. Primaries: 1st narrow, pointed and little more than half longest primary-coverts, 2nd and 3rd about equal and longest, 4th 7–10 shorter, 5th 17–22 shorter, 6th 29–35 shorter. Innermost secondaries long and tapering, longest shorter than 4th–6th primary. Scapulars of moderate length and more or less pointed at tip. Tail with 18 feathers. Bill shorter than head, higher than broad at base; dorsal line of upper mandible gently declinate for half its length then direct to nail, more depressed terminally than in *M. merganser*; serrations as in *M. albellus* but coarser. Nostrils situated near base of bill. Other structure as in *M. m. merganser*.

Soft parts.—Bill (ad. ♂) deep black, (ad. ♀) black edged with orange; legs and feet (ad. ♂) yellowish-brown, claws dusky, (ad. ♀) dusky; iris (ad. ♂) bright yellow, (ad. ♀) hazel.

CHARACTERS.—No subspecies. Middle secondaries with white confined to border of outer webs distinguish this species in all plumages from other British Mergansers.

BREEDING-HABITS.—Haunts wooded swamps, lakes and river-banks. *Nest.*—In hole of trees at varying heights; also recorded from nesting-box. Down, greyish-white as in all hole-breeding ducks. *Eggs.*—5 to 9 or even 12, very round, glossy white with extremely thick and hard shell. Average of 57 eggs, 53.9×43.7 . Max.: 57.5×45.2 and 55.5×45.5 . Min.: 51.1×44 and 51.3×43 mm. *Breeding-season.*—Latter half May, sometimes early June. *Incubation.*—By female. Period not known. Single brooded.

FOOD.—Chiefly fish (Millais records small char); also freshwater mollusca, aquatic insects, and said to take vegetable matter, such as water-plants, seeds, etc.

DISTRIBUTION.—*British Isles.*—Very rare vagrant. Four fully authenticated, viz. young male Menai Straits (N. Wales), winter 1830–31; pair Queenstown Harbour (Cork), Dec., 1878; female Shannon Estuary (Kerry), Jan., 1881. Single birds also said to have been taken Dingle Bay and Tralee Harbour (Kerry), Knockdrin (Meath), near Sligo and Norfolk (winter, 1837–38), near Cheltenham (Gloucester.) March, 1909, and two in Merionethshire, 1864.

DISTRIBUTION.—*Abroad.*—North America. Breeds from central British Columbia, Great Slave Lake, central Keewatin, central Ungava, and Newfoundland, south to Oregon, New Mexico, Louisiana and Florida; winters from southern British Columbia south to Lower California, Mexico, the Gulf States and Cuba. Single records from Alaska, Bermudas.

ORDER STEGANOPODES.

At once recognizable by all four toes being connected by webs. This order contains Cormorants, Shags, Darters, Pelicans, Gannets, Frigate-Birds, and Tropic-Birds, latter rather different from the other genera. Skull desmognathous and holorhinal. No basipterygoid processes. Tongue rather rudimentary. Oil-gland tufted. Aquintocubital. No aftershaft, or very tiny ones. Tarsus short. Young blind when hatched, remain long in nest. Eggs as a rule unspotted, covered with chalky layer; eggs of Tropic-Birds, however, spotted and without distinct chalk covering.

FAMILY PHALACROCORACIDÆ.

Containing Cormorants, Shags, and Darters, latter generally separated as a sub-family. Cormorants and Shags have a long bill laterally compressed, with rounded culmen and strongly hooked tip, along the sides a linear groove; nostrils completely closed in adults. Wings moderately long or short. Tail rounded, 12 to 14 rectrices. Under body-feathers short, soft down. One genus, unless Galapagos Islands species with rudimentary wings, is admitted as a special genus. Chiefly tropical countries, south to islands near New Zealand and 7 (formerly 8) species with several subspecies in Palæarctic region.

Genus PHALACROCORAX Briss.

PHALACROCORAX Brisson, Orn., I, p. 60 (1760—Type according to Orn., VI, p. 511, "*Phalacrocorax*" = *Pelecanus carbo* L.).

See characters under family *Phalacrocoracidae*. Nearly 40 species, 2 British.

PHALACROCORAX CARBO

329. *Phalacrocorax carbo carbo* (L.)—THE CORMORANT.

PELECANUS CARBO Linnæus, Syst. Nat., ed. x, i, p. 133 (1758—Europe. Restricted typical locality: North Scandinavia).

Phalacrocorax carbo (Linnæus), Yarrell, IV, p. 143; Saunders, p. 361.

DESCRIPTION—*Adult male and female. Winter.*—Whole crown and back of neck black, glossed metallic-blue with slight tinge of brown; feathers in centre of nape pointed and very slightly elongated; centre of mantle, back, rump, and upper tail-coverts black, glossed metallic-blue; sides of mantle, scapulars and wing-coverts bronze-brown, each feather evenly bordered glossy-blue; sides of head and chin brownish-white, feathers white, tipped varying amount of pale brown; upper part of throat and sides of neck dark brown mottled whitish and with mixture of blue-black, feathers being white, tipped brown with varying amount of blue-black; lower-throat and rest of under-parts black, glossed blue; tail-feathers black with lead-blue shafts; primaries black, secondaries with outer webs greyish-bronze and feathers narrowly outlined black; wing-coverts as

scapulars. This plumage is acquired by complete moult July–Nov. *Summer*.—The body-plumage is moulted Feb.–March, but not wings, wing-coverts, or tail (in one March specimen tail moulting). Plumage as winter, but whole crown, neck, and throat black, brightly glossed blue as under-parts; chin and sides of head pure white not brownish as winter; in centre of back of crown and down centre of nape line of elongated, narrow, pointed feathers (about 40 mm. long) forming conspicuous crest; on top of crown and upper-part of neck and throat varying number of white feathers, long and extremely narrow almost like filoplumes but not so hair-like, most having longish rami on whole length of shaft, a few, however, are like filoplumes with hair-like shaft tufted at tip, number of these feathers varies in individuals but they never seem so numerous nor so broad or long as in *Ph. c. subcormoranus* in which blue-black feathers are usually practically obscured; at base of thigh large patch of white feathers of loose structure. N.B.—White neck-feathers are gradually lost in May and June and are mostly gone before full moult to winter commences.

Nestling.—When first hatched naked, skin brown, subsequently very thickly covered with dark brown down, brown-black on head and neck, bases of down pale brown to greyish; lores, round eyes and chin bare and down on upper-throat very sparse (often a few white tufts especially on wings). This down is shed as juvenile feathers grow, but is not replaced by them nor is it replaced directly in continuous growth by underdown of feathered stage though the underdown may succeed it.

Juvenile.—Crown and back of neck dark brown with varying amount of blue-black gloss, feathers more or less edged pale or whitish-brown, sides of neck paler brown, neck with varying number of small white filoplumes projecting slightly beyond feathers (hair-like with small tuft of rami at tip and not narrow feathers as in adult); centre of mantle, back, and rump black-brown with varying amount of blue gloss; upper tail-coverts browner; sides of mantle, scapulars and wing-coverts usually paler brown (but varying and in some dark with good deal of gloss), feathers margined dark glossy-brown to glossy blue-black, tips of feathers usually paler and those of greater coverts brownish-white; throat and upper-breast brown to dark brown, feathers edged to varying extent brownish-white; sides of breast, flanks and under tail-coverts black-brown more or less glossed blue; on thighs a few white filoplumes like those of neck; rest of breast and belly varying from uniform white to white mottled brown to dark brown, varying number of feathers having brown tips; tail not so glossy as in adult and with narrow whitish-brown tips; primaries brownish-black, secondaries with varying amount of gloss but much less than in adults and tips of feathers whitish-brown. N.B.—Amount of brown on breast and belly and amount of gloss on upper-parts varies greatly individually; occasional examples have whole breast and belly and centre of throat pure white.

First winter and summer.—Like juvenile but more glossy on upper-parts and usually rather brown on throat and breast, but owing to individual variation of juvenile and partial character of moult no certain difference is noticeable. In some examples new pure white feathers grow on belly which in these examples becomes purer white than in juvenile.* The juvenile body-plumage is very partially (chiefly head and neck) moulted Aug.–Dec. Always distinguishable from older birds by juvenile greater wing-coverts which are somewhat pointed and have whitish tips.

Second winter and summer.—A very gradual moult eventually involving whole plumage commences March (when bird is nearly a year old), and is usually not complete before Oct. Bird is then much like adult winter on upper-parts but not so glossy blue and rather more tinged brown on crown and neck; chin brown or dull white, feathers tipped brown; throat and upper-breast brown, sometimes feathers with a good deal of brownish-white on edges and some feathers often tipped blue-black; rest of under-parts showing good deal of white basal part of feathers and not uniform as in adult and gloss not so bright and greener with brownish tinge; a few white hair-like filoplumes on head, neck, and thighs.

Third winter and summer.—Apparently like adults, but in summer it seems that white feathers on crown and neck are not so plentiful and are more hair-like with few rami, while white feathers on thighs are less plentiful.

Measurements and structure.—♂ wing 330–360 mm. (adult), 330–370 (immature), tail 144–168, tarsus 68–82, bill from feathers 66–82 (ad.), 70–86 (immature). (24 British measured.) ♀ wing 330–345 (ad.), 325–365 (imm.), bill 69–73 (ad.), 65–77 (imm.). Primaries: 2nd and 3rd about equal and longest, 1st 5–10 mm. shorter, 4th 5–15 shorter, 5th 35–50 shorter, 6th 55–72 shorter; 2nd to 4th emarginated outer, and 1st to 3rd inner webs. Secondaries with tips rounded in adult but with point at extreme tip in juvenile, innermost reaching to about 4th primary. Tail much rounded, 14 feathers, narrow and very stiff, tips rounded in adult but more pointed in juvenile when unworn. Bill strong but rather slender, nearly straight but ridge of upper mandible slightly concave and tip decurved with sharp point projecting below under mandible, sides of bill somewhat scaly, but in juvenile smooth, near base of upper mandible a transverse “hinge.” Nostrils completely closed by ossification but in downy nestling open and slit-like. Skin of lores, round eyes and gape, sides of base of lower mandible and sides and apex of angle of lower mandible bare. Tibia feathered to tarsal joint. All four toes in same plane (1st

* The specimen described (*Brit. B.*, III, p. 385, etc.) by Mr. F. W. Frohawk, who has kindly allowed me to re-examine it, is unusually white on the under-parts and is a bird in its first summer (June), i.e. a year old. Another example (Aug.) in Tring Mus. is equally white and undoubtedly in juvenile plumage.

being directed inwards) and fully webbed, claws short, strong and curved, inner edge of third pectinated.

Soft parts.—Bill pale horn-colour, blackish along top of culmen, chrome-yellow at base of lower mandible as are gape, lores and gullet; legs and feet black; iris blue-green to dark emerald-green (ad.), grey-brown to blue-grey and greenish-grey (juv.), appears to become green when bird is about a year old.

CHARACTERS AND ALLIED FORMS.—*Ph. c. subcormoranus* (Holland to S.E. Europe) adult has greenish instead of blue under-parts, in breeding-plumage white feathers on head and neck more plentiful and longer, bill slightly smaller*; *Ph. c. maroccanus* adult is like *Ph. c. carbo* but with throat and often upper-parts white with some black tips to the feathers; forms from India, China, and Australia have been separated but are very close to *Ph. c. subcormoranus*; *Ph. c. lucidus* (S. Africa) is like *Ph. c. maroccanus*, but whiter on breast and with finer bill. Cormorant is larger than Shag, has 14 not 12 tail-feathers and is blue not oily-green.

FIELD-CHARACTERS.—Adult differs from Shag, only British species it resembles, in bronze-brown and black plumage, white chin and throat; and, in breeding-dress, by having conspicuous white thigh-spot and hoary head and neck due to long greyish-white hair-like plumes. Except by size, immature birds less easy to distinguish, but breast and abdomen of Cormorant usually dull white mottled with brown. Frequents estuaries and tidal rivers as well as open seas round coast, and often occurs on lakes and reservoirs inland. Swims with bill, which is noticeably hooked, pointed upwards, and, if alarmed, often submerges, leaving only head and neck protruding. An expert diver, but seldom remains long below surface. Rises with difficulty from water. Flight strong and rapid—long neck and short feet outstretched—usually just above the waves, but at a considerable height when crossing land. A conspicuous object when standing erect and with wings displayed on some rock, sandbank, or buoy. Cry, a reiterated, hoarse, croaking “kraw,” seldom heard except at nesting-place. Creaking hunger-cry of young not unlike “go-back, go-back” of Guinea-fowl.

BREEDING-HABITS.—Mainly a shore- and estuary-haunting species, but also often met with on larger rivers and inland lakes, breeding in colonies on ledges of cliffs, small islands, both inland and off coast, and in some cases nesting in trees. *Nest*.—Mainly composed of seaweed near coast, but in trees inland built of sticks and heather stems, lined grass, green rushes, straw, etc. *Eggs*.—Usually 3 or 4, not infrequently 5 and rarely 6, soft and chalky in texture, with pale blue undershell, almost concealed with chalky-white

* One adult (Brit. Mus. Coll., Christchurch, Hants., Feb., 1873) is as white on crown and neck as is normal in *Ph. c. subcormoranus* and is greenish on under-parts and this may be a migrant of that form but it is the only British-taken adult resembling *subcormoranus* that I have examined.—H.F.W.

deposit on surface. Average of 100 British eggs, 65.8×40.7 . Max. : 74×41.7 and 68.5×44 . Min. : 57.5×39 and 64×38 mm. *Breeding-season*.—Usually latter half April or early May. *Incubation*.—By both sexes. Period 28 days.

Food.—Almost entirely fish, both fresh and salt water, including trout, eel, pike, flounder, plaice, sand-launce, 15-spined stickleback, haddock, young of coal-fish, mullet and conger up to $2\frac{1}{2}$ ft. Crustacea occasionally taken, including crabs and *Pandalus*.

DISTRIBUTION.—*British Isles*.—Resident. Generally distributed on all coasts Great Britain and Ireland but absent as breeding species from east coast England from Flamborough southwards and south coast from Isle of Wight eastwards, also absent east coast Ireland southwards from Co. Antrim (except Wicklow Head and Lambay). Commonly visits many inland waters, and breeds in a few places on islands in inland waters and inland cliff, nesting as a rule on rocks but in west of Ireland also in trees and has bred Norfolk (1914 and 1916) in trees. Some move southwards in autumn.

DISTRIBUTION.—*Abroad*.—Greenland, Iceland, Færoes, Norway to Kola Peninsula, also N. America from Greenland to Labrador and Hudson Bay. Generally resident, but some pass south in winter and have casually been observed as far as Canaries, Madeira, and Azores, in America near New York, on Lake Ontario, Georgia, and Carolina. Replaced by various subspecies in continental Europe, to Central and E. Asia, in China, Japan, and India, Australia, and New Zealand, all these forms being very closely allied, while *P. c. carbo* is quite distinct from all.

PHALACROCORAX GRACULUS

330. *Phalacrocorax graculus graculus* (L.)—THE SHAG.

PELECANUS GRACULUS Linnæus, Syst. Nat., ed. XII, i, p. 217 (1766—Europe. Restricted typical locality: Sweden).

Pelecanus cristatus Gmelin, Syst. Nat., I, ii, p. 575 (1789—"Habitat in Magna Britannia, Norwegia, Islandia, Groenlandia").

Pelecanus lophurus Graves, Brit. Orn., II, pl. and text, unnumbered (1813—"Bass Island in the Firth of Forth.")

Phalacrocorax graculus (Linnæus), Yarrell, IV, p. 151; Saunders, p. 363.

DESCRIPTION.—*Adult male and female*. *Winter*.—Whole crown and neck brown-black, glossed dark metallic green-blue; back, rump and upper tail-coverts same but glossed dark oily-green; mantle and scapulars glossed more purplish and each feather evenly and narrowly bordered velvety-black; chin and round base of lower mandible with varying amount of white to brownish-white; throat glossed blue as neck, but often browner; rest of under-parts glossed rather dull oily-green; axillaries and under wing-coverts browner with little gloss; tail-feathers black narrowly tipped brownish-white when freshly moulted; wing-feathers and primary-coverts black slightly glossed green, inner edges of inner webs brown, inner secondaries with more gloss; all wing-coverts as mantle and

scapulars. This plumage is acquired by complete moult commencing June (sometimes May) when crest-feathers of summer are dropped and winter feathers begin to grow on crown and chin to Sept. and Oct. Moult of primaries and occasionally tail appears to continue until Jan., but it is possible that they moult twice with rest of plumage. *Summer*.—A moult involving whole body-

The Shag (*Phalacrocorax g. graculus*). Adult, summer.

plumage and wing-coverts takes place Oct. (crest-feathers usually grow Dec.) to Feb.; wing-feathers and often tail are growing during this period and may be renewed twice. Plumage as winter but glossy colours on whole bird much more brilliant, whole of chin and throat glossy without any white or brown; in centre of crown large tuft of elongated, semi-erect feathers (40–50 mm. long), slightly curved forwards and of rather loose structure, forming conspicuous crest; white tufted filoplumes numerous and often showing beyond feathers of neck as minute white dots, as also in winter, but less conspicuous.

Nestling.—When first hatched naked, skin brown, subsequently very thickly covered with brown down paler than in Cormorant, greyish-white at base, and often whitish (growing later) on throat; lores, round eyes, base of bill and chin bare and down on upper-throat very sparse (often a few white tufts as in Cormorant). This down is shed as juvenile feathers grow but is not replaced by them nor is it replaced directly in continuous growth by under-down of feathered stage though the under-down may succeed it.

Juvenile.—Whole upper-parts dark brown glossed green especially on crown, back, and rump; feathers of mantle and scapulars somewhat pointed and evenly and narrowly margined black-brown, tips, especially of scapulars, becoming pale brown when slightly worn; sides of head pale brown; chin brownish-white; centre of throat, sometimes centre of breast and belly and

usually vent brownish-white (amount of white varying individually), rest of under-parts brown, darker on flanks; axillaries and under wing-coverts dark brown slightly glossed greenish; tail-feathers brown-black narrowly edged whitish-brown; wing-feathers black-brown, extreme tips paler, secondaries with slight green gloss on outer webs; wing-coverts dark brown glossed green with pale brown tips becoming whitish when worn.

First winter and summer.—Like juvenile, but new feathers of upper-parts more glossed and those of mantle with black velvety margins; chin white; sides of neck and whole throat blackish-brown, feathers with pale brown tips giving a slightly speckled appearance; rest of under-parts rather darker brown, especially on flanks, than in juvenile. The juvenile body-plumage is partially moulted Aug.-Dec.; some examples moult very little but even those acquiring more new feathers retain many juvenile body-feathers, especially scapulars and on breast; tail and wing-feathers and wing-coverts are not moulted.

Second winter and summer.—A moult involving entire plumage commences in some birds May (when bird is a year old) and is not complete in some until following Feb. or March during which period there seems only one gradual moult and not two as in adult. When moult is complete upper-parts and wing-coverts much as adult winter; chin brownish-white; throat dark brown speckled dark glossy-green; centre of breast and belly pale brown, rest of under-parts dark brown with a number of dark glossy-green feathers intermixed.

Third winter.—After moult commencing May bird appears to become like adult, i.e. when it is about $2\frac{1}{2}$ years old.

Measurements and structure.—♂ wing 260–280 mm., tail 118–140, tarsus 60–70, bill from feathers 55–63 (12 measured). ♀ wing 250–263, bill 57–66. Primaries: 2nd and 3rd about equal and longest, 4th as long or 5 mm. shorter, 1st 5–10 shorter, 5th 15–22 shorter, 6th 35–45 shorter; 2nd to 4th emarginated outer, and 1st to 3rd inner webs. Tail with only 12 feathers otherwise rest of structure as in Cormorant.

Soft parts.—Bill, upper mandible and tip of lower blackish-horn, cutting edge of upper and rest of lower yellowish (juvenile pale pink-brown); inside mouth, gape, and round eyes pale orange-yellow (juvenile pale flesh tinged yellow); bare skin on chin and angle of lower mandibles black thickly spotted yellow (juvenile pale flesh tinged yellow: 2nd summer brighter yellow); legs and feet blackish, webs paler (juvenile same with inner sides of tarsus and webs mostly brownish-white); iris sea-green (juvenile yellowish-white, 2nd summer yellowish-green).

CHARACTERS AND ALLIED FORMS.—*Ph. g. desmarestii* (Mediterranean) adult has slightly larger and rather finer bill, shorter crest and paler webs, juvenile whole of under-parts brownish-white. Distinguished from Cormorant by smaller size and 12 not 14 tail-feathers.

FIELD-CHARACTERS.—In habits and appearance not unlike Cormorant, but noticeably smaller, whilst adult has greenish-black plumage and yellow of gape and gular region deeper in colour. In breeding-dress recurved frontal crest and lack of white thigh-spot and hoary head are distinctive; breast of immature bird is never white. More restricted to rocky coasts than Cormorant, and seldom wanders inland. Often springs clear of water in diving, whilst Cormorant usually submerges its head and glides under with scarcely a ripple. Saunders describes the harsh cry as “kroak-kraik-kroak.”

BREEDING-HABITS.—Purely marine, not venturing inland except accidentally, and breeding in hollows of sea-caves, ledges of cliffs, or sometimes among fallen boulders on beach. *Nest*.—Mainly of seaweeds, often in advanced stage of decay, but sticks, heather and grass also used. *Eggs*.—Normally 3, sometimes 2 only or 4 and rarely 5 or even 6, with pale blue under-shell as in Cormorant, overlaid with irregular layer of chalky-white deposit. Average of 100 British eggs 62.9×38.4 . Max.: 74.6×38 and 60.4×41.7 . Min.: 56.6×39.1 and 61.1×34.9 mm. *Breeding-season*.—Very variable, owing to exposed nature of sites: first eggs late March and early April, but where often destroyed by heavy seas fresh eggs may be found in May, June and even later, for young have been seen in nest in Oct. Eggs have been met with also in Feb, and Sept. *Incubation*.—By both sexes. Period 24–27 days.

FOOD.—Almost entirely sea-fish, such as plaice, sillock, wrasse, eels (up to 2 ft. long), herring, garfish and “father-lasher,” etc. Exceptionally also crustacea and mollusca (*Mytilus*).

DISTRIBUTION.—*British Isles*.—Resident. Does not breed on south coast England eastwards of Isle of Wight, nor east coast England except occasionally on Farne Isles and rarely on Northumberland coast, nor east coast Ireland from co. Antrim southwards, except Wicklow Head and co. Dublin islands where a few breed. Elsewhere on coasts generally distributed and usually more common than Cormorant. Scarce visitor inland.

DISTRIBUTION.—*Abroad*.—Coasts of west Europe from Norway to Portugal, Færoes and Iceland. Replaced in Mediterranean by *P. graculus desmarestii*, and a doubtful form on west coast of Marocco.

FAMILY SULIDÆ.

Number of cervical vertebræ 18. Of muscles of leg only semitendinosus, femoro-caudalis, and ambiens present. Palatines fused in middle line, with slight median keel. No syrinx muscles. Bill stout, straight, pointed, tapering gradually towards tip, which is very slightly curved, not hooked, cutting edges finely serrated, upper mandible with an angulated cleft in front of lores, a linear

groove along each side of culmen, nostrils completely closed in adults. Lores, chin and upper part of throat more or less bare. Wings very long and pointed, 1st primary longest, tail long, wedge-shaped, 12 to 18 rectrices. Top of toes and tarsus reticulated, but in *Sula bassana* one row on top of toes and continuation in three rows up tarsus with transverse scutes. All four toes connected by webs. Body-plumage fairly hard and close. Tarsus shorter than foot. Claw of middle toe wide and pectinated on inner edge. Sexes alike. Rock-inhabiting sea-birds, plunging divers, food fish. Tropical and temperate seas, *S. bassana* north to Iceland. One genus of about a dozen species and subspecies, unnecessarily divided into several genera or subgenera, according to number of rectrices and covering of toes.

Genus SULA Briss.

SULA Brisson, Orn., I, p. 60 (1760)—Type according to VI, p. 464, *Sula* Brisson = *S. leucogaster*, by tautonymy).

Characters, etc., see under family *Sulidæ*. One British species.

SULA BASSANA

331. *Sula bassana* (L.)—THE GANNET.

PELECANUS BASSANUS Linnæus, Syst. Nat., ed. x, i, p. 133 (1758—Scotland, America).

Sula bassana (Linnæus), Yarrell, IV, p. 155; Saunders, p. 365.

DESCRIPTION.—*Adult male and female. Summer.*—Crown, sides of head and neck yellowish-cream; whole of rest of body-plumage, tail-feathers, secondaries, and lesser, median and greater wing-coverts pure white (shaft of tail-feathers pale straw-colour); primaries black-brown, paler on inner webs and shafts whitish at base; primary-coverts and bastard-wing black-brown; lesser primary-coverts along edge of wing sometimes pure white and sometimes with black feathers intermixed. This plumage is acquired by a moult in spring, but whether this is complete or confined to the head only I am unable to say as I have had no material collected in March and April for examination. *Winter.*—A complete moult takes place July–Dec. and even sometimes as late as Jan. and Feb.* Plumage as summer, but whole crown, sides of head and neck not so

* Over twenty collected in Sept. were all moulting primaries and this moult appears to be rapid as in all cases two primaries separated by full-grown ones were growing in each wing (often at slightly different stages of growth in each wing). The fact that all these birds in Sept. were in moult makes it surprising that the period (July to Feb.) is so long in which adults may be found moulting their wings. The Dec., Jan., and Feb. birds were all adults and had all nearly completed the moult and the feathers of their heads were newly-grown winter ones and not the yellowish feathers of the summer plumage. Mr. Gurney informs me (*in litt.*, Sept. 2, 1921) that his two adult captive birds shed a few of their wing-feathers in May and June but he states that the birds were never in a very healthy condition.—H.F.W.

yellow, more buffish-cream and more mixed with white, sometimes mostly white tinged with buffish-cream.

Nestling.—At first skin black, very sparsely covered with short pale creamy-white down with hair-like tips. This is replaced by much longer and more woolly white down which also grows on many parts previously bare and eventually covers whole bird very thickly except on lores, round eyes, fore-head, gape, and chin which are bare, and on throat where down is short and sparse. This down is shed as feathers grow, but is not replaced by them nor is it replaced directly in continuous growth by under-down of feathered stage, though the under-down may succeed it.

The Gannet (*Sula bassana*). Nestling.

Juvenile.—Whole upper-parts slate-black tinged brown with small white spots, each feather having V-shaped white mark at tip, these marks larger on rump; upper tail-coverts with tips and most of outer webs white; throat as upper-parts; rest of under-parts dull whitish, feathers tipped and edged to varying extent with brownish-slate and those of upper-breast and lower-flanks usually darker and with small white V-shaped tips and whitish shaft-lines, under-parts thus having a mottled appearance; axillaries and under tail-coverts slate-brown with white V-shaped tips; under wing-coverts same but darker as upper-parts; tail-feathers black-brown with small white tips, shafts pale straw-colour except at tips which darken to black; primaries and secondaries dark, and slightly glossy, brown, shafts straw at base, innermost secondaries with small white tips; all wing-coverts as upper-parts except primary-coverts which have no white tips. N.B.—White spots at tips of

feathers of upper-parts gradually become worn and in tail-feathers soon disappear, dark tips to feathers of under-parts also lessen by wear.

*First summer and second winter.**—The juvenile plumage appears to commence to moult about March (Gurney, *Gannet*, p. 478), and birds apparently completing same moult in Sept. (i.e. 15 months old) with outer primaries growing have: head and neck white faintly tinged buff and with a few old brown feathers here and there; upper-mantle with considerable mixture of pure white feathers, but most brown-black with large white V-shaped tips; rest of mantle brown-black with smaller white V-shaped tips than in juvenile; scapulars with only minute white mark at tip; back and rump with white tips larger but considerably smaller than those in juvenile; upper tail-coverts much as juvenile; under-parts white with a few small brown marks on breast; lower-flanks mostly brown with white central streaks and tips; axillaries white; under wing-coverts white or whitish in most, but round edge of wing slate-brown with white tips; new tail-feathers and wing-feathers as in juvenile; wing-coverts with small white tips as mantle and innermost secondaries with very small white tips. N.B.—An undated bird is like above, but with uppermost lesser wing-coverts white.

Second summer and third winter.—Birds apparently 2 years old moulting in July and Sept. have new plumage as follows: crown and neck as adult but pale cream-colour and with a few brownish feathers; upper-mantle white; rest of mantle, scapulars, back, and rump mixture of black and white, some feathers wholly white, others wholly black-brown, others parti-coloured; upper tail-coverts white, but some central ones black-brown; under-parts white; under wing-coverts mostly white with some brown along edge of wing; outermost one or two pairs of tail-feathers white, rest black-brown with white streaks on outer ones and white tips on central ones; secondaries black-brown some with small white tips, innermost short ones white; lesser wing-coverts white; median and greater mixture of white and brown-black and parti-coloured feathers.

Third summer and fourth winter.—Birds apparently 3 years old moulting in Sept. have heads and neck like adult, but rather paler; body-plumage as adult but with two or three black scapulars; tail-feathers: outer ones white, rest some white and some black-brown (some of latter new ones growing and in one case with corresponding feathers on each side differently coloured); secondaries black-brown with white edges varying in breadth, innermost white; all wing-coverts white. N.B.—Others on same date as

* The material available is insufficient to make sure of the sequence and moults before reaching adult plumage. Spring material is entirely lacking, so it is impossible to say what is the effect of the spring moult and indeed if there is one, but in any case it does not seem to involve the wing- and tail-feathers.—H.F.W.

above but with head and neck of a deeper cream, tail all white, and secondaries many pure white, others (growing) parti-coloured may be more forward individuals of same age as above or may be birds a year older. These black secondaries seem to disappear at next moult and bird is in adult plumage when either 4 or 5 years old.

Measurements and structure.—♂ wing 475–510 mm., tail 180–225, tarsus 56–62, bill from feathers 95–110 (14 British adults measured). ♀ wing 475–505, bill 95–100. Primaries: 1st longest, 2nd equal or 5 mm. shorter, 3rd 20–25 shorter, 4th 55–65 shorter, 5th 95–110 shorter; 1st to 3rd emarginated at tips of outer webs and 1st and 2nd on inner webs. Secondaries short, rather broad, tips obtusely rounded. Tail long, sharply graduated, 12 stiff feathers, narrow and pointed, especially central pair. Bill elongated, conical, gently sloping and curved, but not sharply, at tip, ridge of culmen flattish, separated from sides by groove, near base of upper mandible a transverse “hinge,” cutting edges slightly serrated. No external nostrils. Skin of lores, round eyes, sides of upper mandible and from angle of lower mandible down chin narrowing to a point bare. Feet much as in Cormorant, but third and fourth toes about equal and longest (see fig. Vol. I, p. 1), claw of third curved outwards and serrated on inner edge (not serrated in juvenile). Under the skin a cellular tissue which, apparently, is capable of inflation.

Soft parts.—Bill (ad.) bluish-white with dark slate lines, (juv.) dark horn-brown; bare skin round eyes, eyelid, and centre of chin (ad.) pale blue, (juv.) brown; legs and feet brown-black with pale blue-green lines in adult, dark grey ones in juv.; iris (ad.) silvery-white, (juv.) grey-blue.

CHARACTERS AND ALLIED FORMS.—*S. capensis* (S. Africa) adult has black-brown tail and naked patch on chin about twice as long as in *S. bassana*. *S. serrator* (Australia) has black-brown middle tail-feathers and deeper cream-colour on head. Cuneate tail and structure of bill and feet distinguish Gannet from all other British birds.

FIELD-CHARACTERS.—Essentially maritime and a master of the air, the Gannet, by reason of its great size and long narrow wings, is unmistakable in flight, whether in dazzling white plumage with buff head and black primaries of adult, black plumage speckled with white of young, or different degrees of piedness that mark progress towards maturity. When feeding, it checks its flight for a moment, then plunges into the sea from a height of fifty feet, or even more. In its headlong course, sometimes almost vertical, but usually oblique, the wings are half closed, and, just before it strikes the water with a resounding splash, are folded close to the body, the bird making a half-turn during the descent. Silent as a rule, but loquacious at its nesting-places, where, according to Kirkman, commonest cries in a babel of guttural and discordant noises, are a

strident "urrah, urrah," a long-drawn wailing "yee-orrrr," and hunger-cry of young, a high-pitched "uk."

BREEDING-HABITS.—Breeds in colonies, often of great size, on islands with precipitous cliffs. *Nest.*—Built mainly of seaweed, especially tangle (*Laminaria*) and *Fucus*, though grasses and campion (*Silene*) are also used, and various odds and ends thrown up by the sea. *Egg.*—One only, cases of two being probably due in most cases to two hens, pale blue, but almost covered with a soft chalky deposit of lime, which sometimes fails in places, disclosing blue undershell. Outer layer rapidly picks up nest stains and incubated eggs are often heavily stained with various shades of brown and yellow. Average of 90 eggs 78.8×50.0 . Max.: 87.2×51.6 and 78.6×53.7 . Min.: 62.5×43.1 mm. *Breeding-season.*—Begins usually April, exceptionally late March: often not till May. *Incubation.*—By both sexes. Period 42–45 days. Single brooded.

FOOD.—Almost entirely fish. Gurney records herring, mackerel, coal-fish or saithe, pollack or lythe, codling, whiting, haddock, power cod, sand-eel, salmon smolts, sea-trout, gurnards, garfish, sprat, pilchard and anchovy. Also occasionally cuttle-fish (Cephalopoda).

DISTRIBUTION.—*British Isles.*—Resident. Breeds Grasholm (Pembroke), Bass Rock (Haddington), Ailsa Craig (Ayr), St. Kilda Isles and West Sulisgeir (O. Hebrides), the Stack or East Sulisgeir (Orkneys), Noup of Noss, Bressay (Shetlands) since 1915 (J. S. Tulloch, *Scot. Nat.*, 1915, p. 251), 5 pairs 1919, 10 pairs 1920 (*Brit. B.*, xiii, p. 159; xiv, p. 94), two Stacks (the Rumbings and Humla Stack) west of Muckle Flugga (Shetlands) in 1920, and probably 1919 (E. G. B. Meade-Waldo, *Brit. B.*, xiv, p. 93), Bull Rock, (Cork), and Little Skellig (Kerry). Last bred Lundy Island in 1903. In autumn and winter breeding-places deserted and general southward movement.

DISTRIBUTION.—*Abroad.*—Breeds in Færoes and Iceland, and in North America south to Gulf of St. Lawrence, also on rock off S. Newfoundland. In winter along coasts of north Atlantic, extending south to Morocco (according to Hartlaub even to Senegambia), Azores, and Canary Islands, and in America to Gulf of Mexico. Also rare in Mediterranean and Baltic, and casual in Greenland and Madeira.

[NOTE.—An AMERICAN DARTER, *Anhinga anhinga* (L.), is said to have been shot near Poole (Dorset), June, 1851 (*Zool.*, 1852, p. 3601).]

[NOTE.—A RED-BILLED TROPIC-BIRD, *Phaethon aethereus* (L.), is said to have been found dead in Herefordshire (Saunders, p. 366).]

ORDER TUBINARES.

Oceanic birds of very different size. Nostrils more or less tubular, sometimes united on top of culmen, sometimes more lateral.

Schizognathous and holorrhinal. The rhamphotheca, i.e. horny covering of the bill, is more or less distinctly separated into several pieces by narrow grooves. Bill curved down at tip and generally sharply hooked. 3 front toes completely connected by webs, hallux small, rudimentary, or absent. Wings long, 10 developed primaries, first (11th) rudimentary. 15 cervical vertebrae. Young nidicolous. Some species dichromatic; some crepuscular and nocturnal in habits. One egg only. Peculiar musky smell, different in various genera. Division into families not satisfactory, therefore here omitted. Over 130 species in all seas.

FAMILY PROCELLARIIDÆ.

See characters, etc., under Order *Tubinares*.

Key to genera of Family PROCELLARIIDÆ.

1 {	Nostrils on top of culmen, wings shorter than 40 cm., a hind toe present	2	
	Nostrils lateral, separated by wide culmen, wings longer than 40 cm., no hind toe		<i>Diomedea</i>
2 {	1st developed primary shorter than 2nd	3	
	1st developed primary equal to 2nd or longer	6	
3 {	Tarsus covered in front with an undivided shield, wings under 130 mm.		<i>Hydrobates</i>
	Tarsus with small scutes, wings over 130 mm.	4	
4 {	Underside white		<i>Pelagodroma</i>
	Underside brown	5	
5 {	Tarsus under 30 mm., webs between toes uniform black		<i>Oceanodroma</i>
	Tarsus over 30 mm., webs between toes partially yellow		<i>Oceanites</i>
6 {	Rectrices 14		<i>Fulmarus</i>
	Rectrices 12	7	
7 {	Tarsus laterally compressed, front of tarsus with a more or less sharp ridge, median depressed part of culmen about half length of bill		<i>Puffinus</i>
	Tarsus not distinctly compressed, front without a sharp ridge, median depressed part of culmen less than half length of bill	8	
8 {	Wing under 210 mm.		<i>Bulweria</i>
	Wing over 210 mm.		<i>Pterodroma</i>

Genus HYDROBATES.

HYDROBATES, Boie, Isis, 1822, p. 562 (Type by subsequent designation—*Salvin*, *Cat. B. Brit. Mus.*, xxv, 1896—*H. pelagica*).

Small Petrels, smaller in wing than Swifts, dark sooty-brown, with white rump. Nostrils in one tube on top of culmen. Plumage very thick and soft. Wings long and pointed, second developed primary longest. Tail slightly rounded, 12 rectrices. Tarsus very little longer than middle toe with claw and about half as long as femur, front divided into scutes. 2 species, 1 Palearctic.

HYDROBATES PELAGICUS *

332. *Hydrobates pelagicus* (L.)—THE STORM-PETREL.

PROCELLARIA PELAGICA Linnæus, Syst. Nat., ed. x, i, p. 131 (1758—"Habitat in albo † Oceano." Restricted typical locality: coast of Sweden).

Procellaria pelagica Linnæus, Yarrell, iv, p. 42; Saunders, p. 727.

DESCRIPTION.—*Adult male and female. Winter and summer.*—

Upper-parts sooty-black, fore-head and fore-part of crown and lores and chin paler, tinged brown or greyish; lower-rump and upper tail-coverts white, feathers with black or dark grey shafts, those nearest rump with brown bases, and those nearest tail with long sooty-black tips (sometimes restricted to a spot on lateral feathers); under-parts sooty-brown, bases of feathers greyish; under tail-coverts same but bases whiter, usually concealed but sometimes showing on lateral feathers; feathers of lower-flanks adjoining rump with outer webs white; axillaries sooty-brown with white tips; under wing-coverts sooty-brown, those covering primaries with faint whitish tips and those covering secondaries with longish whitish tips, median ones with whitish tips mostly confined to outer webs and forming

The Storm-Petrel (*Hydrobates pelagicus*).

irregular whitish patch in middle of under-wing; tail sooty-black, bases of all feathers except middle pair white with black shafts; wing-feathers with black outer and sooty-brown inner webs, bases of inner webs of secondaries white, innermost secondaries with faint greyish-white tips and edges; wing-coverts as rest of upper-parts but greater coverts with greyish-white tips and edges to outer webs varying in width but narrow. This plumage is acquired by complete moult. Period varies but ranges from Sept. to May some not completing even until June and July although in others moult is just finishing Nov.‡ In worn plumage under-parts are browner and white edgings to greater coverts and inner secondaries are much reduced by abrasion.

Nestling (Plate 7).—*1st down*, greyish sooty-brown, slightly paler on under- than upper-parts, soft and long, covering bird very closely except lores, round eyes and chin which are nearly bare.

* In the *Cat. B. Brit. Mus.* this species has been called *Procellaria pelagica*, and it has been stated that *P. pelagica* was the type of *Procellaria*. This is an error (cf. *Nov. Zool.*, 1910, p. 497). American and other authors have accepted the generic name *Thalassidroma*, but *Hydrobates* is older, and it need not be rejected on account of the previous name *Hydrobata*.—E.H.

† Doubtless misprint for "alto."—E.H.

‡ It seems probable that those finishing moult in summer are birds hatched the year before and that adults moult in autumn and winter.—H.F.W.

2nd down, very similar to first but slightly darker and of slightly closer structure but of same length succeeds 1st down by almost continuous growth so that 1st down clings to tips of 2nd, which thus appears to be longer. 2nd down is short and sparse on chin, lores and round eyes, but these parts are not quite so bare as in first stage. 2nd down is succeeded by feathers also by continuous growth, so that at first feathers have two generations of down clinging to their tips, down appears longer as nestling grows owing to successive stages.

*Juvenile. Male and female.**—Plumage immediately succeeding 2nd nestling down is like adult and not to be distinguished with certainty when a little worn; feathers of upper-parts when quite fresh have very faint greyish edgings, black tip of some upper tail-coverts is narrowly fringed white, width of greyish-white tips and edges to innermost secondaries and greater coverts though usually greater in young birds varies in individuals in fresh plumage, and all these slight differences are affected by abrasion. Those birds completing moult in May, June and July are probably birds a year old.

Measurements and structure.—♂ wing 116–123 mm., tail 52–55, tarsus 20–24, middle toe with claw 18–22.5, bill from feathers 10–12 (12 British measured). ♀ wing 114–125. Primaries: 1st minute, pointed and concealed by primary-coverts, 3rd longest, 4th usually as long, sometimes 2–4 mm. shorter, 2nd and 5th 5–10 shorter, 6th 14–20 shorter; primaries not emarginated. Outer secondaries shorter than 11th, and inner ones about as long as 10th primaries, tips somewhat incurved with outer webs sloped off and inner webs broad. Tail slightly round, 12 broad feathers, tips slightly emarginated. Three toes long, slender, and webbed, hind toe minute, claws small, concave and rather sharp. Bill slender, tip compressed, decurved and fairly sharp. Proximal third of upper mandible with ridge elevated, ending abruptly at opening of parallel tubular nostrils (amount of elevation varies individually).

Soft parts.—Bill, legs and feet black; iris deepest sepia, nearly black.

CHARACTERS.—No subspecies. Small size and square tail distinguish this from other white-rumped black British Petrels.

FIELD-CHARACTERS.—Essentially maritime and during most of year pelagic, Petrels and Shearwaters come ashore only in breeding-season, and never occur inland except as storm-driven waifs. In size and, despite dark under-parts, in appearance Storm-Petrels suggest long-winged, square-tailed House-Martins, but flight, bat-like and fluttering, is very different, and is often assisted by paddling

* As two distinct generations of down immediately precede the first feathered plumage and as there appears to be no moult in the first autumn and winter, it is possible that the 2nd down takes the place of the juvenile plumage, and that this plumage is really equivalent in generation to a first winter plumage in other birds.—H.F.W.

of the feet as birds move along just clear of the waves. Good swimmer. Sustained crooning uttered by both sexes in nesting holes, is described as "purr-r-r-r-r-chee-ka" by Mrs. A. Gordon, who says that the birds, or possibly male only, in their nocturnal flight about their breeding-grounds have a loud, husky cry, "cuch-ah, cuch-ah, coo-ah."

BREEDING-HABITS.—Usually breeds in colonies of varying size on islets off the coast. *Nest.*—Variously placed at end of burrow in peaty soil or among loose stones and boulders, occasionally in rock crannies or stone-walls. Sometimes no nesting material is used, but generally a few dry grasses, etc. *Egg.*—One only, dull white, sometimes unmarked, at other times with zone of fine red-brown spots round large end. Average of 100 eggs, 27.9×21.2 . Max.: 30.6×21.4 and 26.5×23 . Min.: 25×20.5 and 27×19.1 mm. *Breeding-season.*—Exceptionally end May, but usually latter half June and early July, while young have been found in nest till Oct. or even Nov. *Incubation.*—By both sexes. Period 36 to 42 days. Single brooded.

FOOD.—Little definite evidence. Pieces of fish-liver, otoliths, fragments of fish, small shells, thick yellow oily matter, minute seeds and apparently green seaweed, have been recorded from stomachs, and insects in birds driven inland. Saunders includes crustacea and mollusca as well as small fish and fatty matter in its diet.

DISTRIBUTION.—*British Isles.*—Resident. Breeds Scilly Isles, possibly an islet off Lundy, several islands off southern portion of Welsh coast, many western isles Scotland, as well as Orkneys and Shetlands, and several islands off north and west coasts Ireland. A pair nested Bass Rock, 1904. In autumn and spring generally distributed in British waters, and often driven inland in rough weather; in winter usually very scarce.

DISTRIBUTION.—*Abroad.*—Eastern north Atlantic from Lofoten Is. (and possibly on Westmann Is. near Iceland), Færoes, locally to west Mediterranean, and perhaps Canaries. In autumn and winter near Heligoland and Neuwerk, on west coast Africa—rarely to S. Africa, and often seen, but not obtained in Red Sea to Straits of Bab-el-Mandeb, said also east coast northern N. America. Rarely inland.

Genus OCEANODROMA Reichb.

OCEANODROMA Reichenbach, Avium Syst. Nat., p. iv (1852—Monotype *O. furcata*).

Very similar to *Hydrobates* but larger, tarsus not at all longer than middle toe with claw, less than twice length of bill. Tail longer than half the wing, more or less forked, lateral rectrices being much longer than middle ones. 13 species in seas of Northern Hemisphere, south to St. Helena and Peru.

OCEANODROMA LEUCORRHOA

333. *Oceanodroma leucorhoa leucorhoa* (Vieill.).—LEACH'S FORK-TAILED PETREL.

PROCELLARIA LEUCORHOA (corr. *leucorhoa*) Vieillot, Nouv. Dict. d'Hist. Nat., nouv. éd., xxv, p. 422 (1817—Picardy in France).

Procellaria leachii Temminck, Man. d'Orn., sec. ed., II, p. 812 (1820—St. Kilda).

Procellaria Bullockii Fleming, Hist. of Brit. An., p. 136 (1828—St Kilda).

Cymochorea leucorhoa (Vieillot), Yarrell, IV, p. 37; *Oceanodroma leucorhoa* (Vieillot), Saunders, p. 729.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Upper-parts sooty black-brown (not so black as Storm-Petrel), and when freshly moulted with a slate-grey tinge varying considerably individually and always most marked on crown; fore-head, fore-part of crown, lores, chin, and upper-throat tinged paler ashy

Leach's Fork-tailed Petrel (*Oceanodroma l. leucorhoa*), right-hand, and the Madeiran Fork-tailed Petrel (*O. castro*) left-hand figure.

slate-grey; longest scapulars tinged grey and with narrow white fringe at tip; feathers of lower-rump with white tips and upper tail-coverts white with brown or brownish shafts (especially distal part) and when fresh with narrow sooty-brown tips, lower feathers often with wider tips and sometimes with some brown in centre (varying considerably individually) and central pair immediately over tail-feathers entirely sooty black-brown or with some greyish-white; under-parts paler and browner than upper-parts and, except for throat, usually without slate-grey tinge but occasionally this is well marked on rest of under-parts; a few feathers of lower-

flanks adjoining white rump with outer webs and sometimes tips white; axillaries and under wing-coverts sooty black-brown, median ones slightly paler and sometimes with narrow whitish fringe on outer webs; tail-feathers black-brown, extreme bases of all except central usually white or whitish (varying), white on outer web of outermost not more than 20 mm. (one 25) from base and usually considerably less; primaries brown-black, paler on inner webs; outer secondaries same, inner ones grey-brown with dark tips and often washed ash-grey on outer webs and some (when freshly moulted) with narrow white fringes; primary-coverts, lesser coverts and innermost greater and median brown-black; rest of median and greater coverts grey-brown, forming a decided broad pale bar across wing, tips of outer greater brown-black and inner greater and median when fresh with narrow whitish fringes. This plumage is acquired by complete moult Aug.-March.

Nestling.—Like that of Storm-Petrel.

Juvenile. Male and Female.—Plumage immediately succeeding 2nd nestling down is like adult. Complete moult takes place probably Jan.-March.

Measurements and structure.—♂ wing 150 (one 144)–161 mm., tail: central pair 59–67, outermost 76–90, depth of fork 14–25, tarsus 23–26, middle toe with claw 22–26, bill from feathers 15–16.5 (12 measured). ♀ wing 149–160 (one 164, one 165). Primaries: 1st minute, pointed and concealed by primary-coverts, 3rd longest, 4th 1–3 mm. shorter, 2nd and 5th 5–12 shorter, 6th 20–26 shorter. Tail deeply forked, 12 broad feathers, tips slightly rounded. Rest of structure as in Storm-Petrel, but inner secondaries longer and about equal 8th primary.

Soft parts.—Bill, legs and feet black; iris deepest sepia, nearly black.

CHARACTERS AND ALLIED FORMS.—*O. l. beali* and *O. l. kædingi* (western N. America) are smaller. Paler greater and median coverts, deeply forked tail, brownish shafts to upper tail-coverts distinguish species from other British Petrels.

FIELD-CHARACTERS.—Resembles Storm-Petrel in habits and to some extent in appearance, but is larger, greyer, and has distinctly forked tail. Note of sitting birds corresponding with purring of Storm-Petrel is described as “pewr-wit, pewr-wit.”

BREEDING-HABITS.—Breeds in colonies in burrows in peaty ground and among ruins, heaps of stones, and under boulders. *Nest*.—A handful of dry grass is sometimes found at end of burrow. *Egg*.—One only: decidedly larger than that of Storm-Petrel; dull white, elongated in shape, and usually with zone of fine reddish spots at big end. Average of 100 eggs 32.7×23.9 . Max.: 36×25.6 . Min.: 30×23.5 and 30.4×22.4 mm. *Breeding-season*.—Rather earlier than Storm-Petrel as a rule; from early June onward to July. *Incubation*.—By both sexes. Period about 5 weeks (Hantzsch). Single brooded.

FOOD.—Definite records of fish, copepoda (*Timora longicornis*) and stalk-eyed crustacea. Saunders also mentions floating greasy matter as well as small mollusca and crustacea.

DISTRIBUTION.—*British Isles*.—Resident. Breeds Flannan Isles, St. Kilda group and North Rona (O. Hebrides), and two or three islets off Kerry and Mayo. Elsewhere somewhat irregular visitor (chiefly autumn) to all coasts, and not infrequently driven inland during gales.

DISTRIBUTION.—*Abroad*.—North Pacific and north Atlantic Oceans. Breeds in N. America from Maine northwards, and in north Pacific, in Europe on Westmann Is. near Iceland, stragglers Norway, Heligoland, coasts of Germany, Holland, Belgium, France, Portugal, south to west coast Africa and Brazil, rare west Mediterranean. Subspecies on west coast N. America.

OCEANODROMA CASTRO

334. *Oceanodroma castro* (Harcourt.)—THE MADEIRAN FORK-TAILED PETREL.

THALASSIDROMA CASTRO Harcourt, Sketch of Madeira, p. 123 (1851—Desertas near Madeira).

Oceanodroma castro (Harcourt), Saunders, p. 731.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Coloration as in *O. leucorrhoa*, but usually rather darker, especially under-parts, greater and median wing-coverts usually darker and not so grey-brown, upper tail-coverts white, lower ones with prominent black tips (in some feathers sometimes spot-like), shafts of upper tail-coverts white, not brown as in *O. leucorrhoa*, central pair immediately over tail-feathers white tipped black and not mostly brown as in *O. leucorrhoa*, white patch on lower-flanks larger and both webs and shafts of feathers white, lateral under tail-coverts also with varying amount of white, base of tail-feathers with more, or comparatively to length, more white which often extends in outer feathers up shaft in form of streak often 30–40 mm. from base, very seldom less than 20 mm. This plumage is acquired by complete moult Aug.–Feb. Two completing moult in June and July may be birds a year old. Few moulting examples examined.

Nestling.—Like that of Storm-Petrel.

Juvenile. Male and female.—Plumage immediately succeeding 2nd nestling down is like adult. Sometimes, but certainly not always, young birds have more white than fresh plumaged adults on tips and edges of wing-coverts, inner secondaries and scapulars and have white fringes to the black tips of upper tail-coverts. These differences are not constant and when present soon disappear by abrasion.

Measurements and structure.—♂ wing 150 (one 145)–162 mm., tail: central pair 62–66, outermost 65–78 (one 82), depth of “fork” 3–11 (one 14, one 16), tarsus 21–23.5, middle toe with claw 21–26,

bill from feathers 13.5–16 (20 measured). ♀ wing 147–159. Rest of structure as in *O. l. leucorrhoa* but tail though varying somewhat almost always considerably less forked.

Soft parts.—Bill, legs and feet black ; iris black-brown.

CHARACTERS.—No subspecies. Forked or slightly forked tail, usually considerable white on outer tail-feathers, white shafts of upper tail-coverts and black tips of lower ones distinguish it from other British Petrels.

FIELD-CHARACTERS.—Black tips to white feathers of tail-coverts and squarer tail distinguish this species from *O. leucorrhoa*. Generally first noticed following in wake of ship ; to ordinary observer not unlike a Martin. Flies low with erratic somewhat fluttering flight, the legs hanging down and feet often pattering on water as its pace is diminished to pick up some minute planktonic organisms on which it feeds. Generally seen after storms because ocean surface then strewn with dead plankton and for same reason follows ships as propeller kills plankton which floats to surface some little way aft. (P. R. Lowe.)

BREEDING-HABITS.—Breeds in burrows in ground, which are said to be longer and more tortuous than those of Frigate-Petrel. *Egg*.—One only, white, no gloss, with at times a zone of pale red spots at large end. Average of 32 eggs, 33.5×24.8 . Max. : 36×26 and 35×26.1 . Min. : 30.8×24.1 , and 31.2×23.2 mm. *Breeding-season*.—In Cape Verde group Jan. to March : at Porto Santo apparently not only in June–July, but also in Dec.–Jan. *Incubation*.—Period not ascertained.

FOOD.—No definite information.

DISTRIBUTION.—*England*.—Three. One picked up dead Littlestone (Kent), Dec. 5, 1895 (H. Saunders, *Bull. B.O.C.*, v, p. 37). Female shot near Hythe (Kent), Nov. 8, 1906 (N. F. Ticehurst, *op. c.*, xix, p. 20 ; cf. *Brit. B.*, II, p. 369). One picked up dead Milford (Hants.), Nov. 19, 1911 (P. W. Munn, *Brit. B.*, v, p. 252).

DISTRIBUTION.—*Abroad*.—Has a curiously wide distribution, breeding on outlying rocks of Azores, Salvage and Madeira groups, on Cape Verde Islands and probably St. Helena, as well as on Hawaiian and Galapagos Islands in Pacific Ocean (birds from latter two groups have been separated as distinct forms, but both require confirmation.) Casual on coasts of Denmark and U.S.A.

Genus OCEANITES Keys. & Blas.

OCEANITES Keyserling and Blasius, Wirbelt. Eur., pp. xciii, 131, 238 (1840—Type according to text clearly *O. wilsoni*=*oceanicus*).

Similar to *Hydrobates* and *Oceanodroma*, but legs much longer, tarsus in front with an undivided shield, 1st phalanx of middle toe as long as the distal two phalanges. 12 rectrices, tail straight or emarginated. 4 species, chiefly in seas of Southern Hemisphere.

OCEANITES OCEANICUS

335. *Oceanites oceanicus* (Kuhl)—WILSON'S PETREL.

PROCELLARIA OCEANICA Kuhl, Beiträge z. Zool., p. 136, pl. 10, fig. 1 (1820—Southern Oceans; no locality stated. Typical locality S. Atlantic Ocean east of La Plata, ex Solander's MS.).

Oceanites oceanica (Kuhl), Yarrell, iv, p. 48; Saunders, p. 733.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Coloration much as in *O. leucorrhoa* but slate-grey tinge not so marked as is often case in *O. leucorrhoa*; immediately in front of eye a varying number of feathers partially white or whitish mostly concealed and amount of whitish varying considerably; all upper tail-coverts entirely white (but feathers of lower-rump brown-black tipped white); greater wing-coverts when fresh with rather wide tips and fringes; lower scapulars when fresh faintly

Wilson's Petrel (*Oceanites oceanicus*).

tipped pale brown but not white; white patch on lower-flanks large and lateral under tail-coverts with some white as in *O. castro*; white at base of tail-feathers confined to inner webs and extending as a streak (on outer pair for about two-thirds of length). N.B.—When fresh, feathers of belly have very faint, and under tail-coverts rather wider, white tips, which are soon worn off as are white fringes and tips of greater wing-coverts and these latter become browner and less grey-brown than when fresh. This plumage is acquired by complete moult May–Sept. (two near Aden, Nov., and one Massachusetts, Jan., in full moult may be birds in their first year).

Nestling.—(Not examined.) Uniform greyish-black (R. Hall).

Juvenile. Male and female.—Plumage immediately succeeding nestling down is like adult but with longer white fringes to feathers of belly.* Complete moult takes place apparently Nov.–Jan.

Measurements and structure.—♂ wing 140–152 mm., tail: central pair 58–65, outermost 62–71, depth of “fork” 2–9, tarsus 33–39, middle toe with claw 27–30, bill from feathers 12–13 (12 measured). ♀ wing 135–158. Primaries: 1st minute, pointed and concealed by primary-coverts, 3rd longest, 2nd 4–8 mm. shorter,

* R. C. Murphy (*Bull. Amer. Mus. N.H.*, xxxviii, p. 118) states that young birds have a whitish spot on the lores. I have not examined any very young birds but cannot find that there is any constant difference in this concealed whitish spot in adults or young birds, the variation in the amount of white being individual.—H.F.W.

4th 2-6 shorter, 5th 15-20 shorter, 6th 24-32 shorter. Tail very slightly forked. Tarsus very long. Claws rather flat. Bill short but comparatively broad at base. Rest of structure as in Storm-Petrel.

Soft parts.—Bill, legs and feet black, webs black with broad orange streak margined with black and extending from near base for about three-fourths of length, longer on outer web; iris deep brown.

CHARACTERS AND ALLIED FORMS.—*O. o. exasperatus* (N. Zealand) appears to be larger but measurements overlap. Long tarsus, comparatively short bill, yellow webs and pure white upper tail-coverts distinguish species.

FIELD-CHARACTERS.—Small black Petrel with apparent size of Leach's and with white rump but square tail. Wavering flight compared by Murphy to that of a Goat-sucker (*Chordeiles*). Legs and toes comparatively longer than in Leach's and in flight protrude nearly half an inch beyond tail. When flying low over water in search of food often patters with feet on surface. (P. R. Lowe.)

BREEDING-HABITS.—On Kerguelen breeds under stones and boulders, sometimes scratching away an entrance: depth of cup of typical nest-hole about 5 in., while a rough nest was built of *Azorella* stalks (R. Hall). In the S. Orkneys eggs were laid in narrow clefts and fissures of rock, often far in, at varying heights in face of cliffs or under stones: no nest being made. *Egg*.—One only, white, without gloss, elongated in shape, sometimes with fine brown specks round large end. Average of 16 eggs 33.3×23.6 . Max.: 36×24 . Min.: 32×23 and 32.7×22.7 mm. *Breeding-season*.—Jan. and Feb. in Kerguelen: and from Dec. 11 onwards on S. Orkneys. *Incubation*.—Apparently by both sexes: male caught on egg at 7 a.m. (Hall). Period not ascertained. Single brooded.

FOOD.—Small fishes, mollusca, crustacea, marine plants and floating oil (Audubon), also refuse thrown away after cleaning fish.

DISTRIBUTION.—*British Isles*.—Very rare vagrant. *England*.—Many seen off Land's End, May, 1838. Following *authentic* examples since obtained: Cornwall (one), Wilts. (one), Isle of Wight (two), Sussex (two), Yorks. (one), Cumberland (three). *Scotland*.—One, Jura (I. Hebrides), Oct., 1891. *Ireland*.—Two, Lough Erne (Antrim), and Mossvale (Down), Oct. 1 and 2, 1891.

DISTRIBUTION.—*Abroad*.—Breeds on Kerguelen and S. Georgia Is. and apparently in South Polar regions, migrating northwards during antarctic winter as far north as British Isles and Labrador, having been found in all seas except north Pacific. A subspecies from New Zealand and Australia has been separated, but requires confirmation. This form would breed on coast S. Polar continent! (See Mathews, *B. Austr.*, II, p. 11, 1912.)

Genus PELAGODROMA Rehb.

PELAGODROMA Reichenbach, Av. Syst. Nat., p. iv (1852—Monotype *P. marina*).

Differs at glance from *Hydrobates*, *Oceanodroma*, and *Oceanites* by its white underside and very long and strong feet and tarsi, latter being very little longer than toes. 2nd developed primary longest, 3rd shorter than 2nd. Tail emarginated for about 10 mm. Only one species.

PELAGODROMA MARINA

336. *Pelagodroma marina hypoleuca* * (Webb, Berth. and Moq.-Tandon)—THE FRIGATE-PETREL.

THALASSIDROMA HYPOLEUCA Webb, Berthelot et Moquin-Tandon, Hist. Nat. Iles Canar., Zool., Orn., p. 45 (1841—Tenerife).

Pelagodroma marina (Latham), Saunders, p. 735; Hand-List Brit. Birds (1912), p. 151.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Fore-head, lores and stripe over and behind eye white slightly mottled ash-brown especially in centre of fore-head, where feathers are only lightly tipped white and on eye-stripe, where feathers are often tipped ash-brown; crown dark brownish-slate; hind-neck and upper-mantle paler and greyer, feathers when fresh very narrowly tipped white; rest of mantle, back and scapulars dark brown; rump and upper tail-coverts ash-grey, when fresh with very narrow whitish tip and equally narrow subterminal dark line, bases more or less white mottled grey; immediately in front of eye and extending under eye to base of ear-coverts black-brown tinged grey as crown, forming a dark stripe under and parallel to white eye-stripe; chin, throat and under-parts white, but sides of lower-neck joining grey of hind-neck and extending on to sides of lower-throat and upper-breast ash-grey; flanks narrowly and lightly streaked ash-grey, lower-flanks more mottled and some more or less barred ash-grey; upper under tail-coverts more grey barred or mottled and narrowly tipped white, longer under tail-

The Frigate-Petrel (*Pelagodroma marina hypoleuca*).

* By the kindness of Mr. L. E. Hope of the Carlisle Museum we have been able to examine the Walney Island example, which has the long bill (18 mm.) of *P. m. hypoleuca* though the colour of its upper-parts is rather darker than is usual in that form; its tail is almost square. *Pelagodroma marina marina* (Lath.) (*Procellaria marina* Latham, Index Orn., II, p. 826, 1790, "Habitat in Mari australi; latitudine 37") inhabits the southern Atlantic.

coverts darker and browner, narrowly tipped whitish and inner webs usually mottled ash-grey; axillaries white sometimes with grey bases and some shaft-streaks; under wing-coverts white, feathers round edge of wing brown narrowly fringed white; tail black-brown, bases concealed by coverts, grey-brown; wing-feathers with outer webs and outer part of inner webs and tips black-brown, rest of inner webs pale brown shading to white on basal halves, inner secondaries with very narrow white tips; primary-coverts and those along edge of wing black-brown with narrow pale brown tips; rest of wing-coverts brown, but terminal portions of greater pale brown and when fresh with very narrow white tips. No moulting examples available for examination.

Nestling.—Down on upper-parts slate-grey, on under-parts paler and on centre of breast ashy-grey. Very long, soft, and silky on upper-parts, shorter on under-parts; chin, upper-throat and lores bare. N.B.—I have been unable to find any trace of two downs in the examples examined.

Juvenile. Male and female.—Like adult but feathers of rump and upper tail-coverts with better defined narrow white tips and with more narrow white bars, long scapulars narrowly tipped white, inner primaries narrowly edged white at tips and secondaries more widely tipped white, when fresh greater coverts tipped white with faint subterminal line.

Measurements and structure.—♂ wing 151–167 mm., tail: central pair 60–70, outermost 67–76, depth of “fork” 6–11 (occasionally almost square), tarsus 43–47, middle toe with claw 35–40, bill from feathers 17–20 (9 measured). ♀ wing 154–170 (21 measured). Primaries: 1st minute, pointed and concealed by primary-coverts, 3rd longest, 2nd 8–14 mm. shorter, 4th 2–5 shorter, 5th 12–20 shorter, 6th 25–30 shorter. Tail slightly forked. Tarsus and toes very long. Claws decidedly flat. Rest of structure as in Storm-Petrel.

Soft parts.—Bill, legs and feet black, webs yellow usually with narrow margin of black but sometimes mostly yellow and edges of toes yellow; iris black-brown.

CHARACTERS AND ALLIED FORMS.—*P. m. marina* (south Atlantic) is darker on upper-parts and has shorter bill. Dark crown, white eye-stripe and dark stripe on ear-coverts and white under-parts distinguish this from other small British Petrels.

FIELD-CHARACTERS.—Fluttering butterfly-like flight and conspicuously contrasted colours easily distinguish this Petrel from others. Larger than Leach's or Wilson's Petrels, lighter above (greyish to greyish-brown) with conspicuous grey upper tail-coverts, under-parts wholly white and long black legs dangling over the water: feet black and orange: conspicuous white frontal band and superciliary stripe. Surface feeder. Often

strikes the water with its feet when flying low to pick up food. Ogilvie-Grant states "Short grunting note when caught on eggs, much like that of domestic Pigeon under similar circumstances." (P. R. Lowe.)

BREEDING-HABITS.—Breeds in burrows in sandy soil in large colonies. Apparently no nest made, single egg being laid on bare soil. *Egg*.—White, without gloss, and usually well-defined zone or cap of fine red spots at large end, with violet shell-spots. Average of 22 eggs, 36.2×26.5 . Max. : 37.3×26.7 and 36.9×27.4 . Min. : 33.8×25.7 and 37×25.4 . *Breeding-season*.—About April 27 on Great Salvage Island, but eggs and young in mid-March on Cape Verde group. *Incubation*.—By both sexes. Period unknown.

FOOD.—No definite information.

DISTRIBUTION.—*Great Britain*.—Two. One picked up dead Walney Island (Lancs.), Nov., 1890 (H. A. Macpherson, *Ibis*, 1891, p. 602). Young female caught alive Colonsay (I. Hebrides) Jan. 1, 1897 (W. E. Clarke, *Ann. S.N.H.*, 1897, p. 88).

DISTRIBUTION.—*Abroad*.—Nests on Salvages and Cape Verde Islands and has been obtained on Azores (once), Canaries, and Madeira, also on coast of Massachusetts (U.S.A.). Allied subspecies (*P. m. marina*) inhabits Tristan d'Acunha, Nightingale Is., and probably other islands in southern Atlantic, and is found in Indian and Australian seas; another very close form described from Chatham Isles east of New Zealand.

Genus PUFFINUS Briss.

PUFFINUS Brisson, Orn., I, p. 56 (1760—Type according to vol. VI, p. 130, "*Puffinus*," i.e. *Procellaria puffinus* Brünn.).

Middle-sized Petrels with very long wings and elongated slender bills. The depressed middle portion is about half the total length of bill. Nostrils on top of culmen, well divided and visible from above. Tarsus laterally compressed and with a more or less sharp ridge in front. Tail cuneate, 12 rectrices. Wings pointed, 1st or 1st and 2nd developed primaries longest. Over 20 species and a number of subspecies in all oceans.

Key to species of genus PUFFINUS.

1	Underside brown	<i>P. griseus</i> , p. 434
	Underside white with grey-brown area in middle of abdomen	<i>P. gravis</i> , p. 429
	Underside entirely or mostly white	2
2	Larger, wing over 290 mm., bill more or less yellowish	<i>P. kuhlii</i> , p. 431
	Smaller, wing under 280 mm., bill dark	3
3	Wing over 200 mm.	<i>P. puffinus</i> , p. 422
	Wing under 200 mm.	<i>P. assimilis</i> , p. 426

PUFFINUS PUFFINUS

337. *Puffinus puffinus puffinus* (Brünn.)—THE MANX SHEAR-WATER.

PROCELLARIA PUFFINUS Brünnich, Orn. Bor., p. 29 (1764—Færoes, Norway).

Procellaria anglorum Temminck, Man. d'Orn., éd. II, p. 806 (1820—St. Kilda, Man, Orkneys).

Puffinus anglorum (Temminck), Yarrell, iv, p. 21; Saunders, p. 741.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole upper-parts black, on nape a few white filoplumes frequently projecting beyond contour feathers; lores and in front of eyes speckled greyish-white; eyelids greyish-white; under-parts white; from base of lower mandible, lower edge of ear-coverts and down sides of neck and sides of breast, feathers tipped or barred near

The Manx Shearwater (*Puffinus p. puffinus*).

tip, mottled or very finely speckled slate-grey, occasionally a few feathers across lower-throat with slate tips; flanks often minutely and lightly speckled slate and lower feathers with patch of brown-black at tip on inner webs; tibial feathers black; under tail-coverts white but lateral feathers with outer webs black (or mostly black or slate and black) and inner webs usually more or less finely speckled or mottled slate-grey; axillaries white sometimes with broad black penultimate band, sometimes only mottled dark slate-grey at tip and rarely pure white; under wing-coverts white, those along edge of wing with black or slate-black bases and shafts or outer webs; tail black; wing-feathers black, inner webs shading from brown to white at base; all wing-coverts black. This plumage is acquired by complete moult Aug.—Sept.; one completing moult April. (Very few in moult examined.)

Nestling. 1st down.—Upper-parts varying mouse-brown to soft grey-brown; chin, throat and broad band down centre of breast dividing and going down each side of belly to vent greyish-white; middle of belly and rest of under-parts grey-brown. Down soft and long, covering bird very closely, short on lores, round eyes and on chin.

2nd down.—Like first but slightly darker, about same length but slightly closer structure. Growth of 2nd down is almost continuous with first and division of the two sometimes not very clearly marked. 2nd down is succeeded by feathers, growth being continuous and by time feathers grow most of 1st down has worn off tips of 2nd down.

Juvenile. Male and female.—Plumage immediately succeeding 2nd nestling down is like adult.

Measurements and structure.—♂ wing 225–244 mm., tail 74–82, tarsus 42–47, middle toe with claw 47–53, bill from feathers 32–39 (14 British measured). ♀ wing 225–240, bill 33–36. Primaries: 1st minute, pointed and concealed by primary-coverts, 2nd longest, 3rd 2–5 mm. shorter, or occasionally as long, 4th 9–16 shorter, 5th 24–33 shorter, 6th 40–50 shorter; outer web of outer (2nd) primary considerably narrower than in rest. Outer secondaries about as long as 10th and inner as 8th primaries. Tail rounded, 12 feathers, tips rather sharply rounded. Under tail-coverts nearly as long as tail-feathers. Tarsus much compressed. Three toes long, slender, and fully webbed, hind toe minute and free; claws fairly sharp and somewhat arched. Bill slender, tip of both mandibles compressed and sharply decurved, base broad and not greatly elevated by parallel tubular nostrils, apertures of which are oval and open at an angle inclined upwards and forwards. Nostril tubes separated by ridge of culmen; in nestling slit-like on each side of culmen with only slight indication of tube.

Soft parts.—Bill, leaden-black, cutting edge greenish, base bluish-grey; legs and feet pink-flesh, hinder edge and outer toe brown-black, webs grey-blue and ochreous, claws brown-black; iris black.

CHARACTERS AND ALLIED FORMS.—For distinctions of *P. p. mauretanicus* see under that form. *P. p. yelkouan* (Mediterranean from Corsica eastwards) is intermediate between *P. p. puffinus* and *P. p. mauretanicus*, being rather browner on upper-parts than former, flanks more or less sooty-brown, axillaries with longer brown tips and under tail-coverts more brown than in *P. p. puffinus*. Black upper-parts, pure white under-parts and size distinguish Manx from other British Shearwaters.

FIELD-CHARACTERS.—Sometimes seen at rest on the water, but comes under notice oftenest as it careers over surface of sea. A few rapid beats alternate with periods of sailing with long narrow wings quite rigid, dead black of back in view at one moment, pure white

under-parts at next, as body is tilted at right angles and tip of lower wing seems almost to cut the waves. Obtains some of its food by diving but bulk from surface, and in picking it up the bird often paddles with its feet as smaller Petrels do. Silent except after dark at the breeding-places where there is a babel of varying sounds, some harsh, some soft and crooning. In hubbub of large colony Coward distinguished following cries: "It-y-corka," "Kitti-koo-roo," "Kok-a-kok," "Kok-a-roo-roo," and "It-is-yor-folt."

BREEDING-HABITS.—Breeds in colonies, sometimes of considerable size, sometimes making its burrow in low-lying islands, or at times in grassy slopes on face of cliffs. *Nest.*—Merely a little dry grass in some cases at end of burrow. *Egg.*—One only, white. Average of 100 eggs, 60.8×42.2 . Max.: 66.5×42 and 63.7×45.1 . Min.: 54.5×39.8 and 58.5×39 mm. *Breeding-season.*—From early May to first half June. *Incubation.*—By both sexes. Period unknown, but estimated at a month (Hantzsch). Single brooded.

FOOD.—Small fish (sprats, etc.), and offal of fish: also jaws of Cephalopoda found in stomach.

DISTRIBUTION.—*British Isles.*—Resident. Breeds Scilly Isles (in great numbers), Lundy, several islands (notably Skomer) off coast Wales as well as on mainland Carnarvon, several I. and O. Hebrides (notably Eigg and St. Kilda), Orkneys and Shetlands, and several islands and a few promontories in Ireland (most numerous Kerry). In late Aug. and Sept. considerable migrations (small numbers end July and early Aug.) noted, and then becomes widely spread round coasts, and examples are frequently picked up exhausted inland. In winter a decided diminution in numbers, which has been especially noted in Ireland and Scotland.

DISTRIBUTION.—*Abroad.*—Breeds south Iceland (Westmann Is.) and Færoes, and probably on Madeira, perhaps Salvages and apparently formerly Azores. Other races in east and west Mediterranean and on Bermudas.

338. *Puffinus puffinus mauretanicus** Lowe—The WESTERN MEDITERRANEAN SHEARWATER.

PUFFINUS PUFFINUS MAURETANICUS Lowe, Bull. B.O. Club, xli, p. 140 (1921—Western Mediterranean, Algeria, Malaga, also England).

Puffinus yelkouanus (Acerbi), Saunders, pp. 741–2.

Puffinus puffinus yelkouan (Acerbi), Hand-List Brit. Birds (1912), p. 153.

DESCRIPTION.—*Adult male and female.* *Winter and summer.*—Like *P. p. puffinus* but upper-parts black-brown not so black and

* All the British-taken examples so far examined belong to this form and not to *P. p. yelkouan* (*Procellaria yelkouan* Acerbi, Bibl. Ital., cxl, p. 297, pl. XLVII, 1827—Mediterranean) which occurs from the Bosphorus to Sardinia and Tunisia.

especially brownish on nape and upper-mantle (feathers when fresh very rich black-brown with paler tips, when worn darker brown) ; sides of neck pale sooty-brown, feathers having long sooty-brown tips and white bases ; sides of throat sometimes mostly pale sooty-brown as sides of neck but usually feathers are white with narrow crescentic subterminal bars giving a finely mottled appearance, usually centre of chin and throat white but sometimes mottled as sides ; sides of breast and flanks sooty-brown extending considerably on to belly and more or less on to sides of body, centre of breast sometimes pure white but feathers usually with some brown dusting or tips and sometimes shafts brown ; vent and under tail-coverts sooty-brown, feathers with paler, sometimes almost whitish, bases and when fresh with faint whitish tips ; axillaries sooty-brown, paler or whitish at extreme base ; under wing-coverts as *P. p. puffinus* but with browner and less black markings ; wings and tail browner not so black as in *P. p. puffinus*. This plumage is acquired by complete moult Aug.-Sept. N.B.—As compared with *P. p. yelkouan* rather browner on upper-parts ; considerably more brown on flanks, axillaries, vent, and under tail-coverts ; throat, breast and belly mottled and dusted brown and not pure white except sometimes down centre.

Measurements and structure.—♂ wing 235–253 mm., tail 70–77, tarsus 47–51, middle toe with claw 50–57, bill from feathers 37–41 (5 measured). 9 unsexed examples measure : wing 234–255, tail 68–77, tarsus 44–51, middle toe 51–56, bill 37–39. Structure as in Manx Shearwater.

BREEDING-HABITS.—No definite information on breeding-habits of this race, but probably habits similar to those of *P. p. yelkouan*, breeding in holes and under boulders and laying one white egg. 66 eggs of *P. p. yelkouan* average 57.2×40.5 mm. *Breeding-season*.—Probably end March and early April. Single brooded.

FOOD.—No definite information. Levantine Shearwater said to eat leaves of *Inula crithmoides*.

DISTRIBUTION.—*Great Britain*.—Vagrant. Nineteen recorded off coast Yorks., one Northumberland, two Norfolk, one Kent, one Hants., three Devon, and one Firth of Forth. Most Sept., some Aug., one Oct., and one Feb. (cf. Saunders, p. 742, and *Brit. B.*, II, pp. 137, 206, 313, 372 ; III, p. 295 ; VI, p. 227). All the above with the exception of 10 from Yorks. and one from Hants., which have not been examined, have been determined as of this form and not *P. p. yelkouan* (see *Brit. B.*, xv, pp. 151–3).

DISTRIBUTION.—*Abroad*.—Western Mediterranean (exact limits not yet known), casually (out of breeding-season) as far north as North Sea. A closely allied subspecies in middle and east Mediterranean.

PUFFINUS ASSIMILIS

339. *Puffinus assimilis baroli* * Bp.—THE MADEIRAN LITTLE SHEARWATER.

PUFFINUS BAROLI Bonaparte, Consp. Gen. Av., II, p. 204 (1857—"Mediterranean," Desertas, Canaries. Name ex Bonelli MS., who put it on a specimen said to be from Mediterranean. Restricted typical locality: Desertas).

Puffinus godmani Allen, Auk, 1908, p. 339. (Madeira. From literature.)

Puffinus obscurus atlanticus Rothschild and Hartert, Bull. B.O.C., XXVII, p. 43 (1911—North Atlantic Islands. Type from Porto Santo near Madeira).

Puffinus obscurus (nec Gmelin), Yarrell, IV, p. 27; *P. assimilis* nec Gould, Saunders, p. 743; *P. bailloni* Bonaparte, Godman, Mon. Petrels, p. 138.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole upper-parts black with a slight slaty tinge most marked when feathers fresh when also they have indications of white tips;

The Madeiran Little Shearwater (*Puffinus assimilis baroli*).

upper edge of lores, round eye and down sides of neck to sides of upper-breast mottled white and dark slate-grey, feathers having narrow white tips and dark slate-grey subterminal mottlings and irregular barrings; rest of lores and under-parts white; lateral under tail-coverts with outer webs wholly or partly dark slate-grey (varying individually) and often with two or three longest under tail-coverts mostly black, sometimes with white tips and sometimes more or less mottled white; feathers of lower-flanks with most of inner webs and usually tips white, outer webs as upper-parts; axillaries white often with dark slate-grey bases or

* It is somewhat uncertain what was meant by the name *obscurus*, and therefore it has been proposed by Mathews not to adopt it for this species, and I agree that it is perhaps better to avoid it, and that *Puffinus assimilis* Gould, *Syn. B. Austral.*, pt. IV, add., p. 7 (1838—"New South Wales," but later said to be from Norfolk I.) is better. In the B.O.U. list (1915) this Shearwater is called *Puffinus obscurus baroli*, but I have fully explained (*Brit. B.*, VIII, p. 282, 1915) that in my view it is not advisable to adopt the name *baroli*, and I have therefore called this subspecies *godmani*. This, however, being a question not of rules but whether the diagnosis is applicable or not to the bird in question, it has been decided by a majority of the interested authors of this work that the name *baroli* shall not be rejected.—E.H.

shaft-streaks or mottlings ; under wing-coverts white, but lesser series and those round edge of wing slate-grey with white tips ; tail black as rest of upper-parts ; primaries and secondaries black tinged grey, becoming paler on inner webs and white basally on inner edges giving a whitish appearance to under-wing ; primary-coverts and lesser and median coverts black slightly tinged grey, median when fresh with very narrow white tips ; greater coverts grey on inner webs and with white tips more marked on outer feathers and absent from innermost. N.B.—Grey tinge on upper-parts and white tips of median coverts especially, and to a less extent white tips of greater coverts, are much less noticeable in worn plumage. This plumage is acquired by complete moult probably in autumn and winter but very few examples taken other than in breeding-season are available for examination and none in moult. Several in April and May have some body-moult, but none shows any moult in wings or tail.

Nestling. 1st down.—Upper-parts greyish sooty-brown, paler and greyer than in Storm-Petrel and like Manx Shearwater, under-parts considerably greyer and with a broad greyish-white central band widening on abdomen, where it is divided by narrow V-shaped patch of grey-brown on vent. Down soft and long, covering bird very closely except lores, round eyes and chin where down is short.

2nd down.—Like first but of slightly closer structure, rather darker and with whitish tips (lores, round eyes and chin at this stage nearly bare). 2nd down succeeds 1st by almost continuous growth and similarly feathers succeed 2nd down and thus at first have two generations of down clinging to their tips.

Juvenile. Male and female.—Like adult but median coverts without white tips, outermost greater coverts occasionally with narrow white tips but rest with narrow pale grey fringes ; feathers of sides of body and flanks and under tail-coverts very narrowly tipped dark grey.

Measurements and structure.—♂ wing 170–187 mm., tail 68–80, tarsus 35–40, middle toe with claw 39–45, bill from feathers 25–28 (11 measured). ♀ wing 174–182, bill 24–25. Primaries : 1st narrow, about three-fourths primary-coverts, 2nd longest, 3rd often as long, sometimes 1–5 mm. shorter, 4th 5–10 shorter, 5th 14–20 shorter, 6th 25–32 shorter. Rest of structure as in Manx Shearwater.

Soft parts.—Bill, ridge of culmen and tip black, rest slate ; legs and feet slate-blue (livid flesh in juv.), back of tarsus and outer toe black, middle of webs and joints dusky ; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*P. a. l'herminieri* (Bermuda, West Indies) is browner on upper-parts and larger in all dimensions. For differences of *P. a. boydi* see under that form. Small size and white under-parts distinguish species from other British Shearwaters.

FIELD-CHARACTERS.—Small Shearwater, wholly black above and

white beneath. Generally seen in scattered flocks or small parties within touch of the islands on which they breed, and generally resting on the water. When disturbed fly away for some little distance with wings beating rapidly—impression given being one of great haste but little speed. Flight low and in calm waters near land as described above, but in rougher weather flight gliding as in all Shearwaters but wings beaten much more often than in large Shearwaters; four or five beats and then a short glide and so on. Surface feeder, does not dive. (P. R. Lowe.)

BREEDING-HABITS.—Breeds in holes in ground and also under boulders. *Nest.*—Occasionally a little dry grass. *Egg.*—One only, white, without gloss. Average of 37 eggs 50.2×34.6 . Max.: 54.2×35.5 and 50.5×37.5 . Min.: 45×34 and 51×32.5 mm. *Breeding-season.*—Usually late Jan. or Feb. to April in Madeira group: probably rather later on Salvages. *Incubation.*—Period not ascertained.

FOOD.—No definite records.

DISTRIBUTION.—*British Isles.*—Eight. One caught on board ship off Bull Rock (Cork) May 6, 1853 (*Birds Ireland*, p. 395). Male found dead near Bungay (Suffolk) about April 10, 1858 (Saunders, p. 743). Female picked up near Bexhill (Sussex), Dec. 28, 1900 (W. R. Butterfield, *Bull. B.O.C.*, xi, p. 45). Male caught near Lydd (Kent), Nov. 27, 1905 (N. F. Ticehurst, *op. c.*, xvi, p. 38; *cf. Brit. B.*, ii, p. 373). Female picked up dead St. Leonards (Sussex), Oct. 27, 1911 (H. W. Ford-Lindsay, *op. c.*, v, p. 253). Male picked up dead Pevensey Sluice (Sussex), Nov. 15, 1911 (F. F. Witherby, *l.c.*). Male picked up exhausted Welling (Kent), Aug. 20, 1912 (R. Lydekker, *Country Life*, Jan. 18, 1913; *cf. Brit. B.*, vi, p. 314). Female shot near Lydd (Kent), Dec. 27, 1913 (J. B. Nichols, *op. c.*, ix, p. 212).

DISTRIBUTION.—*Abroad.*—Islands in eastern parts of northern half of Atlantic Ocean: Canaries, Salvages, Madeira, and neighbouring islands, probably Azores. Replaced by other subspecies Cape Verde Is. and in western part of north Atlantic (east coast of United States, Bahamas, Bermudas), on Mascarene Islands (Seychelles, Mauritius, Réunion, Madagascar), in Australian and New Zealand seas, on Galapagos Islands.

340. *Puffinus assimilis boydi* Math.—THE CAPE VERDE LITTLE SHEARWATER.

PUFFINUS LHERMINIERI BOYDI Mathews, B. Australia, ii, p. 70 (1912—Cape Verde Islands).

Puffinus assimilis boydi J. B. Nichols, *Brit. B.*, ix, p. 201.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Like *P. a. baroli* but under tail-coverts mostly black instead of mostly white, inner webs of lateral feathers usually white, but varying, otherwise all under tail-coverts black many with narrow

white tips when fresh ; inner webs of primaries and secondaries darker, being pale brown instead of white basally. Several Nov. birds were just completing a full moult and one in March had some body-moult.

Measurements and structure.—♂ wing 177–190 mm., tail 71–82, tarsus 36–38, middle toe with claw 39.5–44, bill from feathers 24–26.5 (8 measured). ♀ wing 180–190, bill 24–28.

BREEDING-HABITS.—Boyd Alexander found it breeding in holes in ground and also under boulders and in cleft of rock and in one case under floor-boards of deserted hut. *Nest.*—Occasionally of dry grass. *Egg.*—One only, white, no gloss, very similar to that of Madeiran Little Shearwater. *Breeding-season.*—Eggs taken in March on Rombos. *Incubation.*—No details available.

FOOD.—No definite information.

DISTRIBUTION.—*England.*—Two. Female picked up Pevensey (Sussex), Dec. 4th, 1914. Female caught West St. Leonards (Sussex), Jan. 2nd, 1915 (*ut supra*).

DISTRIBUTION—Abroad.—Known only from the Cape Verde Islands.

[NOTE.—A specimen of *P. a. l'herminieri* in the Brit. Mus. coll. ex Gould coll. is said by Whiteley to have been killed in Devonshire but there is no confirmation of this (see Saunders, p. 744 and *Brit. B.*, ix, p. 203).]

PUFFINUS GRAVIS

341. *Puffinus gravis* (O'Reilly)—THE GREAT SHEARWATER.

PROCELLARIA GRAVIS O'Reilly, Greenland, adjacent seas, etc., p. 140, pl. 12, fig. 1 (1818—Cape Farewell and Staten Hook to Newfoundland). *Puffinus major* Faber, Prodr. isl. Orn., p. 56 (1822—Nomen nudum.); Temminck, Man. d'Orn., sec. éd., iv, p. 507 (1840—1st descr. Said to nest in millions in Newfoundland and to stray to northern coasts of Europe, Iceland, England. Name ex Faber. Newfoundland error. Terra typica should be Iceland, ex Faber.) *Puffinus major* F. Faber, Yarrell, iv, p. 12 ; *P. gravis* (O'Reilly), Saunders, p. 737.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Fore-head and crown dark sooty-brown ; centre of nape and hind-neck paler ; rest of upper-parts black-brown, feathers with broad sooty-brown edges paler and greyish on scapulars and all becoming paler when worn ; lower upper tail-coverts with long white or whitish tips and fringes and rest of feather with varying amount of brown and tips usually with some brown mottling or incomplete bars ; lores and ear-coverts as crown but round anterior margin of eye some feathers partially white making a mottled spot ; under-parts white which extends backwards in centre of throat to sides of nape, feathers adjoining brown of centre of nape being tipped or lightly barred brown ; feathers of centre of lower-breast and belly and sometimes most of vent broadly tipped sooty-brown making a somewhat mottled long dirty brown patch ; varying number of

flank-feathers with large subterminal sooty-brown bands or spots, lower-flanks and under tail-coverts sooty-brown, latter tipped pale brown or whitish, lower ones mottled whitish; axillaries white with about distal quarter brown and extreme tips white; under wing-coverts white, those round edge and bend of wing with broad brown shaft-streaks or brown with white fringes, and some in centre often with narrow brown shaft-streaks; tail brown-black; primaries brown-black becoming brown on inner webs and on basal portions white; secondaries same with more or less silver-grey wash and narrowly margined white and more white on inner webs, inner feathers browner; greater coverts washed silver-grey and fringed white, rest of coverts as mantle. This plumage is acquired by complete moult June–Sept.*

Nestling.—(Not examined.)

Juvenile.—Apparently as adult.

Measurements and structure.—Wing 310–335 mm., tail 107–121, tarsus 56–62, middle toe with claw 66–75, bill from feathers 44–49 (20 measured, but insufficient sexed material to give separate measurements). Primaries: 1st minute, pointed and concealed by primary-coverts, 2nd longest, 3rd 3–8 mm. shorter, 4th 15–23 shorter, 5th 38–45 shorter, 6th 60–70 shorter, 7th 82–95 shorter. Rest of structure as in Manx Shearwater.

Soft parts.—Bill yellow-green (Audubon) in dried skins dark horn-colour; legs and feet outer side brown, inner side yellowish-flesh; iris grey-brown.

CHARACTERS.—No subspecies. Large size, white under-parts with brown patch down centre of belly distinguish it from other British Shearwaters.

FIELD-CHARACTERS.—One of the large Shearwaters looking as big as *P. kuhlii*, from which it is easily distinguished by the strongly marked line of demarcation between brown of head and pure white of throat, sides and front of neck. White of neck also runs backwards some little way so as to produce impression of a conspicuous brown cap which is very diagnostic. A minor point for recognition is the white tips to upper tail-coverts. With glasses sooty-brown smudge on white abdomen might be made out as bird tilts over. Flight as under North Atlantic Great Shearwater. Brewster says will frequently glide half a mile without moving wings perceptibly. (P. R. Lowe.)

* It has frequently been stated that Great Shearwaters and Manx Shearwaters moult their wing-feathers so rapidly as to become almost flightless (compare especially Prof. A. Newton, *Ann. Scot. Nat. Hist.*, 1900, pp. 142–7). In the moulting examples of *Puffinus* which I have examined usually two adjacent primaries have been in different stages of growth, and those next to them on either side full grown or old. In one case (Great Shearwater, Greenland, June) the outer *four* primaries are all in various stages of growth, giving the bird a very short-winged and flightless appearance. The wing-feathers, however, are not dropped simultaneously and thus the moult is not comparable with that of the Anatidæ and others.—H.F.W.

BREEDING-HABITS.—Almost unknown. Only known eggs taken on Inaccessible Island, Tristan d'Acunha group, but no details given.

Egg.—One only, white, unmarked. Average of 5 eggs, 76.2×48.2 . Max. : 81×49.1 and 78.5×51 . Min. : 70.3×46.9 and 71.6×44.3 mm. *Breeding-season.*—One egg dated May 29. *Incubation.*—No details.

FOOD.—Chiefly Cephalopoda (cuttle-fish), but also captured on baited hooks and will take refuse from fishing boats.

DISTRIBUTION.—*British Isles.*—Autumn-visitor. Most frequent and regular off coasts of south-west England, western isles Scotland, and south and west coasts Ireland. Fairly frequent off Yorks. coast, but seldom noticed elsewhere on east coast. Very seldom near land. Often in flocks and generally seen Aug. to Nov., but not infrequently late June and July.

DISTRIBUTION.—*Abroad.*—Atlantic Ocean from Arctic Circle to S. Africa and Cape Horn. Only known with certainty to breed in Tristan d'Acunha group, but probably nests in other localities in Southern Hemisphere. During southern winter to N. Atlantic as far as Canaries, Madeira, Færoes, Iceland, Greenland, Newfoundland ; Holland (once).

PUFFINUS KUHLLI

342. *Puffinus kuhlii kuhlii* (Boie)—THE MEDITERRANEAN GREAT SHEARWATER.

PROCELLARIA KUHLLI Boie, Isis, 1835, p. 257 (Corsica).

Puffinus kuhlii (Boie), W. R. Butterfield, Bull. B.O.C., xvi, p. 71 ; Saunders, Brit. B., i, p. 16.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Crown, nape, and hind-neck greyish sooty-brown, usually one or two white feathers on crown ; feathers of mantle and back darker sooty-brown with broad grey-brown fringes and when fresh with narrow greyish-white fringes at extreme tip ; scapulars darker brown tinged grey and narrowly tipped pale brown or whitish ; rump and shorter upper tail-coverts dark sooty-brown broadly fringed grey-brown, lower upper tail-coverts dark sooty-brown with long tips and varying amount of outer webs white mottled brown ; fore-head, lores, round anterior half of eye and base of lower mandible grey-brown, feathers narrowly edged greyish-white giving a mottled appearance ; down sides of chin and throat extending on to sides of neck feathers with their bases white and distal halves finely barred grey-brown and white giving a finely barred or mottled appearance (mottling sometimes extending across chin) ; sides of breast and flanks white with some pale brown barring, small patch of feathers on lower-flanks and some lateral under tail-coverts with varying amount of brown mottling and barring, especially on outer webs which are occasionally mostly brown ; centre of throat, rest of under-parts white ; axillaries

white occasionally with some fine brown shaft-streaks; under wing-coverts white, most feathers with fine brown shaft-streaks and those round edge of wing brown tipped and edged white; tail-feathers dark brown with a grey bloom when fresh, bases of inner webs white mottled brown; primaries: outer webs and tips black-brown with grey bloom, inner webs brown along shafts and along edge of distal portion, rest white, white extending along middle of web on distal portion, but rarely whole distal portion

The Mediterranean Great Shearwater (*Puffinus kuhlii kuhlii*) lower, and the North Atlantic Great Shearwater (*P. k. borealis*) upper figure.

brown as in *P. k. borealis* except outer primary which often has wide distal portion brown; secondaries same but outer webs not quite so dark and extremely narrowly fringed white; primary-coverts black-brown with grey bloom; rest of wing-coverts dark brown fringed and tipped paler brown. This plumage appears to be acquired by complete moult July-Jan. and sometimes not quite complete in Feb. and March. Very few moulting examples available for examination.

Nestling. 1st down.—Upper-parts greyish-brown, darker and browner than in *P. p. puffinus* like that of *P. p. yelkouan*, under-parts rather paler than upper-parts, lower-throat and upper-breast white, centre of breast very pale brown but not white as in *P. puffinus*. Fore-head, round eyes, chin and upper-throat nearly bare. *2nd down.*—Like first but rather darker on upper-parts.

Juvenile.—Like adult.

Measurements and structure.—♂ wing 335–360 mm., tail 118–140, tarsus 51–57, middle toe with claw 66–73, bill from feathers 50–55, width at base 18.5–20 (8 measured). ♀ wing 325–355, bill 46–53, width at base 16–19. Primaries: 1st minute, pointed and about two-thirds primary-coverts, 2nd longest, 3rd 3–10 mm. shorter, 4th 20–28 shorter, 5th 40–50 shorter, 6th 70–80 shorter. Rest of structure as in Manx Shearwater.

Soft parts.—Bill yellow-horn; legs and feet pale flesh, outer side of tarsus, outer toe, joints and webs dusky; iris brown.

CHARACTERS AND ALLIED FORMS.—For differences of *P. k. borealis* see under that form. *P. k. edwardsii* (Cape Verde Is.) is smaller than typical form; *P. k. flavirostris* (Kerguelen) has a longish but slender bill. Large size, mottled sides of neck, yellow bill distinguish species.

BREEDING-HABITS.—Breeds in holes in ground and clefts of rocks, sometimes in face of high cliffs, but also on low islets. *Nest.*—A layer of dead leaves of *Scilla maritima*. *Egg.*—One only, white, no gloss. Average of 65 eggs, 68.1×45.3 . Max.: 73.7×44.9 and 65.6×52.9 . Min.: 63×42 and 65×41 mm. *Breeding-season.*—Late May or early June. *Incubation.*—Apparently by both sexes. Period estimated as four weeks by Krüper. Single brooded.

FOOD.—Chiefly Cephalopoda (cuttle fish), including *Loligo vulgaris*. Also green substance, said to be leaves of *Inula crithmoides* and once eggs of fish (Feilden).

DISTRIBUTION.—*England.*—One. Female picked up Pevensy Beach (Sussex), Feb. 21, 1906 (*ut supra*).

DISTRIBUTION.—*Abroad.*—Mediterranean Sea, from Palestine to Spain. Replaced in north Atlantic by other forms inhabiting east Atlantic Islands (Azores to Canaries and Madeira), Cape Verde Is., and Kerguelen group.

343. *Puffinus kuhlii borealis* Cory—THE NORTH ATLANTIC GREAT SHEARWATER.

PUFFINUS BOREALIS Cory, Bull. Nuttall Orn. Club, vi, p. 84 (1881—"Near Chatham Island, Cape Cod, Massachusetts").

Puffinus kuhlii fortunatus Bannerman, Bull. Brit. Orn. Club, xxxv, p. 120 (1915—Type, Canary Islands).

Puffinus kuhlii borealis, J. B. Nichols, Brit. B., ix, p. 203.

DESCRIPTION.—*Adult male and female.* *Winter and summer.*—Like *P. k. kuhlii* and not to be distinguished with certainty by plumage, but in most examples white on inner webs of primaries extends less far towards the tip. Sept. and Oct. examples examined were in full moult.

Measurements and structure.—♂ wing 350–378 mm., tail 125–145, tarsus 54–60, middle toe with claw 68–77, bill from feathers 54–60, width at base 20–23 (16 measured). ♀ wing 335–368, bill 51–60, width at base 18–21. Thus bigger than *P. k. kuhlii* but measurements overlapping, bill markedly thicker and deeper.

FIELD-CHARACTERS.—Appearing about same size as *P. gravis*, brown above, white beneath. Bill yellow. Differs from *P. gravis* in not having distinctly capped appearance, grey-brown of crown and hind-neck gradually merging into a vermiculated pattern which extends from bill backwards along sides of neck and upper-breast. Flight rapid, planing, swooping, rising and falling. With wings extended and rigid it follows contours of the ocean waves for long intervals without apparent effort or motion of wings. Often seen in flocks rising and falling against the horizon. A surface feeder. Sits on water often in flocks. D. Bannerman states that at breeding site note is a long drawn-out wailing, often replied to by a purring sound. (P. R. Lowe.)

BREEDING-HABITS.—Breeds in vast numbers in crevices of cliffs, among boulders on islands, in interior of caves, sometimes 20 yards or more from entrance, and occasionally in burrows in hard or sandy soil. *Nest*.—Merely a few feathers or bits of seaweed. *Egg*.—One only, white, without gloss. Average of 70 eggs, 75.3×50 . Max. : 82.5×51 and 75×53 . Min. : 68.6×46.8 and 73.5×45 mm. *Breeding-season*.—Begins late in May, but laying general at beginning of June in Canary group. *Incubation*.—Shared by sexes. Period not ascertained. Single brooded.

FOOD.—Chiefly Cephalopoda (cuttle-fish), but definite records lacking.

DISTRIBUTION.—*England*.—One. Male picked up West St. Leonards (Sussex), March 14th, 1914 (*ut supra*).

DISTRIBUTION.—*Abroad*.—Nesting Azores, islands of Madeira group, Salvages, Canary Islands and (probably this form) Berlenga Is. off coast of Portugal. Is not rare in autumn (Aug.–Nov.) on coasts of Massachusetts, Rhode and Long Islands in North America.

PUFFINUS GRISEUS

344. *Puffinus griseus* (Gm.)—THE SOOTY SHEARWATER.

PROCELLARIA GRISEA Gmelin, Syst. Nat., i, ii, p. 564 (1789—Southern Hemisphere).

Puffinus griseus (Gmelin), Yarrell, iv, p. 17; Saunders, p. 739.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Whole upper-parts sooty black-brown, feathers fringed slightly paler and more greyish-brown, more obvious in worn plumage (fairly often sprinkling of greyish-white filoplumes on nape and sides of neck); lores varying with or without hoary tinge; whole under-parts grey-brown varying in shade and often with more or less grey-slate tinge, feathers more or less greyish-white at extreme tip (varying) and paler greyish bases of feathers showing, chin paler than rest of under-parts and bases of feathers whitish; axillaries as rest of under-parts; under wing-coverts greyish-white with black-brown shaft-streaks and varying amount of black-brown.

mottling and markings; tail-feathers black-brown; wing-feathers same but inner webs paler brown and tips and outer webs with more or less grey bloom; wing-coverts as upper-parts. This plumage is acquired by complete moult Feb.-Sept. or even Oct. N.B.—In worn plumage of a more rusty tinge of brown not so blackish.

Nestling.—One in Tring Mus. (New Zealand, Sir W. Buller) showing both downs, is like nestling Manx Shearwater. A little down remaining on a young feathered bird is, however, rather darker with a greyish-sooty tinge.

Juvenile.—Apparently like adult.

Measurements and structure.—♂ wing 290 (one 270, one 280)—310 (one 320) mm., tail 84–98, tarsus 52–60, middle toe with claw 61–68, bill from feathers 39–44 (14 measured). ♀ wing 280 (one 273)—305, bill 38–44. Primaries: 1st narrow, pointed and about two-thirds primary-coverts, 2nd longest, 3rd 5–8 mm. shorter (exceptionally as long), 4th 16–25 shorter, 5th 40–50 shorter, 6th 65–75 shorter. Rest of structure as Manx Shearwater.

Soft parts.—Bill dark grey, dark brown to purplish-black, paler on ridge of culmen; legs and feet slate-grey, outer side of tarsus and outer toe dark grey or blackish, webs dark grey or yellowish; iris black-brown.

CHARACTERS.—No subspecies. Grey-brown under-parts and large size distinguish it from other British *Puffinus*.

FIELD-CHARACTERS.—An all dark sooty-brown bird with black bill and feet and short tail, smaller than *P. kuhlii* and more elegant and slender. Flight conforms to that characteristic of smaller members of Shearwater group rather than to such species as *P. kuhlii*. (P. R. Lowe.)

BREEDING-HABITS.—Nests in burrow, 3 or 4 ft. long in peaty ground.

Nest.—Consists only of a few twigs and dead leaves. *Egg*.—One only, white. Average of 10 eggs, 75.8×49 . Max.: 81×49 and 75.6×51 . Min.: 71.5×49.5 and 74.9×45.4 mm. *Breeding-season*.—Nov. and Dec. *Incubation*.—Apparently shared by both sexes as males have been taken on eggs. Period not ascertained.

FOOD.—No definite records.

DISTRIBUTION.—*British Isles*.—Autumn-visitor (Aug.–Oct., exceptionally Nov. and Dec.). Chiefly noticed off Firth of Forth, coast Yorks., along Channel from Kent to Cornwall, and off coasts Cork, Kerry, and Mayo. Also recorded Northumberland (four and others seen), several Outer Hebrides, two Orkneys, and once each from coasts Haddington, Norfolk, Down.

DISTRIBUTION.—*Abroad*.—Breeds in Southern Hemisphere (New Zealand and neighbouring islands), ranging north after breeding-season to Færoes and United States, as well as to Kuriles and south Alaska. Said to nest on Pescadores near Formosa, but this requires confirmation.

Genus *PTERODROMA* Bp.*

PTERODROMA Bonaparte, Compt. Rend. Acad., Paris, XLII, p. 768 (1856—Type by subsequent designation of Coues, 1866, *P. macroptera*).

Differ at a glance from *Puffinus* by comparatively deeper and shorter bill; horny distal portion of upper mandible is comparatively longer and depressed middle part is shorter, less than half length of whole bill. Nostrils on top of culmen, with a distinct dividing membrane. Tarsus not compressed as in *Puffinus*, front rounded, without sharp ridge. Claws sharp-pointed. Wings comparatively shorter, 1st developed primary longest. Tail more or less pointed, short, cuneiform. 12 rectrices. About 30 species in all oceans.

Key to species of genus PTERODROMA.

1 {	Wing under 250 mm.	.	.	.	.	.	<i>P. brevipes</i> , p. 439
	Wing over 250 mm.	.	.	.	.	2	
2 {	Under tail-coverts white	.	.	.	.	.	<i>P. hasitata</i> , p. 438
	Under tail-coverts grey-brown	.	.	.	.	.	<i>P. neglecta</i> , p. 436

PTERODROMA NEGLECTA**345. *Pterodroma neglecta* (Schleg.)—KERMADEC PETREL.†**

PROCELLARIA NEGLECTA Schlegel, Mus. Pays-Bas., VI, Procell., p. 10 (1863—Kermadec Islands).

Æstrelata neglecta (Schlegel), Newstead and Coward, P.Z.S., 1908, p. 433; Brit. B., II, p. 14; C. Oldham, Bull. B.O.C., XXI, p. 101.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Very variable especially on head and under-parts. Crown and nape varying from white lightly spotted and finely streaked brown (most feathers having small subterminal tips and shaft-streaks of brown) to sooty black-brown with white proximal portions of feather entirely concealed, intermediate examples differ in width of brown at tips of feathers and depth of colour; rest of upper-parts dark brown to sooty black-brown, feathers tipped slightly paler and white proximal portions of feathers sometimes not entirely concealed; lores and under eye in darker examples usually somewhat speckled white and in paler examples speckled brown; under-parts varying from white to almost uniform slate-brown or sooty-brown with white proximal parts of feathers mostly concealed, “white” examples have feathers of chin and sides of face and neck and occasionally some on breast and belly with very narrow brown

* The generic name *Pterodroma* antedates *Æstrelata*, 1857, which is generally erroneously quoted as having been published in 1855.—E.H.

† *Procellaria phillipii* Gray has been erroneously quoted as a synonym of *P. neglecta*, and the name of Phillip's Petrel (or “Fulmar”) cannot be used, as *P. phillipii* is a different species—cf. footnote in *Handl. Brit. B.*, p. 154, and Iredale, *Ibis*, 1914, p. 433. As, however, Godman (*Mon. Petrels*) called *P. incerta* Schlegel's Petrel, *P. neglecta* should have another English name, and we adopt “Kermadec Petrel” (cf. *Ibis*, 1914, p. 434).

tips giving a finely barred appearance, feathers of sides of upper-breast usually with broadish smoky-brown tips and these sometimes extend right across lower-throat and form a more or less broad band, in those with practically uniform sooty-brown under-parts (including under tail- and wing-coverts), white proximal portions of feathers are not everywhere concealed and are usually exposed on chin; flanks in "white" examples more or less marked sooty-brown; under tail-coverts in "white" examples with basal halves white and distal portions sooty-brown (sometimes tipped white) or mottled and barred with brown, shorter feathers mostly white mottled with brown at tips; axillaries and under wing-coverts with sooty-brown and white varying greatly in distribution; tail-feathers sooty black-brown with white bases; primaries and secondaries with black-brown outer webs and about distal quarter of shafts and inner webs, rest of shafts white (sometimes tinged straw-colour) and inner webs white which often extends towards tip in a wedge; wing-coverts as rest of upper-parts. Of many December examples examined two only were moulting and in body only, one March moulting body and tail. Loomis* states that two in Oct. were in full moult.

Nestling.—(Not examined.) Down varies from pure white to dark grey (T. Iredale, *Ibis*, 1914, p. 429).

Juvenile.—One not quite full grown is exactly like a dark adult.

Measurements and structure.—♂ wing 288–300 mm., tail 100–110, tarsus 38–43, middle toe with claw 50–56, bill from feathers 30–33 (12 measured). ♀ wing 280–296, tarsus 37–41, bill 29–32. Primaries: 1st minute, about three-fourths primary-coverts, 2nd longest, 3rd 2–7 mm. shorter, 4th 14–20 shorter, 5th 27–38 shorter, 6th 48–60 shorter; 2nd with outer web much narrower than in rest. Outermost secondaries shorter than 10th and innermost between 8th and 9th primaries. Tail rounded, 12 feathers, tips rounded, outermost pair 10–15 mm. shorter than central pair; longest under tail-coverts nearly as long and upper ones about two-thirds as long as tail. Tarsus rather slender, not compressed. Three toes long and slender and fully webbed, claws sharp and arched, hind toe minute, free and with comparatively large claw. Bill in general shape like *Puffinus puffinus*, but much shorter and deeper, curved tips of mandibles much larger and more curved. Nostril tubes shorter, higher, nearer together with one covering not divided by ridge of culmen, apertures oval and opening abruptly forwards and slightly inwards, but not so inclined upwards as in *Puffinus*.

Soft parts.—Bill black; legs and feet varying greatly both dark and light birds having uniform black legs and feet or "sandalled" or light legs (T. Iredale); iris dark hazel.

CHARACTERS.—No subspecies. Distinguished from other *Pterodroma* on the British list by larger size, white inner webs of wing-feathers and dark upper tail-coverts.

* L. M. Loomis, *Proc. Calif. Acad. Sci.*, 4th Series, vol. II, pt. II, p. 103.

BREEDING-HABITS.—Iredale describes this variable species as breeding all over Sunday Island on the ground (not in burrows) but generally under shelter of fern or cover of some kind. One egg only is laid, on Sunday Island from mid-October onward, but on Meyer Island from February to April.

Food.—No definite records.

DISTRIBUTION.—*England.*—One. Male found dead near Tarporley (Cheshire), April 1, 1908 (*ut supra*).

DISTRIBUTION.—*Abroad.*—South Pacific Ocean, breeding Kermadec Islands.

PTERODROMA HASITATA *

346. *Pterodroma hasitata* (Kuhl)—THE CAPPED PETREL.

PROCELLARIA HASITATA Kuhl, Beiträge z. Zool., 2. Abt., p. 142 (1820—Without locality. Type now in Leiden Museum. First known locality Guadeloupe, W. Indies, taken as typical).

DESCRIPTION.—*Adult.*—Crown brown-black forming well-defined cap; feathers of hinder crown with brown-black tips not entirely concealing white remaining portions; nape and sides of neck as chin and rest of under-parts white; centre of fore-head and narrow line at base of sides of upper and lower mandibles brown, feathers tipped white; lores white but feathers in front of and under eyes tipped brown-black; upper-mantle pale sooty-brown becoming darker on lower-mantle and blackish on back, rump, and lower scapulars, feathers edged paler; upper tail-coverts white; pale sooty-brown of upper-mantle extending slightly on to sides of upper-breast; rest of under-parts white, but small patch of feathers on lower-flanks with long brown-black tips; under tail-coverts white, longest with tips mottled and edged pale sooty-brown; axillaries white, some slightly edged and mottled sooty-brown; under wing-coverts white with broad edging of black-brown feathers round edge and bend of wing; tail-feathers with about basal half white and tips brown-black which extends further basally on outer webs; primaries and secondaries brown-black on outer webs and tips, inner webs paler brown and white at base; greater wing-coverts sooty-brown; median and lesser coverts brown-black. Only two examples examined, one (Aug. 28) in full moult.

Nestling.—(Not examined.)

Measurements and structure.—Wing 290 mm., tail 130–135, tarsus 42–43, middle toe with claw 49–52, bill from feathers 32–33.5 (one unsexed, Hayti, B. M. Coll.; one moulting primaries, Tring coll., examined). Primaries: 2nd longest, 3rd 5 mm. shorter, 4th 15 shorter, 5th 35 shorter, 6th 55 shorter. Rest of structure as *P.*

* The name was spelt *hasitata*. We cannot possibly assume that this is a misprint for *hesitata*, because it is based on the "*Hasita*" of Forster's unpublished plates. Temminck called it "*Le Hasite*."—E.H.

neglecta, but tail more graduated outer feathers being 40 mm. shorter than central.

Soft parts.—Bill black; legs and basal half of toes and webs flesh colour (in dried skin yellowish), distal half black (Hartert).

CHARACTERS.—No subspecies. Definite black "cap" and size distinguish it from other British Petrels.

BREEDING-HABITS.—Formerly bred in burrows in interior of islands in dense forest at about 2000 ft. altitude, but no details of nesting or eggs available.

FOOD.—No definite records.

DISTRIBUTION.—*England*.—One. Caught on a heath, Southacre, near Swaffham (Norfolk), March or April, 1850 (Newton, *Zool.*, 1852, p. 3691).

DISTRIBUTION.—*Abroad*.—Formerly breeding on Hayti and Lesser Antilles and not rare in West Indies, straying to United States and Canada, France, and England. Having been driven from its breeding-places it is now almost, if not quite, extinct; last one killed in United States in 1898.

PTERODROMA BREVIPES

347. *Pterodroma brevipes* (Peale)—THE COLLARED PETREL.*

PROCELLARIA BREVIPES Peale, U.S. Expl. Exp., VIII, pp. 294, 337, pl. 80 (1848—Pacific Ocean, lat. 68° S., long. 95° W.).

Estrelata brevipes (Peale), Saunders, p. 747.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Fore-head mostly white in fresh plumage but when worn spotted dark-brown, feathers being black-brown with wide white edges; fore-part of crown with narrow white edges, rest of crown and nape black-brown slightly tinged ash-grey when fresh; upper-mantle washed ash-grey, tips of feathers darker and browner, rest of mantle, short upper scapulars, back and upper tail-coverts ash-grey, feathers faintly tipped paler and shafts dark; patch on rump and long lower scapulars black-brown slightly tinged grey; lores white but feathers in front of eye tipped black-brown, under eye and sides of neck black-brown extending forwards

* Mr. T. Iredale states (*Ibis*, 1914, p. 435) that the British-taken specimen now in the British Museum does not belong to this species but he does not state how it differs. The under-parts, except for the chin and throat, which are white, are darker than in other specimens I have seen and almost uniform, the feathers having such long grey-brown tips that the white bases are concealed, the axillaries and under tail-coverts are grey-brown with some fine white mottlings. In all other respects including its measurements (wing worn about 210 mm., tail 96, tarsus 28, middle toe with claw 34, bill 23) the bird is like other examples examined. J. MacGillivray (*Zool.*, 1860, p. 7134) describes some birds as having the whole under-parts from the upper-breast grey and it is obvious that the species is polymorphic in the colouring of its under-parts as is *P. neglecta*.—H.F.W.

at base of neck and forming a patch on each side of upper-breast and sometimes almost a band, feathers in centre being usually finely and closely freckled; chin and throat white, finely freckled grey-brown on sides and at base where it joins black-brown; rest of breast, belly, under tail-coverts and flanks white with varying amount of fine brown-grey freckling at tips of feathers; sometimes this is confined to flanks and lateral under tail-coverts but at others extends all over under-parts; axillaries mostly white, often with some fine grey-brown freckling; under wing-coverts with a broad band round edge of wing black-brown somewhat tipped and mottled grey, rest of under wing-coverts including those covering primaries white sometimes slightly freckled brown-grey; tail-feathers grey-brown, central ones darker, outer ones more washed grey, and when fresh two outermost narrowly tipped white and with inner webs finely mottled white; primaries black on outer, grey-brown on inner webs which have narrow greyish-white edging; secondaries and outermost greater coverts with outer webs washed grey and very narrowly margined white, inner webs pale brown becoming whitish at base; innermost secondaries, rest of greater coverts as well as all rest of coverts black-brown but innermost lesser with ash-grey tips. The British example taken end Nov. or early Dec. was in full moult. Loomis states * that 8 taken about 200 miles S.S.W. of the Galapagos in June were undergoing a complete moult.

Nestling.—"Covered with black down" (MacGillivray †).

Measurements and structure.—♂ wing 210–220 mm., tail 97–103, tarsus 25–28, middle toe with claw 31–35, bill from feathers 22.5–24 (5 measured). ♀ wing 205–223, tail 94–99, tarsus 26–31, bill 22–26 (3 measured). Primaries: 1st narrow, pointed and hidden by primary-coverts, 2nd longest, 3rd 3–4 mm. shorter, 4th 11–16 shorter, 5th 23–30 shorter, 6th 38–46 shorter. Rest of structure as *P. neglecta*, but tail much graduated, tips sharply rounded, central pair longest, rest graduated and outermost 25 to 30 mm. shorter than central.

Soft parts.—Bill black; tarsus fleshy-black, toes and webs (except basal portion of latter which are flesh) black (MacGillivray); iris dark brown.

CHARACTERS.—No subspecies, but other species are nearly allied. *P. mollis fæa* (Madeira, Cape Verde) is larger with a stouter bill, has more uniform upper-parts, whiter under-parts and darker under wing-coverts.

BREEDING-HABITS.—Formerly bred in burrows in mountains at an elevation of 2700 ft., but no recent details of nesting-habits or eggs are known.

FOOD.—No definite records.

DISTRIBUTION.—*Wales*.—One. Shot between Borth and Aberys-

* L. M. Loomis, *Proc. Calif. Acad. Sci.*, 4th Series, vol. II, pt. II, p. 93.

† J. MacGillivray, *loc. cit.*

twyth (Cardigan) end Nov. or beginning Dec., 1889 (J. E. Harting, *Zool.*, 1890, p. 454; Salvin, *Ibis*, 1891, p. 411).

DISTRIBUTION.—*Abroad*.—Western and southern Pacific Ocean, said to breed New Hebrides, Tanna, Erromanga, and Fiji Is.

Genus BULWERIA Bp.

BULWERIA Bonaparte, Nuovi Ann. Sci. Nat. (Bologna), VIII, p. 423 (1843—Monotype *B. bulwerii*).

Of uniform slate-coloured appearance. Very closely allied to *Pterodroma*, but considerably smaller than most of latter, feet weaker, tail comparatively longer. Nasal openings on top of culmen forming two quite separate round holes, this portion somewhat soft. One species and another of which only the type is known.

BULWERIA BULWERII

348. *Bulweria bulwerii* (Jard. and Selby)—BULWER'S PETREL.

PROCELLARIA BULWERII Jardine and Selby, Illustr. Orn., II, pl. 65 and text (1828—Madeira or near by).

Bulweria columbina (Moquin-Tandon), Yarrell, IV, p. 34; *B. bulweri* (Jardine and Selby), Saunders, p. 749.

DESCRIPTION.—*Adult male and female. Winter and summer*.—Whole upper-parts brown-black; lores, cheeks and especially chin and upper-throat with more or less ash-grey tinge; rest of under-parts dark sooty-brown; tail brown-black; wing-feathers same but inner webs paler and browner, secondaries with very narrow and inconspicuous greyish edgings; greater wing-coverts except innermost grey-brown forming a pale band across wing; rest of wing-coverts brown-black as upper-parts. No moulting birds examined.

Bulwer's Petrel (*Bulweria bulwerii*).

Nestling.—1st down long and thick except on lores, round eyes and chin where it is scanty, dark sooty-brown with a very slight greyish tinge and slightly paler on under-parts than on upper-parts. (One only seen: Tenerife.)

Measurements and structure.—♂ wing 190–204 (one 211) mm., tail 104–114, tarsus 25–29, middle toe with claw 27–32, bill from feathers 21–23 (15 measured: Atlantic Is.). ♀ wing 194–205, bill 20–22. Primaries: 1st pointed, about three-fourths primary-coverts, 2nd longest, 3rd as long or 1–4 mm. shorter, 4th 5–12 shorter, 5th 18–23 shorter, 6th 33–40 shorter; 2nd with considerably narrower web than rest. Outer secondaries very short and square

tipped, inner as long as 7th to 8th primaries with tips of outer webs sloped off to a point. Tail graduated, outer about 40 mm. shorter than central, 12 feathers, rather broad, tips rounded; under tail-coverts nearly as long as tail, upper about two-thirds as long. Tarsus slender. Three toes long, slender and fully webbed, hind toe minute and free. Claws small and arched. Bill and nostrils much as in *Pterodroma*, but opening of nostrils rounder and slightly more inclined upwards.

Soft parts.—Bill black; legs and feet very pale flesh, outer toe and terminal joints of two inner ones and webs dusky-black; iris brown-black.

CHARACTERS AND ALLIED FORMS.—*B. b. pacifica* (Japan) has been described as having a heavier bill but I cannot differentiate Pacific from Atlantic birds. *B. macgillivrayi* (Ngau, Fiji, type only specimen known) has a larger bill and dark greater wing-coverts. Uniform dark coloration, size and wedge-shaped tail distinguish Bulwer's from other British Petrels.

FIELD-CHARACTERS.—An all black or dark brown Petrel larger than Leach's with long wedge-shaped tail, comparatively short legs. Almost entirely nocturnal in habits. Rarely flock. Ogilvie-Grant states "Note at breeding hole consists of four higher notes, and a lower more prolonged note; the whole repeated several (usually three) times and uttered in a loud, cheerful strain." (P. R. Lowe.)

BREEDING-HABITS.—Breeds under rocks and boulders and also at times in burrows. Little or no nest, egg being laid on bare ground. *Egg*.—One only, white, without gloss. Average of 66 eggs, 42.9×31.2 . Max. : 47×30 and 42×33 . Min. : 39.6×30.4 and 44.6×29.6 mm. *Breeding-season*.—June and occasionally July. *Incubation*.—No definite information.

FOOD.—No definite records.

DISTRIBUTION.—*England*.—Six. One found dead Tanfield (Yorks.), May 8, 1837 (Saunders, p. 749). One found dead near Beachy Head (Sussex), Feb. 3, 1903 (N. F. Ticehurst, *Bull. B.O.C.*, xiii, p. 51). Female found dead near St. Leonards (Sussex), Feb. 4, 1904 (W. R. Butterfield, *op. c.*, xiv, p. 49). Male picked up near Winchelsea (Sussex), Sept. 4, 1908 (C. J. Carroll, *op. c.*, xxiii, p. 32; cf. *Brit. B.*, ii, pp. 282, 373). Male picked up Pevensy (Sussex), Oct. 24, 1911 (H. W. Ford-Lindsay, *Brit. B.*, v, p. 198). Male shot near Lydd (Kent), March 16, 1914 (J. B. Nichols, *op. c.*, viii, p. 13).

DISTRIBUTION.—*Abroad*.—Nesting Madeira and adjacent islands, Salvages, Canaries and perhaps Azores, also in N. Pacific (Laysan and other islands west of Hawaiian Is.), and perhaps south of Japan and China (?). Casual north to British Isles and once said to have occurred in Greenland (specimen in Leiden Museum), in Pacific once south to Marquesas (Tristram Coll.), and north to China and Japan.

Genus FULMARUS Steph.

FULMARUS Stephens, Shaw's Gen. Zool., XIII, I, p. 233 (1826—Type by subsequent designation, of Gray, 1855, *F. glacialis*).

Large Petrels with distinct pterygoid processes. 1st developed primary longest; tail slightly rounded with 14 rectrices. Nostrils in tube on top of culmen, divided by thin membrane. Tarsus shorter than feet. One species, one form of which in N. Atlantic, another in N. Pacific.

FULMARUS GLACIALIS

349. *Fulmarus glacialis glacialis* (L.)—THE FULMAR PETREL.

PROCELLARIA GLACIALIS Linnaeus, Fauna Svecica, ed. II, p. 51 (1761—Arctic Sea).

Fulmarus glacialis (Linnaeus), Yarrell, IV, p. 1; Saunders, p. 751.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole head, nape, hind-neck extending on to upper-mantle white more or less tinged yellow, or varying from white with a tinge of grey to entirely blue-grey as dark as mantle,* small patch on anterior edge and in front of eye blackish-grey, feathers with somewhat bristle-like black projecting shafts; rest of mantle, scapulars and back blue-grey with a silvery tinge and feathers margined paler silver-grey (in worn plumage exposed portions of feathers become brownish owing to abrasion of silvery-white radii); long scapulars rather darker than mantle; upper tail-coverts varying somewhat in shade but paler and more ashy than mantle; in those with white heads whole under-parts are white (tinged yellow especially on throat and breast but varying in depth) except for a tinge of grey on flanks, those with grey heads have under-parts varying from white tinged grey (darker on flanks) to pale grey; axillaries and under wing-coverts in white examples are white bordered dark grey along edge of wing, grey-headed birds have axillaries and under wing-coverts of varying shade of grey; tail-feathers pale grey, sometimes with whitish tips (narrower in dark birds than light ones and lost in both in worn plumage), outer feathers often whitish and occasionally with a longish ill-defined dark streak; wing-feathers with outer webs and tips dark grey, inner webs paler and often white on inner edges and white on basal portions, tips of feathers very narrowly margined whitish when fresh, shafts yellowish white at base, darker at tips; primary-coverts dark grey with narrow whitish tips; wing-coverts grey as long scapulars with mixture of brownish in worn plumage. N.B.—Pure white examples or white with only a tinge of grey here and there are sometimes met with, but these are probably albinisms (one examined was noted to

* British-breeding birds are mostly white on head and under-parts. In the collections examined I have seen only three grey birds from St. Kilda and a few others from localities where they do not breed.—H.F.W.

have had pink eyes). This plumage is acquired by complete moult July–Sept. and probably Oct. but few moulting examples have been available.

Nestling. 1st down.—Crown, whole head and under-parts white, triangular patch on vent very pale blue-grey, upper-parts and wings pale blue-grey. Down of crown and chin short but close and rest of down longer and very close.

2nd down.—Crown and whole head including chin and throat grey like upper-parts which are darker grey than upper-parts in 1st down, breast and rest of under-parts white, slightly tinged grey.*

Juvenile.—Plumage immediately succeeding 2nd down is exactly like that of adults in four white-headed birds with remains of down except that head, neck, and under-parts are pure white or with only a faint tinge of yellowish. No grey-headed examples in this stage are available for examination.

Measurements and structure.—♂ wing 318–330 (one 345) mm., tail 117–134, tarsus 51–56, middle toe with claw 65–74, bill from feathers 38–43 (8 British measured). ♀ wing 308–340, bill 36–40. Primaries : 1st narrow, about two-thirds longest primary-covert, 2nd

Bill of the Fulmar Petrel (*Fulmarus g. glacialis*).

longest, 3rd 2–12 mm. shorter, 4th 16–28 shorter, 5th 36–50 shorter ; primaries not emarginated but outer web of 2nd considerably narrower than in rest, outer secondary shorter than 10th primary and inner about as long as 7th, tips rounded but outer webs rather sharply sloped off. Tail rounded, 14 feathers, tips rounded. Under tail-coverts as long as tail-feathers. Tarsus compressed and rather slender. Three toes long, slender and fully webbed, hind-toe almost reduced to its claw ; claws fairly sharp and arched. Bill short, wide at base, tip of upper mandible compressed, decurved and sharply pointed, tip of lower mandible much compressed and sloped off. Nostril tubes elevated, long (rather less than half length of bill), parallel, separated by thin septum, apertures oval and directed forwards.

Soft parts.—Bill (variable) : nasal tubes brown-black, blue-grey, or yellowish, sometimes mottled blackish, culmen greenish-

* All the nestlings I have examined have been from Scotland and are as above described. Prof. Koenig, however, states of downy nestlings which he collected in Spitsbergen : “As far as I can make out the light birds have white down and the dark ones dark down. We have not been able to observe, however, that there are differently coloured stages of the down plumage” (*in litt.* to E. Harte t). Prof. Koenig’s specimens may all have been too young to show the second down and if so the nestlings are certainly dimorphic.—H.F.W.

brown, grey or yellowish, tip yellow or horn, lower mandible olive, sometimes with pinkish at base, tip yellower; legs and feet pale bluish-flesh, greenish-grey or yellowish-flesh; iris dark brown.

CHARACTERS AND ALLIED FORMS.—*F. g. rodgersii* (N. Pacific) has yellow bill, in pale form white is purer and secondaries, wing-coverts and rump are often white with grey tips to feathers, dark form is darker than in *F. g. glacialis*. Fulmar is distinguished from other British Petrels by size and gull-like coloration.

FIELD-CHARACTERS.—Rather larger than a Common Gull and not unlike it in coloration; but, in flight, thick neck and narrow wings, curved like a boomerang instead of being sharply angled and lacking black at tips, prevent confusion with any gull. Flight is strong and powerful, performed by slow wing-flaps alternating with long glides on rigid outstretched wings, body often tilted at a high angle like a Shearwater's, with one wing just clear of waves. A silent bird as a rule but utters hoarse coughs and grunts during courtship.

BREEDING-HABITS.—Breeds in colonies, normally in ledges on face of cliff, but in Spitsbergen also on top of stacks and high islands. *Nest*.—Merely a scratching with bits of broken rock and stones sometimes round egg. *Egg*.—One only, but 2 have been recorded, pure white, variable in shape, said occasionally to show red spots. Average of 100 eggs, 73.6×50.2 . Max.: 81.5×50.5 and 72.5×54.1 . Min.: 67.6×46.6 and 74.1×43.2 mm. *Breeding-season*.—From mid-May onward in British Isles. *Incubation*.—By both sexes. Period, long; variously estimated at from 6 to 8 weeks or even 60 days. Single brooded.

FOOD.—Smaller Cephalopoda: also crustacea, offal from ships, and remains of fish. In northern waters blubber of whale, and leaves of plants during breeding-season. Exceptionally drowned birds (Redwing recorded in stomach).

DISTRIBUTION.—*British Isles*.—Resident. During last twenty years has steadily increased and extended its breeding range, and now nests in O. Hebrides, besides St. Kilda (where increased), N. Rona, Flannans, Haskeier Rocks off N. Uist, Lewis, Barra, and probably Shiant Isles; Shetlands more than fifteen sites; Fair Isle; Orkneys some eight sites; Handa and Bulgach Isles (off Sutherland), Clomore Cliffs (Sutherland); Dunnet Head and Berriedale Head (Caithness); seen Fowlsheugh (Kincardine), 1914 and proved breeding 1920; breeding Pennan (Aberdeen), 1916; breeding St. Abb's Head (Berwick), 1920; breeding between Arbroath and Red Head (Forfar), 1921; seen Bampton Cliffs (Yorks.), 1919 and 1921, and Scarborough Cliffs, 1921; seen Farne Isles, 1919–21. Discovered breeding Ireland, 1910, Horn Head (Donegal), 1911, Stags of Broadhaven and near Portacloy (Mayo), 1913, Great Skellig (Kerry) and Tory Island (Donegal). Except in breeding-season rarely comes to land, even after storms, but is met with most

times of year at sea off east coast Great Britain and north and west coasts Ireland, and in winter off south and west coasts England.

DISTRIBUTION.—*Abroad.*—Nests from arctic America to Spitsbergen, Franz Josef Land, and Novaya Zemlia, Iceland, Færoes, in winter south to 43° lat. and Massachusetts, casual in Baltic and New Jersey. Replaced by allied subspecies in north Pacific.

[NOTE.—The CAPE PIGEON, *Daption capense* (L.) (*Procellaria capensis* Linnæus, Syst. Nat., ed. x, i, p. 132, 1858—Cape of Good Hope) which inhabits the South Atlantic and South Pacific oceans has been recorded as having been taken three times in the British Isles, viz. near Dublin, Oct. 30, 1881 (A. G. More, *Ibis*, 1882, p. 346), Bournemouth (M. A. Mathew, *Zool.*, 1894, p. 396), the Dovey, 1879 (J. H. Salter, *op. cit.*, 1895, p. 254). The species has also been recorded on several occasions from France. These birds have been known to have been captured at sea and brought even as far as the Channel and there liberated (cf. *Ibis*, 1867, p. 188) and for this reason the occurrences have been considered by previous writers as not due to genuine wanderings. As no recent examples have been recorded it seems best to continue to exclude the bird from the list.]

Genus DIOMEDEA L.

DIOMEDEA Linnæus, Syst. Nat., ed. x, i, p. 132 (1758—Type by subsequent designation, of Gray, 1840, *D. exulans*).

At once distinguishable from all British Petrels by enormous size, wings much longer than 40 cm., and nostrils, which are semi-tubular and situated laterally on culmen, near base of a longitudinal groove. Top of culmen rounded, bill longer than head. Wings very long, 1st primary longest. Differing from all British Petrels by absence of hind-toe. Tail rounded or wedge-shaped. A number of species, mostly inhabitants of southern oceans, recently separated into 4 or 5 genera, but usually not split up at all.

DIOMEDEA MELANOPHRYS

350. *Diomedea melanophrys* Temm.—THE BLACK-BROWED ALBATROS.

DIOMEDEA MELANOPHRYS (corr. *melanophrys*) Temminck (ex Boie MS.), Pl. Col. 456 (1828—Cape of Good Hope).

Diomedea melanophrys Boie, Saunders, p. 753.

DESCRIPTION.—*Adult male and female. Winter and summer.*—Whole head and neck extending on to upper-mantle usually white but sometimes pale grey or pale smoky-grey, feathers being tipped grey *; in front and behind eye broad streak and narrower over eye of blackish-grey; mantle grey; scapulars and back dark grey

* It is usually stated that young birds have grey heads. I have not examined any birds which were undoubtedly young (i.e. with any trace of nestling down). It is, however, certain that some adults have grey heads and necks as I have examined several in full moult with new growing grey feathers on head and neck, the old ones being white, their grey tips having worn off. None moulting from grey to white have been seen.—H.F.W.

becoming blackish on longer scapulars, feathers margined slightly paler (in worn plumage tips become whitish-brown on mantle); rump and upper tail-coverts white; under-parts white; axillaries white some tinged grey basally; under wing-coverts white or greyish-white in centre with broad margin round edges of wing brown-grey; tail-feathers grey, when fresh with silvery tinge especially on outer webs, shafts white; wing-feathers with outer webs and tips dark grey-brown, inner webs silvery-grey, shafts pale yellow basally; all wing-coverts dark (often blackish) grey as scapulars. This plumage is acquired by complete moult Jan.-July and probably later.

Nestling.—(Not examined.)

Measurements and structure.—♂ wing 50.5–54 cm., tail 185–210 mm., tarsus 80–95, middle toe with claw 115–130, bill from feathers 115–125 (10 measured). ♀ wing 49–53 cm., bill 105–120 mm. Primaries: 1st narrow, pointed and hidden by primary-coverts, 2nd longest, 3rd 5–20 mm. shorter, 4th 30–45 shorter, 5th 60–90 shorter; outer web of 2nd much narrower than in rest. Secondaries short, tips gently sloped off on outer webs. Tail slightly rounded, 12 feathers, tips slightly rounded. Bill large, deep, compressed, and strong, ridge of culmen somewhat concave, tip abruptly decurved and sharply pointed, lower mandible with no groove on side, but the two rami joined at their distal ends with a separate piece projecting below the under line of the mandible. Nostrils with short and semi-tubular opening projecting upwards and slightly forwards on sides of upper mandible near its base. Tarsus short, toes long and somewhat slender, no hind toe, claws short, broad, and rounded.

Soft parts.—Bill yellow, tip orange (adult), blackish or with blackish tip ("young"); legs and feet flesh-grey darker on joints and webs, claws yellow-horn; iris brown.

CHARACTERS.—Several forms have been separated but do not seem to be satisfactory. Colour, large size, long narrow wings, large, deep, hooked bill with short nasal tubes on sides at once distinguish species from other birds on British list.

BREEDING-HABITS.—Breeds in large colonies up to 1800 ft. on islands. *Nest*.—Earth and moss obtained from ground near and thus forming a trench round nest, which is raised to a height of 4 inches or so. *Egg*.—One only, but 2 said to have occurred, white with a few red-brown spots, chiefly at big end. Average of 8 eggs, 103.9×62.6 . Max.: 108.5×65 and 113×68 . Min.: 96×63 and 97×53.5 mm. *Breeding-season*.—Nov. and Dec. *Incubation*.—By female alone. Period about 60 days during which she does not leave nest, but is fed by her mate. Single brooded.

FOOD.—Cephalopoda (cuttle-fish), and according to Saunders also medusæ and mollusca, as well as floating refuse from ships. Remains of a Diving Petrel have been found in stomach, and it is said to force other birds, especially Great Shearwater, to disgorge food.

DISTRIBUTION.—*England*.—One. Exhausted bird picked up near Linton (Cambs.), July 9, 1897 (E. A. Butler, *Ibis*, 1897, p. 625). [A bird supposed to have been an Albatros, was seen by Mr. J. A. Harvie-Brown twenty miles north-west of Orkneys, July 18, 1894 (*Ann. Scott. N.H.*, 1895, p. 57).]

DISTRIBUTION.—*Abroad*.—Seas near Cape of Good Hope, occasionally straying into European waters (lat. 80° 11' N., long. 4° E., Færoes). Probably widely spread in southern oceans, but several other subspecies (New Zealand and Australian seas, Kerguelen Is., and west coast of S. America) have been separated.

ORDER PYGOPODES.

Contains the Grebes and Divers. Holorhinal, schizognathous; no basi-pterygoid processes. First primary rudimentary. Aquinotocubital. Tail very short. Toes lobed or completely connected by webs. Tibia entirely feathered. Tarsus strongly compressed laterally, thus showing sharp ridge in front and behind. Pullus covered with down, nidifugous.

Key to families of Order PYGOPODES.

Toes completely connected by webs	COLYMBIDÆ.
Toes lobed	PODICIPIDÆ.

A. Great Crested Grebe (*Podiceps c. cristatus*).

B. Red-throated Diver (*Colymbus stellatus*).

FAMILY PODICIPIDÆ.

1st to 4th dorsal vertebræ fused; spina externa and interna absent; sternum notched, much shorter than in COLYMBIDÆ. 11 developed and 1 rudimentary primary, as a rule less than 20 secondaries. Toes with lobes on both sides, wider on inner, united at base. Hind-toe above level of outer toes. Claws short and flat. Plumage soft, fur-like, partly disintegrated, rectrices vestigial, mostly difficult to distinguish. Pullus striped. 3 genera generally admitted, only one in Europe, other two American. Fresh-water birds.

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