The Scottish Naturalist

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The Annals of Scottish Natural History

EDITED BY

ADAM WATSON,

WITH THE ASSISTANCE OF

V. C. WYNNE-EDWARDS, JAMES W. CAMPBELL,

and WINIFRED U. FLOWER

Volume 69

OLIVER AND BOYD

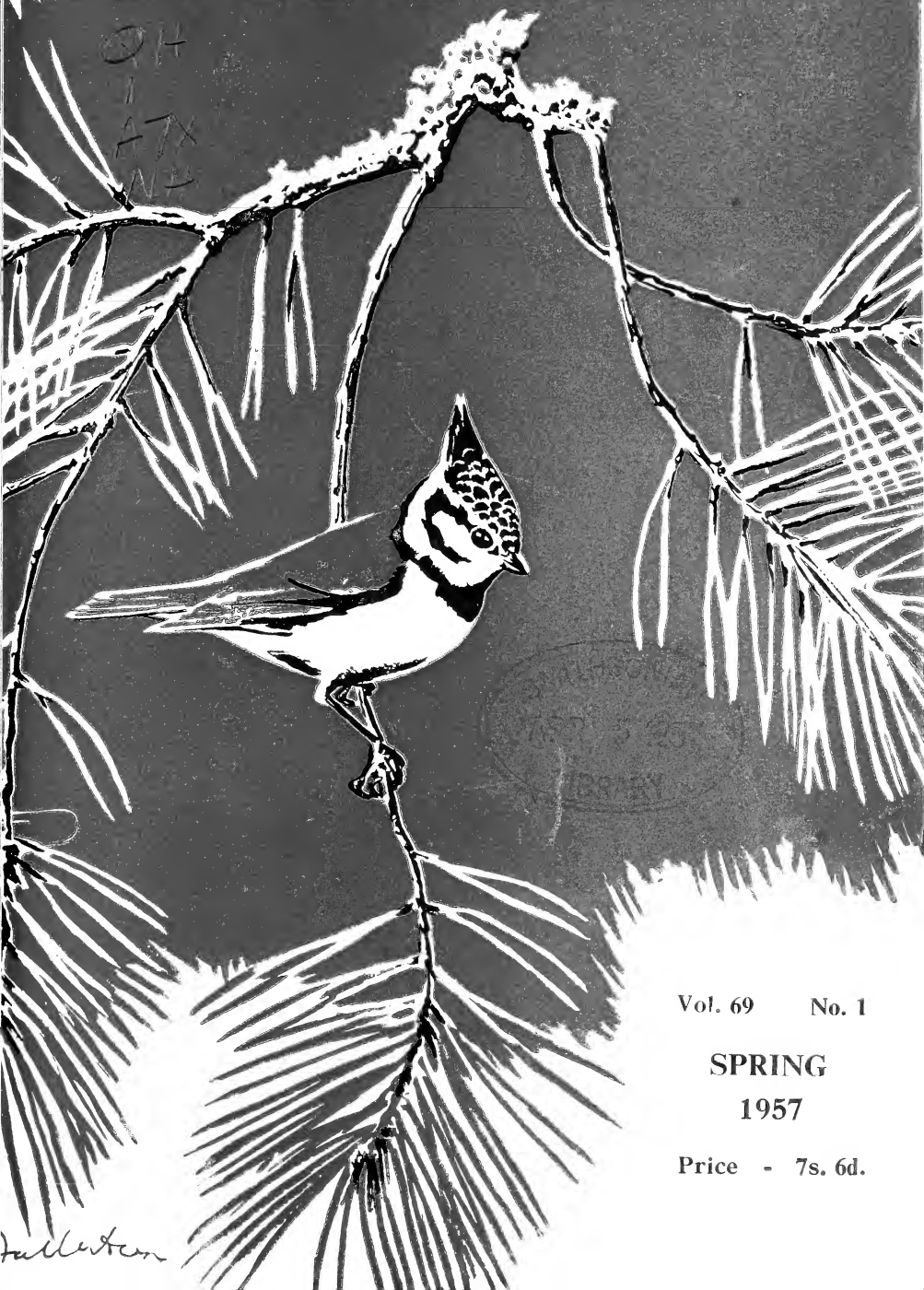
EDINBURGH: TWEEDDALE COURT

LONDON: 39A WELBECK STREET, W.1

1957

Printed in Great Britain at The University Press, Aberdeen

THE SCOTTISH NATURALIST



Vol. 69 No. 1

SPRING
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CONTENTS

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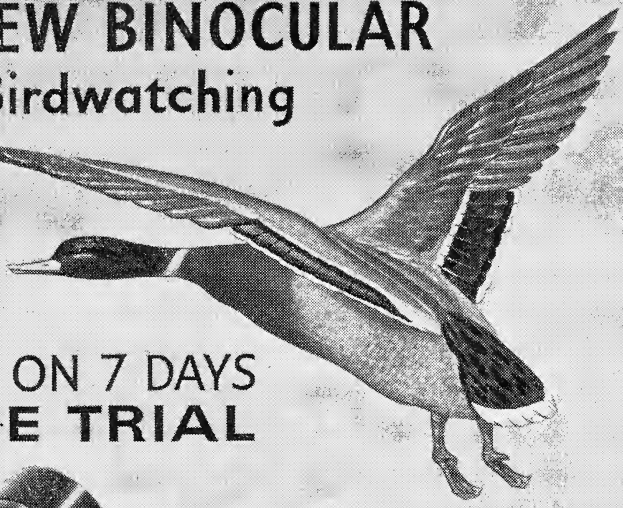

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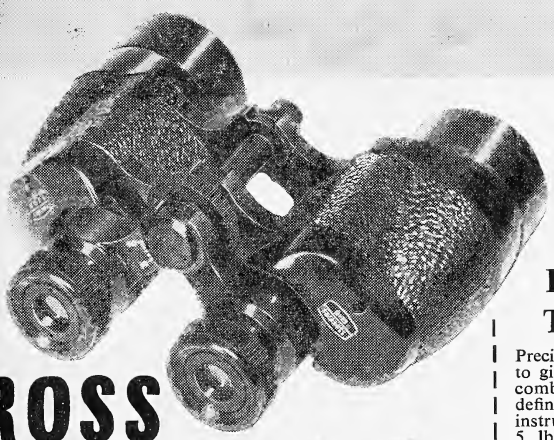

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The Scottish Naturalist

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SOME FURTHER COLLEMBOLA FROM SHILLAY, OUTER HEBRIDES *

H. E. Goto

Department of Zoology,
Imperial College, London

During their second visit to Shillay † in September to October 1955, Mr. H. R. Hewer and Dr. H. Gorvett collected a further twenty species of Collembola, nine of which were not represented in their previous collections (Goto, 1955). Amongst these nine additions, three genera (*Xenylla*, *Anurophorus* and *Sminthurides*) are new to the Hebrides, one sub-genus *Sminthurides* (*Sphaeridia*) is new to Scotland, and of the remainder one species is new to Scotland and three new to the Hebrides.

A full description is given below of *Hypogastrura* (*Ceratophysella*) *scotica* (Carpenter and Evans, 1899), since this species has never been adequately figured or described.

The specimens belonging to the sub-family Dicyrtominae do not agree with the diagnosis of any known species of *Dicyrtomina*, *Dicyrtoma* or *Ptenothrix*, nor do they fit conveniently into any of these genera. The minute size of the body, and the comparatively large head, indicate that they are probably juveniles rather than examples of a new species. They have been kept for further study.

As in the earlier visit, specimens were collected (with the exception of *Anurida maritima*) by taking samples of vegetation in polythene bags, from which the Collembola were later extracted in a modified Tullgren funnel.

* *Received 25th April* 1956. † Sound of Harris.

ARTHROPLEONA

HYPOGASTRURIDAE

Hypogastrura (*Ceratophysella*) *scotica* (Carpenter and Evans, 1899)

Colour

Ground colour yellow, with scattered dense blue-black patches on the dorsal surface of the head and trunk.

Length

1.6 mm. (excluding antennae).

Cuticle

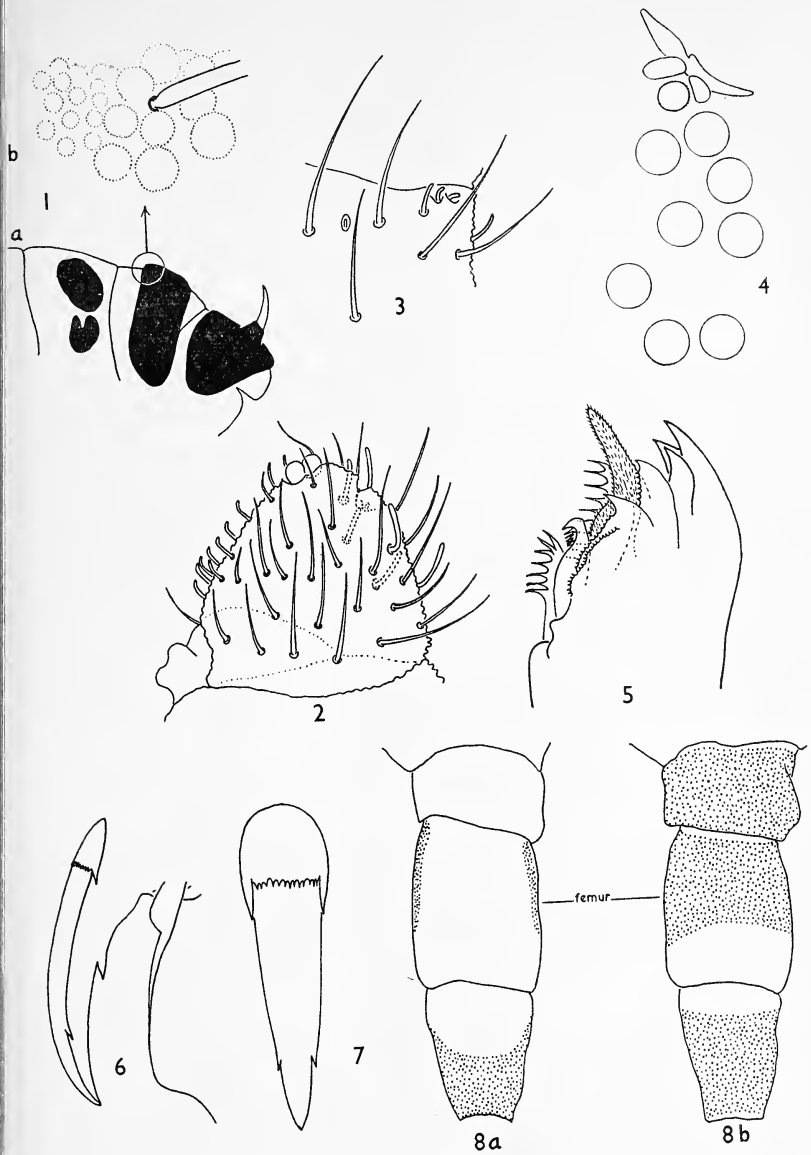
Largely covered with rugose granules. Granulation particularly coarse on the last three abdominal segments as follows : Abd. IV—a pair of dorsal and a pair (one on either side) of lateral tubercles (groups of coarse granules), none very well defined ; Abd. V—a band extending over the dorsal and lateral regions in the posterior half of the segment; Abd. VI—dorsally and laterally including the anal papillae (Fig. 1*a*).

Vestiture

Body covered with setae of various sizes. With the exception of some very fine (probably sensory) setae, all are minutely toothed (not shown in figures). A single bifid seta, possibly an abnormality, is present on one side of Abd. V near the lateral limit of the band of coarse granules. Some extra large outstanding setae are distributed as follows : Th. I—2 ; Th. II—4 ; Th. III to Abd. V—6(-8) ; Abd. VI about 10-12 scattered.

Head

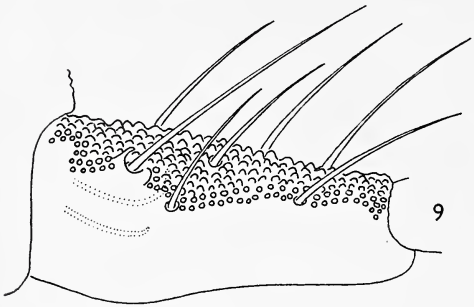
All segments of the antennae completely separate. A well developed eversible sac is present between Ant. III and IV. Ant. IV has a bilobed, finely granulate retractile organ, a sub-apical pit, a minute sense pin in a pit-like depression, about six not very well-defined olfactory setae, and about twelve apically hooked ventral sensillae (Fig. 2). Ant. III has a pair of blunt-tipped sensillae, each in separate pits, a larger blunt-tipped rod on either side of them, and a single sense pin near by (Fig. 3). The postantennal organ (Fig. 4) is

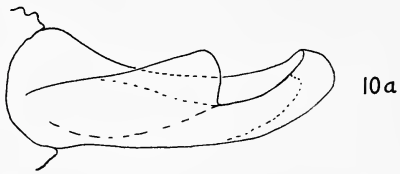


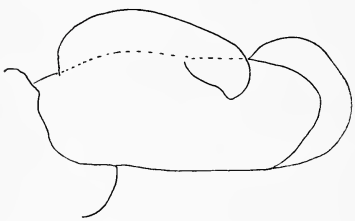
Figs. 1–10 *Hypogastrura* (*Ceratophysella*) *scotica*.

1. Abd. tergites IV–VI in side view (*a*), and enlarged portion (*b*).
2. Ant. IV.
3. Sensillae of Ant. III.
4. Postantennal organ and eyes.
5. Head of maxilla.
6. Unguis and unguiculus I in side view.
7. Unguis II in outer view.
8. (*a*) Outer face of leg II; (*b*) inner face of same. Granulate areas stippled.

four-lobed, with the anterior lobes elongated along the same line. A distinct accessory boss lies between the two posterior lobes. Eyes (Fig. 4), eight on either side of the head on heavily pigmented patches, all sub-equal in size. Mandibles with a well-developed basal molar area and some apical teeth (four on one mandible and five on the other). Maxillae with a tridentate ungulum and finely toothed or ciliated lamellae arranged as in Fig. 5.







9. Dens in side view.
10. Mucro in outer lateral view (*a*), and dorsal view (*b*).

Legs

Clavate tibiotarsal setae absent. Unguis with a single well-defined inner tooth and two pairs of lateral teeth (Fig. 6). On the outer face of the unguis, between the basal lateral teeth, are a number of very fine teeth which disappear with excessive clearing of the specimen (Figs. 6 and 7). Unguiculus with a distinct but small basal lamella and a terminal filament which exceeds the length of the unguis (Fig. 6). With the exception of the distal half of the tibiotarsus the outer face of each leg is covered with minute granules visible only under phase-contrast oil immersion. (Figs. 8*a* and *b*).

Abdomen

Abd. VI with a pair of slightly curved acuminate anal spines approximately equal in length to the diagonal of unguis III and about twice the length of the anal papilla (Fig. 1). The bases of the anal papillae are practically contiguous. The

rami of the retinaculum are each provided with four teeth and the corpus is without setae. The furca is well developed and all three parts are separate. When flexed, the apex of the mucro reaches forwards to the posterior half of Abd. II. The manubrium and dentes are ventrally and ventrolaterally non-setose and covered with minute granules like those on the outer faces of the legs. The dentes are each armed with seven dorsal setae (Fig. 9), and are about twice the length of the mucrones and slightly longer than the anal spines. Each mucro (Figs. 10*a* and *b*) has a well-developed outer lamella and an up-turned apex giving the appearance, in dorsal view, of a thickened band around the tip.

One specimen from grass-heath about 200 feet, Sept./Oct. 1955, retained in the author's collection.

Previous records

Scotland :—Midlothian (Carpenter and Evans, 1899 ; Bagnall, 1940), and Perthshire (Bagnall, 1940). England :—Cheshire, Durham, Northumberland, Yorkshire (Bagnall, 1940), Finland and Sweden.

Discussion

The above description departs in some respects from Bagnall's (1940). The differences are mainly in the relative sizes of various parts of the body—characters of little significance, unless the range of variation in any particular instar and the variation between successive instars are known. At present neither of these is known for *scotica*, but comparison with other species indicates that these differences are probably of no importance as systematic criteria. The yellow ground colour, which is quite obvious in the specimen from Shillay, was apparently absent in Bagnall's specimens. Bagnall stated that his examples of *scotica* had always been taken from sphagnum. Dr. H. Gorvett cannot recall the occurrence of any sphagnum in the vicinity of the locality from which he obtained the specimen from Shillay. The additional details described above concern the mouthparts, the sense organs of head and antennae, and perhaps most important of all, the outer transverse row of minute teeth on the unguis. In freshly mounted specimens, these teeth are very obvious, but disappear rapidly in most mounting media.

Considered by itself, this specimen might, with a certain amount of justification, be regarded as a species distinct from *scotica*. Fortunately, two further specimens, this time from sphagnum, were collected by Mr. P. N. Lawrence of the British Museum (Natural History), on the west side of Llyn Idwal in Caernarvonshire at 1,223 feet, on 28th April 1956. These specimens are colourless (mounted) as Bagnall's ones were. However, in three more specimens from the same Welsh locality, preserved in spirit in the Museum, the blue-black pigmentation is similar to that in the specimen from Shillay. The yellow ground-colour, however, is apparent only in the Hebridean example. In the Welsh specimens, the apical organ of Ant. IV is not so markedly bilobed as in the one from Shillay. A trace of the outer transverse row of teeth of the unguis was found in only one of the mounted Museum specimens, and then solely on one claw. The apical pair of lateral teeth on the unguis was not clear, and the terminal seta of the unguiculus was only about the same length as the unguis. Otherwise, the Caernarvonshire specimens were similar to that from Shillay, and there is little doubt that they are both conspecific with *scotica* of Carpenter and Evans.

Xenylla brevicauda Tullberg, 1896

Grey lichen on rock near edge of shore. A frequently misidentified and not very common species. The specimens from Shillay agree with the description given by Stach (1949) in possessing a pair of weakly-clavate setae on the ventral (inner) face of the tibiotarsus, in addition to the dorsal (outer) pair. Specimens previously recorded under this name from the British Isles were found in Cambridgeshire, Cardiganshire, Derbyshire, Durham and Sligo. Stach (1949) doubts the correct determination of Womersley's (1930) record from Sligo, stating that " Womersley's specimens have only two dorsal clavate hairs ". Normal specimens of *brevicauda* never have more than two such setae on the dorsal (outer) face. By this statement Stach obviously meant that Womersley had omitted to mention the ventral (inner) clavate setae. Womersley, however, did not mention these characters at all in his brief diagnosis of the species or in his key to the species of *Xenylla*. The remaining British records are not accompanied

with adequate diagnoses and their identity must remain in doubt.

Friesea mirabilis (Tullberg, 1871)

Armeria tuft on rock about 30 feet ; moss on rock about 200 feet ; grass and *Armeria* at foot of saddle. Specimens from the first of these three habitats were all of the typical form, with small but distinct mucrones, and those from the second and third were of the emucronate form. Only the emucronate form was found in the 1954 collections. In no case were the mucronate and emucronate forms found together. Both forms of this species are fairly common and widespread in the British Isles and Europe.

Anurida maritima (Guérin, 1836)

On sea-shore. A very common and widespread species, not represented in the 1954 collections, but previously recorded from the Hebrides (Gauld, Bagenal and Connell, 1953).

Anurida granaria (Nicolet, 1847)

Grass and *Armeria* at foot of saddle. Also taken in 1954.

ONYCHIURIDAE

Onychiurus armatus (Tullberg, 1869)

Grass and *Armeria* at foot of saddle ; mainly silver-weed (*Potentilla anserina* L.). A common and widespread species, but new to the Hebrides.

Tullbergia krausbaueri Börner, 1901

Armeria tuft on rock at about 30 feet. Present in 1954 collections.

ISOTOMIDAE

Anurophorus laricis Nicolet, 1841

Grey lichen on rock near edge of shore. A common and widespread species under the bark of trees, particularly of *Pinus sylvestris* L., but also found more rarely in moss and occasionally in lichens. This is a true corticicolous species which, when found in the latter two habitats, is usually never far from trees with a suitable bark. It seems at first sight rather surprising to find it on Shillay, which is completely

without trees. Collembola can, however, be carried by birds and by wind, and this colony on Shillay may have originated on the mainland or on a nearby island with trees. New to the Hebrides.

Folsomia quadrioculata (Tullberg, 1871)

Grass and *Armeria* at foot of saddle. Represented in the 1954 collections.

F. fimetaria (Linné, 1758)

Grass-heath at 200 feet. New to the Hebrides. A common and widespread species.

Isotoma (*Pseudisotoma*) *sensibilis* Tullberg, 1876

Moss on rock at 200 feet. Represented in the 1954 collections.

I. (*Isotoma*) *viridis* Bourlet, 1839

Armeria tuft on rock at 30 feet (form *principalis* and form *riparia*) ; mainly *Potentilla anserina* near edge of rocks at 15 feet (form *annulata*). One of the commonest British species. Very variable in colour. It was also in the 1954 collections, but in none of the above three colour forms.

I. (*I.*) *notabalis* Schäffer, 1896

Mainly *Potentilla anserina* near edge of rocks. Present in 1954 collections.

Isotomiella minor Schäffer, 1896

Grass and *Armeria* at foot of saddle ; mainly *Potentilla anserina* near edge of rocks at 15 feet. Present in 1954 collections.

ENTOMOBRYIDAE

Entomobrya nivalis (Linné, 1758)

Grass-heath at 200 feet ; grass and *Armeria* at foot of saddle. Specimens from both of these habitats were of the colour form *nicoleti* of Lubbock (1867). The principal colour form of this species was present in the 1954 collections.

Lepidocyrtus violaceus (Geoffroy, 1762)

Grass-heath at 200 feet. There is considerable doubt as to the validity of this species, which can be separated from

L. cyaneus Tullberg, 1871, only by colour pattern. The specimens from Shillay agree with the diagnosis given by Gisin (1944). If *violaceus* is a good species, it is recorded here for the first time in Scotland. *L. cyaneus* has been recorded on many occasions from Scotland, and was represented in the 1954 collections from Shillay.

TOMOCERIDAE

Tomocerus minor (Lubbock, 1862)

Mainly *Potentilla anserina* near edge of rocks at 15 feet. Present in 1954 collections.

SYMPHYPLEONA

NEELIDAE

Neelus (*Megalothorax*) *minimus* Willem, 1900

Grass near edge of rocks at 15 feet. Present in 1954 collections.

SMINTHURIDAE

Sminthurides (*Sphaeridia*) *pumilis* (Krausbauer, 1898)

Mainly *Potentilla anserina* near edge of rocks at 15 feet. In the British Isles this species has been recorded only from Berkshire, Caernarvonshire, Cambridgeshire and Hampshire. It is widely distributed, being found in Europe, America, North Africa and Australia, and is not uncommon round the edges of ponds and in other damp situations.

Five specimens of an undetermined species of the sub-family Dicyrtominae were found on the grass-heath at 200 feet. No member of this sub-family has so far been recorded from Scotland.

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Corrigendum to Goto (1955)

It is regretted that in Goto (1955), no mention was made of the paper by J. E. Forrest, A. R. Waterston, and E. V. Watson, (*Proc. Roy. Phys. Soc. Edin.*, 1935, 22 : 24-96) in which the authors list a number of Collembola from Barra, Outer Hebrides. Paragraphs 2 and 3 on p. 29 of Goto (1955) should be amended accordingly.

SPIDER COLLECTIONS IN SUTHERLAND *

A. M. Wild
Stone, Staffordshire

During the first two weeks of June 1955 I made a journey to the extreme north of the Scottish mainland with the object of studying the Sutherland spider fauna. Before giving more details of this, however, I wish to review the extent of our knowledge of Sutherland spiders up to that time, because otherwise there would be a danger of certain records becoming lost, through having inadvertently been omitted from Bristowe's (1939) county lists.

The first spider recorded from Sutherland was *Linyphia peltata*, found by Rev. J. F. Montgomery about 1861. It was included in a list of Scottish spiders published by Rev. O. Pickard-Cambridge (1862). The next collector was Professor J. W. H. Traill, of the University of Aberdeen. He published one list (Traill, 1874) with 24 records for Sutherland. He sent many of his specimens to Pickard-Cambridge, for identification or verification of identity, and the latter included them in a list of Scottish spiders. Pickard-Cambridge's list (1877) included only 10 of Traill's 24 records, and Bristowe, in compiling his county lists, seems to have consulted Pickard-Cambridge's paper but not Traill's. Consequently 14 of Traill's records are on the way to being lost or recorded as new by other collectors. Traill's list, translated to the modern nomenclature, was as follows :

Trochosa terricola	Bolyphantes alticeps
Lycosa armentata	Oreonetides vaginatus
Tarentula pulverulenta	Drapetisca socialis
Xysticus cristatus	Erigone longipalpis
Xysticus erraticus	Linyphia pusilla
Ciniflo fenestralis	Lepthyphantes tenuis
Dictyna arundinacea	Araneus quadratus
Textrix denticulata	Araneus cornutus

* *Received 26th July* 1956

Robertus lividus	Araneus diadematus
Theridion sisyphium	Araneus cucurbitinus
Poeciloneta globosa	Meta segmentata
Bolyphantes luteolus	Tetragnatha extensa

As all except three of these have subsequently been found by other collectors, it is evidently a reliable list.

In 1922 Bristowe (1927) climbed Suilven and searched for spiders both there and in the adjoining area of Lochinver. If we exclude those of his specimens already listed by Traill, the following were new to Sutherland :—

(*a*) From Suilven :

Lepthyphantes zimmermanni
Hilaira frigida
Caledonia evansi
Oreonetides abnormis

(*b*) From Lochinver :

Segestria senoculata
Clubiona stagnatalis
Oedothorax fuscus

Finally, a recent paper by Millidge and Locket (1955) included eight new records for Sutherland, from spiders collected by Mr. D. M. Reid :

Zelotes apricorum	Xysticus cristatus
Clubiona brevipes	Lycosa lugubris
Agroeca proxima	Hahnia helveola
Zora spinimana	Halorates reprobus

Of these, *Xysticus cristatus* must be accredited to Traill.

My aims in Sutherland were three-fold. Firstly, I hoped that a thorough search might yield spiders new to Britain, or at least new to Scotland. Secondly, I wished to supplement the number of existing county records so that a better picture of the fauna could be obtained. Thirdly, I intended to collect information about the distribution of spiders in different environments ; this is why I have given a full list of specimens from each locality searched. I selected Tongue on the north coast of Sutherland as my base, an area containing a very wide variety of habitat.

6th June

Among gorse at Tongue, the following species were found :

Meta merianae	Dismodicus elevatus
Meta segmentata	Peponocranium ludicrum
Araneus diadematus	Lepthyphantes tenuis
Robertus lividus	Linyphia peltata

Amongst the above, *Dismodicus elevatus* is of interest, having previously been found in only one locality in Britain (Loch Garten, Inverness-shire) where it occurred on juniper bushes (Millidge and Locket, 1947). *Peponocranium ludicrum* has not been found so far north before.

On an outhouse to an hotel and on a nearby wall I found the following common species :

Segestria senoculata	Tegenaria domestica
Ciniflo fenestralis	Textrix denticulata

7th June

Cold and dry, with some sunshine in the afternoon. A visit was made to Borgie Forest (Forestry Commission) which proved to be a disappointing locality. The following species, all common, were taken :

Dictyna arundinacea	Oreonetides abnormis
Lycosa nigriceps	Bathyphantes gracilis
Trochosa terricola	Lepthyphantes mengei
Robertus lividus	Lepthyphantes ericaeus
Meta segmentata	Linyphia peltata
Gonatium rubens	Linyphia pusilla

In the afternoon I went to the north-east face of Ben Hope. The following common species were taken near the base :

Clubiona compta	Araneus diadematus
Lycosa pullata	Araneus cornutus
Tarentula pulverulenta	Araneus quadratus
Robertus lividus	Oreonetides abnormis
Tetragnatha extensa	Lepthyphantes ericaeus
Meta merianae	Linyphia pusilla

8th June

Cold, but long sunny periods. In the morning I visited Torrisdale Bay where there are some sand-dunes. These are not extensive nor are the clumps of marram grass very dense. It was reported to be a very cold and exposed place. Very few spiders were found and these appeared in some cases to be very backward for the time of the year. The following were taken :

Agroeca sp. (immature)	Tibellus (? oblongus) (immature)
Lycosa armentata	Hypomma bituberculatum
Lycosa pullata	Lepthyphantes tenuis

The *Agroeca* species is unlikely to be anything except *A. proxima*, and this species was, in fact, recently recorded from Sutherland (see above). There can be little doubt that the *Tibellus* is *T. oblongus*, since this species has a wide distribution in Scotland, whereas *T. maritimus* has not been recorded north of Northumberland.

In the early afternoon I searched without much success in a small wood near Ben Tongue. In one hour only five species were taken :

Robertus lividus	Lepthyphantes alacris
Trachynella nudipalpis	Lepthyphantes ericaeus
Lepthyphantes zimmermanni	

I then went to a tarn a few miles to the east known as Lochan Dubh, and searched the damp ground around the edges amongst the grass and under stones :

Lycosa armentata	Meioneta beata
Pirata piraticus	Stemonyphantes lineatus
Pachygnatha clercki	Bolyphantes luteolus
Pachygnatha degeeri	Lepthyphantes mengei
Meta merianae	Linyphia pusilla
Robertus lividus	

Of special interest is *Meioneta beata* which has only once been recorded from Scotland (Bristowe, 1927) and then not from the mainland. In England, this spider is described as widespread but rare. I found it in three different localities in Sutherland (one as far south as Lairg), and also in the Black Wood of Rannoch in Perthshire, so that it may well prove to be

widespread in Scotland also. Since this *Meioneta* is peculiar to Britain, the Tongue record represents, as far as is known, the northern limit of the species.

9th June

Spiders were collected between 1,700 feet and the summit of Ben Hope (3,040 feet) :

Robertus arundineti	Collinsia holmgreni
Pholcomma gibbum	Tiso aestivus
Trachynella nudipalpis	Oreonetides vaginatus
Caledonia evansi	Meioneta nigripes
Hilaira frigida	

The last four spiders on this list are amongst our rarest British mountain species. Several of both sexes of *Meioneta nigripes*, a tiny black spider, were found from about 2,500 feet upwards, running over stones, at least 1,000 feet lower than on the other two mountains from which it has been recorded. The *Collinsia*, *Tiso* and *Oreonetides* were also found well below the normal height for these species in Britain, supporting the view that at more northerly latitudes mountain species can exist at lower altitudes. The *Hilaira* and *Caledonia* were exceedingly common near the summit, but *Pholcomma gibbum* appears to have been a stray visitor. The only males found were of *Meioneta nigripes*.

10th June

Fine warm day. Most of the time was spent in Tongue Bay and the adjoining Kyle of Tongue, searching for spiders on or near the beach. In the list which follows I include species taken in the same locality on the 6th June :

Oonops pulcher	Pachygnatha degeeri
Drassodes lapidosus	Dicymbium nigrum
Trochosa terricola	Gonatium rubellum
Textrix denticulata	Oedothorax apicatus
Theridion ovatum	Erigone arctica
Pholcomma gibbum	Halorates reprobus
Nesticus cellulanus	Meioneta beata
Meta segmentata	Lepthyphantes tenuis
Meta merianae	

The *Oonops* has never been recorded so far north and this may be true of *Pholcomma* as well. *Erigone arctica* and *Halorates reprobus* occur here in their most typical environment (tidal estuaries), and I have found the *Oedothorax* in similar situations before. Mention has been made above of the rare *Meioneta beata*.

11th June

Most of the time was spent in a marshy area just east of Loch Craggie. The latter is united with Loch Loyal by a narrow neck of water. This neck is spanned by a small bridge and all my hunting was carried out on the side of this farthest from the road. The marsh originates in a tarn, 450 feet above sea level, known as Loch na Moine, which drains by a winding stream into Loch Loyal.

I searched first by the north shore of Loch Loyal where the only find of interest was a colony of *Tetragnatha extensa* in which the abdominal folium was in all cases a rich red brown and the ground colour bright silver (in consequence, it was at first thought to be one of the other *Tetragnatha* species).

Later I searched in the marshy ground on the north and west banks of the stream, and here, in about 30 minutes, I took two rare species new to Scotland, and several other uncommon spiders.

During the whole day the following spiders were taken :

Clubiona reclusa	Erigone atra
Lycosa prativaga	Lophomma punctatum
Lycosa pullata	Eboria caliginosa, three ♀♀
Tetragnatha extensa (var.)	Hilaira pervicax, ♀
Araneus quadratus (immature)	Hilaira excisa
Oedothorax retusus	Bathyphantes pullatus

Eboria caliginosa and *Hilaira pervicax* are new to Scotland and there are only one or two records of each in England. These are confined to Northumberland, Yorkshire and the Lake District on high ground (in contrast to the Scottish records at 400 feet). It would be strange indeed if these spiders occurred only in this belt and in the extreme north of Scotland, but not at intervening points, and I anticipate that they will eventually be

discovered in other parts of Scotland. The *Eboria* is peculiar to Britain so that the Scottish record is the most northerly so far known. *Hilaira excisa* and *Lophomma punctatum* are both of infrequent occurrence.

Bathyphantes pullatus has only once before been recorded from Scotland.

12th June

On the way south from Tongue, I stopped at several points along the road, while still in Sutherland, to do a little collecting. The following were found :

(*a*) Between Tongue and Altnaharra :

Lycosa pullata
Robertus lividus
Oreonetides abnormis

(*b*) Between Crask Inn and Lairg :

Philodromus aureolus (immature)
Lycosa pullata
Cryphoeca silvicola
Tetragnatha sp. (immature)
Robertus lividus
Meioneta beata
Lepthyphantes mengei
Lepthyphantes zimmermanni

SUMMARY OF RECORDS

1. *Spiders new to Scotland*

Eboria caliginosa Falconer
Hilaira pervicax Hull

2. *A List of Sutherland spiders*

Numbers after each species indicate the collector :

1 = W. S. Bristowe
2 = J. F. Montgomery
3 = D. M. Reid
4 = J. W. H. Traill
5 = A. M. Wild

* = New county record

Ciniflo fenestralis (Stroem)	4
Dictyna arundinacea (Linn.)	4
*Oonops pulcher Templeton	5
Segestria senoculata (Linn.)	1
*Drassodes lapidosus (Walck.)	5
Zelotes apricorum (L. Koch)	3
*Clubiona reclusa (O. P.-Camb.)	5
Clubiona stagnatalis Kulcz.	1
*Clubiona compta C. L. Koch	5
Agroeca proxima (O. P.-Camb.)	3
Zora spinimana (Sund.)	3
Xysticus cristatus (Clerck)	4
Xysticus erraticus (Blackwall)	4
*Philodromus aureolus (Clerck)	5
*Tibellus? oblongus (Walck.)	5
*Lycosa pullata (Clerck)	5
*Lycosa prativaga L. Koch	5
Lycosa armentata (Clerck)	4
*Lycosa nigriceps (Thorell)	5
Lycosa lugubris (Walck.)	3
Tarentula pulverulenta (Clerck)	4
Trochosa terricola Thorell	4
*Pirata piraticus (Clerck)	5
Textrix denticulata (Oliv.)	4
*Tegenaria domestica (Clerck)	5
*Cryphoeca silvicola (C. L. Koch)	5
Hahnia helveola Simon	3
Theridion sisyphium (Clerck)	4
*Theridion ovatum (Clerck)	5
Robertus lividus (Blackwall)	4
*Robertus arundineti (O. P.-Camb.)	5
*Pholcomma gibbum (Westring)	5
*Nesticus cellulanus (Clerck)	5
Tetragnatha extensa (Linn.)	4
*Pachygnatha clercki Sund.	5
*Pachygnatha degeeri Sund.	5
Meta segmentata (Clerck)	4
*Meta merianae (Scopoli)	5
Araneus diadematus Clerck	4
Araneus quadratus Clerck	4
Araneus cornutus Clerck	4
Araneus cucurbitinus Clerck	4
*Trachynella nudipalpis (Westring)	5
*Dicymbium nigrum (Blackwall)	5
*Dismodicus elevatus C. L. Koch	5

*Hypomma bituberculatum (Wider)	5	*Meioneta beata (O. P.-Camb.)	5
*Gonatium rubens (Blackwall)	5	*Meioneta nigripes (Simon)	5
*Gonatium rubellum (Blackwall)	5	Oreonetides abnormis (Blackwall)	1
*Peponocranium ludicrum (O. P.-Camb.)	5	Oreonetides vaginatus (Thorell)	4
Oedothorax fuscus (Blackwall)	1	*Bathyphantes pullatus (O. P.-Camb.)	5
*Oedothorax retusus (Westring)	5	*Bathyphantes gracilis (Blackwall)	5
*Oedothorax apicatus (Blackwall)	5	Poeciloneta globosa (Wider)	4
*Tiso aestivus (L. Koch)	5	Drapetisca socialis (Sund.)	4
*Lophomma punctatum (Blackwall)	5	*Stemonyphantes lineatus (Linn.)	5
Caledonia evansi O. P.-Camb.	1	Bolyphantes luteolus (Blackwall)	4
*Collinsia holmgreni (Thorell)	5	Bolyphantes alticeps (Sund.)	4
*Erigone atra (Blackwall)	5	*Lepthyphantes alacris (Blackwall)	5
*Erigone arctica (White)	5	*Lepthyphantes obscurus (Blackwall)	5
Erigone longipalpis (Sund.)	4	Lepthyphantes tenuis (Blackwall)	4
*Eboria caliginosa Falconer	5	Lepthyphantes zimmermanni Bertkau	1
*Hilaira excisa (O. P.-Camb.)	5	*Lepthyphantes mengei Kulcz.	5
Hilaira frigida (Thorell)	1	*Lepthyphantes ericaeus (Blackwall)	5
*Hilaira pervicax Hull	5	Linyphia peltata Wider	2
Halorates reprobus (O. P.-Camb.)	3	Linyphia pusilla Sund.	4

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THE BIRDS OF THE ISLAND OF RHUM*

W. R. P. Bourne

The island of Rhum in the Inner Hebrides has been a private deer-forest since the middle of the 19th century, and few naturalists have succeeded in visiting it, although many, such as Darling (1947), have speculated upon its fauna. The only available information on the birds is contained in the general account of the island by Harvie-Brown and Buckley (1892), an article on mountaineering by Weir (1948), and in *The Birds of Scotland* by Baxter and Rintoul (1953) ; a complete list of the birds has never been published. A careful survey of the birds was, however, carried out by A. G. S. Bryson, J. H. B. Munro and George Waterston in June 1934, and Miss G. M. Rhodes has made some notes on the birds during holidays on the island since that time. I have now combined these unpublished observations with notes which I made myself during visits in June 1950 and July 1955. I wish to thank Lady Bullough for permission to visit Rhum, Mr. and Mrs. Macnaughten for information and hospitality while I was there, Miss Winifred Flower, J. Lockie and David Whitham for assistance, Ian Nisbet for criticising these notes, and Miss Rhodes and George Waterston for placing their unpublished observations at my disposal.

Rhum is a barren, mountainous island some seven miles square, rising to 2,659 feet high. The south of the island is a great rugged gabbro-granite massif, an eroded igneous intrusion, which forms one of the finest groups of mountains in the north of Scotland. The north consists of lower Torridonian and granite hills dissected by the three main glens, Kinloch, Kilmory, and Harris, which radiate east, north, and south-west from a central peaty plateau. The upper parts of the island are barren, except where the uppermost ledges of gabbro have weathered to a fine sand, fertilised by the shearwaters to form grassy terraces at the mountain summits. The eastern slopes consist mainly of Torridonian sandstone with

* *Received* 30*th August* 1956

patches of heather, many shallow stony lochans, and steep, fissured sea-cliffs. The western slopes are of granite, with smoother, more fertile grass and boulder slopes. The condition of the valleys has varied at different times. I found no traces of woodlands in the bogs, so it seems likely they have been open since the glaciations. They were heavily cultivated before the clearances of the early 19th century, and many old shielings can still be seen. In recent times they have reverted to rough grassland and bog, except for the home farm at Kinloch, and have been grazed first by sheep then by deer, and since the last war by an increasing number of sheep and cattle once more. The east coast is cliff-bound, except for the rocky harbour in Loch Scresort and small shell-sand beaches at Kilmory, Shamnan insir and Bagh na h-Uamha, while the west coast is rocky with a remarkable raised boulder-beach at Harris.

In the 19th century, Kinloch consisted of a farm and a clump of trees at the head of Loch Scresort. Since 1900 it has been extended by the construction of a Scottish Baronial castle with outbuildings and large gardens of imported soil, and the formation of large plantations all round the head of the loch. The castle and gardens have fallen into increasing disuse since the first world war, but the plantations have matured, and now form fine dense stands of hard and soft woods. Glen Harris and Glen Kilmory still hold single shepherds' cottages, although they are otherwise deserted ; there are ruinous shooting lodges at Dibidil and Papadil on the south shore, with a small loch and a damp plantation around the lodge at Papadil. There are now fifteen to twenty permanent human inhabitants, and there is no longer any active game preservation.

I found no endemic mammals, reptiles, or amphibia, but deer, goats, rats and mice have been introduced. There are now some 700 head of deer, and hundreds of goats in the cliffs. The rats are confined to the sea-shore, and have been satisfactorily reduced by poisoning at Kinloch ; they do not appear to have affected the larger sea-birds, although they may have exterminated colonies of terns and Leach's petrels. I could obtain no news of wild cats, reported by Darling (1947). The butterflies which I noticed included only the common

blue, small and large heath, speckled wood, meadow brown, green-veined, small, and large whites, clouded yellow, and dark-green fritillary.

The birds include most of the common species of mountains, moorlands, fresh water and rough ground in the north of Scotland ; most are very thin on the ground, usually concentrated in the northern glens and along the sea-cliffs. The commonest species inland were wheatears and meadow-pipits, and even they were seldom seen a dozen times in a long hill-walk. The raptors were kept down in the days of game preservation and they were still very scarce in 1934 ; they have been allowed to increase again now, and the island is probably saturated with them once more. The birds of agriculture and houses, which are quite common on the neighbouring islands of Eigg and Canna, probably occurred on Rhum in the days of the crofts but they have virtually disappeared since the clearances ; the house-sparrow and starling reappeared during the hey-day of the castle, but they have now gone once more. There must have been a similar dearth of woodland birds in the past, but they have increased considerably since the formation of the plantations at Kinloch. The present plantation at Papadil is roughly the size of the original wood at Kinloch, and holds blackbirds, song-thrushes, robins, willow-warblers, wrens, chaffinches and woodcock. If this was the original avifauna of Kinloch, it has gained the sparrow-hawk, one or more owls, the blue tit, whitethroat, wood-warbler, spotted flycatcher, hedge-sparrow and goldcrest since 1900, and the wood-pigeon and great tit since 1934. Coal and long-tailed tits, mistle-thrush and lesser redpoll have also been resident at times, although it is not clear whether they have stayed permanently. Long-tailed, coal and great tits seem to have replaced each other progressively since 1934 ; this may be a result of hard winters or the change in the environment as the woods mature, but possibly the island cannot support many species together. Corncrake and red grouse have declined and ptarmigan have vanished in the last twenty-five years ; corncrakes seem to have lost many nests in the hayfields, as elsewhere, while grouse and ptarmigan may be suffering from changes in climate.

The Inner Hebrides provide breeding stations for the large

population of sea-birds feeding in the Minch to the west, and a considerable proportion of these birds nest on Rhum. The immense colony of shearwaters is described below. Possibly a large colony of Leach's petrels was wiped out along the west shore in the past. There are large gull colonies scattered along the screes of the west shore, with smaller numbers all round the coast ; Harvie-Brown found considerable numbers of lesser black-backs here, but the number and proportion of herring-gulls seem to have increased now. The inshore shags, black guillemots, and eiders are common all round the island. The offshore sea-birds have four small colonies totalling 250 pairs in the north-east, and some half-dozen colonies running into thousands of pairs on the higher cliffs of the south-west, especially at Welshman's Rock and between Dibidil and Papadil. These colonies hold the usual community of razorbills, guillemots, puffins, and kittiwakes, with a rapidly increasing proportion of fulmars in the south-east.

According to Baxter and Rintoul (1953), the Inner Hebrides hold the largest colony of Manx shearwaters in Scottish waters, forming the headquarters of the birds which feed throughout Hebridean seas. The Rhum colony has been known at least since 1640, and Harvie-Brown saw nests on Trallval, but the more accessible colonies in the sea-cliffs of Eigg and Canna have received more attention, and insufficient importance has been attached to the enormous colonies on Rhum.

On Rhum they breed everywhere above 1,500 feet on the main Barkeval-Hallival-Askival-Trallval gabbro ridge ; scattered groups of nests extend at least as far down as 750 feet wherever there are steep slopes, as above Kinloch and in Glen Dibidil. It is difficult to assess the total of nests in this huge colony, which covers several square miles of broken mountain slopes, but I estimated roughly there were several thousand holes on the east side of Hallival alone, and since the birds seem to be equally closely packed all round the ridge, the total must run into many tens of thousands of pairs. I found no nests in the western granite hills, but in 1934 birds were found along the coast at the Bloodstone Hill and north of Cave Bay, so it seems likely that the birds nest throughout the sea-cliffs as well, as they do nearby on Eigg and Canna. So the

colonies on these three islands must approach the order of hundreds of thousands of birds.

The nests were deep crooked tunnels, excavated in patches of short green turf in or near steep slopes. There were many shallow empty new holes with piles of fresh dirt outside, but occupied holes were usually better hidden in the grass or rocks, and were revealed only by their smell and a few droppings and feathers outside the entrance. The holes were normally longer than my arm, and held substantial nests of grass, moss and feathers. In the third quarter of June, many still had eggs and the rest small young of different sizes, In late July, at least a quarter held rotten eggs, a few set eggs, and the rest growing young of all sizes up to pin-feathered, so that there must be considerable variation in the laying date from early April to late May. There were no signs of mortality on the breeding grounds, no bodies, no diseased birds, no sign of rats, and no abandoned burrows.

Since the nests are up to four miles and up to 2,500 feet high from the sea, and are separated from it by cliffs, the birds must normally fly to and from the nests. They were common at sea off the island all day, gathering to feed on shoals of fish, but the main body arrived from the west during the afternoon, flying up and down or collecting on the water in rafts well offshore all round the island until dark. Rafts running into many thousands were seen off the south-west coast on fine days in 1950. According to Miss Rhodes they normally came to land about 10.30 p.m., but on the very fine clear night of 26th July 1955, they did not arrive at the colony on top of Hallival until it got really dark an hour later. From the shore they could usually be heard calling as they came in low from the sea and circled up the lower slopes to the nests. The first birds arrived over the colony silently and went straight to their holes, but others started calling soon afterwards, and the noise rapidly increased until the individual calls merged into a continuous roar for an hour or more. Most birds seemed to feed the young quickly and leave soon after, so that the noise soon subsided, but some calling continued until dawn two hours later. In July most birds seemed to have young, but there were still a few excavating holes and displaying desultorily.

There has been some speculation as to how they succeed in locating their nests in a large colony in the dark. The night was never really dark in July, and the birds could be seen on the wing. When one first appeared it would make several wide sweeps over the colony, the circuits would become smaller until it was flying around a regular beat over the nest, and then it would suddenly dive down, and either land in front of the hole or plunge into it. There were occasional false landings, and once or twice birds flew clumsily into me. They seemed to locate prominent landmarks during the first circuits, adopt a fixed circuit over the nest, and then descend to the nest. They are unlikely to have located the nest by ear, since silent birds homed to empty nests. While their olfactory apparatus is well developed, it seems doubtful whether it would be enough to locate one nest in the centre of a large colony. Lockie (1952) has shown that while shearwaters are generally adapted for diurnal rather than nocturnal vision, they probably have a high visual acuity, combined with considerable powers of dark adaptation. This would give them in the dark a visual acuity sufficient for an elementary type of orientation on prominent landmarks. They appear to feed to a considerable extent after dark (Saunders, 1871).

Systematic List

This list is compiled from notes made between 19th and 26th June 1934 by A. G. S. Bryson, J. H. B. Munro, and George Waterston, and between 17th-22nd June 1950 and 25th-30th July 1955 by W. R. P. Bourne, unless otherwise stated ; the source of the observations is clear from the date.

Great Northern Diver *Gavia immer.* Said to frequent Loch Scresort throughout the year ; an adult offshore on 30th June 1950.

Red-throated Diver *Gavia stellata.* One inland and four at sea in 1931, when it was persecuted. A nest with a chipping egg on 20th June 1950, and three pairs offshore in 1955.

Leach's Petrel *Oceanodroma leucorrhoa.* In 1871, after enumerating the recognised colonies, Gray stated : " there is a more extensive breeding place on the island of Rhum,

situated on rough stony ground at the north-west side of a place called Braedinach ". Harvie-Brown searched for this colony without success ; I searched for storm-petrels along the immense screes of the west shore, but failed to identify Braedinach, presumably A'Brideanach of the map, the extreme west point. It seems likely that the colony has been exterminated by rats, but this place might repay an examination by night.

Manx Shearwater *Puffinus puffinus*. Discussed above.

Fulmar *Fulmarus glacialis*. Some 22 pairs on the south shore between Sron na h-Iolaire and Dibidil in 1931. In 1950 this colony had spread to Papadil, and there was a new colony of about 25 pairs near the Welshman's Rock. In 1955 the new colony was still present, and the original colony included over 250 pairs. None elsewhere.

Gannet *Sula bassana*. Common at sea.

Cormorant *Phalacrocorax carbo*. Only record one on Papadil Loch in 1934.

Shag *Phalacrocorax aristotelis*. Many large colonies all round the shore, numbering up to 25 nests in the north, 100 nests in the south.

Heron *Ardea cinerea*. One at Papadil in 1934, and up to eight feeding in Loch Scresort in 1955.

Mallard *Anas platyrhynchos*. A tame flock was formerly kept at Kinloch. Two or three single birds offshore in 1934, and a pair on Papadil Loch in 1955.

Eider *Somateria mollissima*. Up to a dozen families at many places all round the shore.

Red-breasted Merganser *Mergus serrator*. Formerly persecuted. Rarer than the eider in 1934, but some around the low shores, and broods at Loch Scresort and Camas Pliasgaig. A brood of four in Loch Scresort in 1955.

Sheld-Duck *Tadorna tadorna*. Two at Rudha na Caranean in 1934.

Grey-lag Goose *Anser anser*. One flushed from Kilmory Shore in 1934.

Golden Eagle *Aquila chrysäetos*. One seen in 1934 ; two or three pairs regularly in recent years.

Buzzard *Buteo buteo*. Two or three at Papadil in 1934 ; families at two places in 1950, once in 1955.

Sparrow-Hawk *Accipiter nisus*. A possible bird and an old nest at Kinloch in 1934. One at Kinloch in 1950.

Peregrine *Falco peregrinus*. None seen in 1934 ; one at Welshman's Rock in 1950 : two or three pairs resident in recent years.

Merlin *Falco columbarius*. One pair west of Kilmory in 1934 ; one or two at three places in 1950.

Kestrel *Falco tinnunculus*. A few at Kinloch in 1934. Seen at one place in 1950, and two family parties in 1955.

Red Grouse *Lagopus scoticus*. Six to ten birds and one party of young in 1934 ; single or paired birds without young once or twice in 1950-55. Decreasing steadily.

Ptarmigan *Lagopus mutus*. Possible droppings on Ainshval and Sgurr nan Gillean in 1934, although the birds had not been seen for two years. Only occasional unreliable reports of droppings since, and I saw no sign of it. It must be presumed extinct.

Pheasant *Phasianus colchicus*. Once kept at the castle, but now extinct.

Corncrake *Crex crex*. Once common, but decreasing steadily. Up to six birds at Kinloch in 1934, when it was seen on the derelict lawn and heard in the garden ; two birds calling in the only hayfield there in 1950, and two nests cut out of the hay in 1955.

Oystercatcher *Haematopus ostralegus*. Common round the shore, with flocks of up to 25 in July.

Lapwing *Vanellus vanellus*. Eight to twelve pairs at Kilmory in 1934 ; a flock of 26 at Harris in 1955.

Ringed Plover *Charadrius hiaticula*. One to three pairs at Kilmory, with young in 1934, and occasionally elsewhere.

Golden Plover *Charadrius apricarius*. Scattered pairs in the north, with flocks of 30 and 60 on Orval in July.

Snipe *Capella gallinago*. Not numerous, but one nest, in 1934. Common on the low bogs in 1950-55, with small young in the fields at Kinloch and Papadil, and in the centre of the plantation at Kinloch, in July.

Woodcock *Scolopax rusticola*. Many in the woods, with small young at Kinloch in July.

Curlew *Numenius arquata*. Occasionally along the shore, with a flock of 28 in Glen Harris in July.

Common Sandpiper *Tringa hypoleucos*. Common along the shore, with odd pairs along the streams.

Redshank *Tringa totanus*. One at Guirdil in 1934, not breeding.

Arctic Skua *Stercorarius parasiticus*. Single birds at sea to the north in 1934 and 1950.

Great Black-backed Gull *Larus marinus*. Scattered pairs along the shore.

Lesser Black-backed Gull *Larus fuscus*. A large colony at Rudha Camas Pliasgaig in 1934 ; still present there in 1950-55, and in a minority (about a quarter) among the herring-gulls elsewhere.

Herring-Gull *Larus argentatus*. Scattered colonies totalling thousands of pairs continuously along the west shore, and odd colonies along the shore elsewhere.

Common Gull *Larus canus*. Breeding near Papadil, Shamnan Insir, and the Welshman's Rock in 1934. Up to 25 pairs at the last two places in 1950, and common but not breeding elsewhere.

Black-headed Gull *Larus ridibundus*. Young and moulting adults in Loch Scresort in July, but not breeding.

Kittiwake *Rissa tridactyla*. Two or three colonies of up to 50 pairs in the north, and some six colonies of up to 250 pairs in the south.

Arctic Tern *Sterna macrura*. About four pairs at Shamnan Insir and one at Rudha Port na Caranean in 1934. None in 1950, but two pairs at Rudha na Caranean in 1955, where it still breeds irregularly.

Razorbill *Alca torda*. Two or three colonies of up to 25 in the north, and many hundreds scattered along the south shore.

Guillemot *Uria aalge*. Two or three colonies of up to 25 in the north, and several of up to 250 in the south.

Black Guillemot *Cepphus grylle*. Common all round the island.

Puffin *Fratercula arctica*. One colony of about fifty pairs in the north at Camas Pliasgaig ; some three colonies of 100-500 pairs on cliff ledges in the south.

Rock-Dove *Columba livia*. A few in the caves in the south shore.

Wood-Pigeon *Columba palumbus*. Not seen in 1934. A few pairs at Kinloch in 1955.

Turtle-Dove *Streptopelia turtur*. Has occurred in May (Weir, 1948).

Cuckoo *Cuculus canorus*. A few, widespread.

Barn-Owl *Tyto alba*. Reported at Kinloch in 1955.

Long-eared Owl *Asio otus*. An old nest, fledged young, and several adults at Kinloch in 1934 ; reported there in 1955.

Tawny Owl *Strix aluco*. Suspected at Kinloch in 1934 ; reported in 1955.

Swift *Apus apus*. One over the castle, 26th June 1934.

Greater Spotted Woodpecker *Dendrocopos major*. A drilling at Papadil in 1934, but no further evidence of its presence.

Skylark *Alauda arvensis*. Rather scarce.

Swallow *Hirundo rustica*. One around the castle in 1934.

Raven *Corvus corax*. Only two seen in 1934 ; fair numbers in 1950-55.

Hooded Crow *Corvus cornix*. Only about half-a-dozen round the shore in 1934 ; common in 1950-55, when 38 gathered to roost at Kinloch and 28 at Harris in July.

Great Tit *Parus major*. First records a family and odd birds in 1955.

Blue Tit *Parus caeruleus*. Numerous at Kinloch.

Coal Tit *Parus ater*. Only record a family at Kinloch in 1950.

Long-tailed Tit *Aegithalos caudatus*. Seen at Kinloch in 1934 and 1948 (Weir, 1948), but not since.

Wren *Troglodytes troglodytes*. Common in the woods and rocks.

Dipper *Cinclus cinclus*. Odd pairs on the streams.

Mistle-Thrush *Turdus viscivorus*. A pair nesting at Kinloch in 1934.

Song-Thrush *Turdus ericetorum*. Common in the woods.

Ring-Ouzel *Turdus torquatus*. A number of pairs in the upper corries.

Blackbird *Turdus merula*. Common in the woods.

Wheatear *Oenanthe oenanthe*. Widespread but scarce.

Stonechat *Saxicola torquata*. Odd pairs along the south shore and the Kinloch-Kilmory road.

Whinchat *Saxicola rubetra*. A few pairs at Kinloch and Kilmory.

Robin *Erithacus rubecula*. Common in the woods.

WHITETHROAT *Sylvia communis*. A male at Kinloch in 1934 ; a pair in 1950.

WILLOW-WARBLER *Phylloscopus trochilus*. Common in the woods.

WOOD-WARBLER *Phylloscopus sibilatrix*. One at Kinloch in 1934, and a number since.

GOLDCREST *Regulus regulus*. Abundant at Kinloch.

SPOTTED FLYCATCHER *Muscicapa striata*. Two pairs at Kinloch in 1934, and a family in 1955.

HEDGE-SPARROW *Prunella modularis*. Scarce at Kinloch.

MEADOW-PIPIT *Anthus pratensis*. Scarce, widespread.

PIED WAGTAIL *Motacilla alba*. Birds at Kinloch in 1950, Kinloch and Harris in 1955.

GREY WAGTAIL *Motacilla cinerea*. One at Kinloch in 1934, a pair in Kinloch glen in 1950.

STARLING *Sturnus vulgaris*. Scarce at Kinloch and a party at Kilmory in 1934 ; seen at Kinloch in 1950, but said to be extinct in 1955.

TWITE *Carduelis flavirostris*. Some feeding on Kinloch lawn in 1934 ; seen only three times, on the cliffs, in 1955.

LESSER REDPOLL *Carduelis flammea*. Some at Kinloch in 1934 ; not recorded in 1950, nor found in 1955.

CHAFFINCH *Fringilla coelebs*. Abundant in the woods.

REED-BUNTING *Emberiza schoeniclus*. Occasional pairs in the glens.

HOUSE-SPARROW *Passer domesticus*. Breeding at Kinloch in 1934 ; not recorded in 1950, and not found in 1955, although it was said to be present.

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THE NIGHT-HERON COLONY IN THE EDINBURGH ZOO*

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In the gardens of the Royal Scottish Zoological Society, Edinburgh, there is a free-living colony of the night-heron (*Nycticorax nycticorax*) which I studied during the first half of 1955. Past records were available in the Annual Reports of the Society, the Society's records of births in the gardens, and the day-book of the keeper in charge of birds.

The colony was founded in 1936, by six birds obtained from the National Parks Bureau of Canada. They were kept unpinioned in a roofed aviary. One pair bred successfully in 1938, and breeding has occurred every year since. A new pair from the same source was added to the colony in 1946. The numbers of birds in the colony were not recorded until 1951, and after that only approximately, but the growth of the colony was deduced from the nesting records.

In December 1950 the aviary fell into disrepair and a few birds escaped. In May 1951 the roof was taken off and the colony was completely free. The birds did not move from the area nor did they die out, but established themselves in and around the old aviary. The estimated number at that time was 18. In January 1955 I found the colony to consist of 20 adults and four juveniles.

Breeding Season

In the wild state the breeding season of the night-heron is restricted and sharply defined. Allen and Mangels (1940) described how birds arrived at colonies on Long Island, New York, early in April. Pair-formation took place shortly afterwards, and eggs were laid on the average 4-5 days after pair-formation. Young were leaving the colony 9-10 weeks after hatching, and the pairs began to break up in August. A similar pattern occurs in the Camargue, France (Valverde,

* *Received 7th September* 1956

1955), and near Milan, Italy (S. Frugis, personal communication).

In Edinburgh, on the other hand, nests have been found with eggs in every month of the year except August, September, and October (the keeper says that the birds are moulting during these three months). The greatest number of nests was in January (7) and April (also 7), while the smallest number in the remaining months was three. In 1955, however, there were nine nests in May (at least three of which were second or third attempts, due to destruction or desertion of earlier clutches), so there is presumably a peak at the normal breeding season. This does not mean that the breeding season has contracted since the birds became free in 1951. In the first week of February 1955, one pair hatched eggs which must have been laid in the second week of January, while two other pairs built nests and laid eggs during the last week of January and the first week of February. There was no further nesting activity until the milder weather of the last week in March, when four pairs started. Only one of these completed the nest and laid eggs, the others relapsing into inactivity. The same birds later recommenced nesting activity at the same sites and laid eggs. It is a general habit of herons to make further attempts at breeding if unsuccessful the first time.

The reason for this remarkably extended breeding season is not clear. Possibly the following two factors are concerned. Firstly, the birds have a constant and abundant food supply. Though not " looked after " in any way by keepers, they regularly take dead haddock put out for other animals and birds. I did not see them take any other kind of food, although at the beginning of April a party of five or six birds flew each evening at dusk to the Gogar Burn, $3\frac{1}{4}$ miles south-west of the Zoo, where they may well have spent the night feeding. This behaviour is the same as that I have seen in the night-herons of the Camargue, where there is an evening flight of parties of birds to the feeding grounds. At the Gogar Burn the birds were quite unapproachable, though tame while in the Zoo. Secondly, the migratory part of the life-cycle has been lost. Since the stimulus to migrate has an endocrinological basis, linked to the reproductive stimulus, stoppage of migration might result in earlier breeding. In Holland, the migrant

purple heron (*Ardea purpurea*) breeds 4-6 weeks later than its close relative the resident common heron (*Ardea cinerea*).

Population Change

No population figures are available from 1938 to 1950, but they can be estimated from the difference between the number of young raised and the number of deaths and exchanges to other Zoos. On this basis the population is estimated to have grown as follows :—

1938	9	1946	27
1939	12	1947	27
1940	16	1948	28
1941	18	1949	18*
1942	15	1950	20
1943	20	1951	*c.*18
1944	27	1952-53	*c.*20
1945	27	1955	21

* 10 going through exchange

Between 1938 and 1944 the numbers rose gradually, then levelled off from 1945 to 1951 (omitting the 10 removed), although the reproductive rate was presumably as high as before. After the birds became free in 1951 there was still no increase. In the first period the stability must have been primarily due to poor reproductive success, coupled with the removal of small numbers of adults for exchange. Since 1951 the potential rate of increase is not likely to have fallen : in view of the number of nests in 1955, it has probably risen. But as the number of adults has not increased much, there must either still be a low reproductive success, or emigration of adults (or both). In 1955 many eggs did not hatch, especially in early nests during cold weather.

A factor which would operate in freedom but not in captivity is predation. I could obtain only indirect evidence of this. Grey squirrels, rats, carrion-crows, jackdaws, and magpies are all present close to the herons' breeding area. Herons were seen to display aggressively at jackdaws and magpies, and carrion-crows obviously took notice of the nests. The two young which hatched in February disappeared after two days and the foot-prints of a cat were seen in the snow

below. (Seven regularly-used nest sites are only eight feet high in holly bushes.)

A second possibility is that the numbers are kept steady by birds leaving the colony. Since they became free, there have been four local records of them outside the Zoo :

January 1952, at Union Canal, Sighthill, 2 miles S.W.
May-June 1954, at River Tyne, Haddington, 19 miles E.
June 1954, at Water of Leith, Colinton, $2\frac{1}{2}$ miles S.
June 1954, at River Almond, Cramond Brig, $2\frac{1}{2}$ miles N.W.
(D. G. Andrew, personal communication.)

As birds regularly visited the Gogar Burn ($3\frac{1}{4}$ miles S.W.) in April 1955, two of the above records could have been of individuals which later returned to the Zoo. The Sighthill bird was found dying. The Haddington one may have been a genuine emigrant.

Perhaps more significant is the fact that, whereas between 1930 and 1947 there were no records of night-herons in the British Isles, since then there have been several :

	May 1947	Kent	*Brit. Birds*, 41 : 24.
	Nov. 1949	Dorset	*Brit. Birds*, 43 : 302.
Juvenile	Mar.-Aug. 1953	Northumberland	*Brit. Birds*, 47 : 353-354.
Adult	July-Aug. 1953	Norfolk	Ibid.
Adult	July-Aug. & Oct. 1953	Lancaster	Ibid.
Juvenile	Oct.-Nov. 1953	Kent	Ibid.
Juvenile	Winter 1953-54	Essex	Ibid.
Juvenile	Mar.-Apr. 1954	Devon	Ibid.

The Editors of *British Birds* (1954) comment on the unusual number of records for 1953-54, and on the fact that all the birds remained where first seen for some time, suggesting that they may therefore have escaped from captivity. It is also possible, however, that these birds were from a Dutch colony established in 1946 (while Holland is outside their normal range, Lebret (1947) thinks they may have been driven out of France by wartime disturbances, or may have escaped from a local private aviary). However, no increase was noted in the Dutch colony in 1953, nor were there any unusual occurrences on the North Sea or Channel coasts.

Although the Edinburgh night-herons belong (presumably) to the American race, which is subspecifically separated from the European race, the two could not be distinguished in the field. In the future it would be possible to colour-ring the

young birds before they leave the nest, thus providing some check on any further British records.

Hence it is not possible to say how much the colony size has been affected by emigration. The average annual increment between 1938 and 1950 was just under four (the increment for 1954 was also four, so the calculation seems reasonable). The increment in the three years 1951 to 1954 should therefore be twelve. There were four deaths during this period, and the population was greater by two than at the previous estimate. Thus six birds are theoretically unaccounted for. It is suggestive, but no more, that this number is close to the number of British records of the bird during the same period.

Acknowledgments

The complete account of this investigation is in the library of the Department of Zoology, University of Edinburgh, together with a short film of the nesting and feeding habits of the birds. The work was done while I was a student in the Department, and I wish to acknowledge much assistance received there. I am also grateful to Dr. D. M. Steven and to many others for helpful advice and criticism, and to the Director-Secretary and staff of the Zoological Gardens for their willing co-operation.

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REVIEW OF ORNITHOLOGICAL CHANGES IN SCOTLAND IN 1955 *

Evelyn V. Baxter

Upper Largo

The records published in 1955 again show much of interest : as before, the review is divided into birds new to Scotland, additions to areas and counties, and changes in breeding range. The Scottish Bird Records Committee of the Scottish Ornithologists' Club have studied the records with much care and this review embodies their findings.

Six birds have been admitted to the Scottish list, all being American ; one other of which the evidence is insufficient to warrant inclusion, has been retained in square brackets. A list of North American land-birds, published in *British Birds* but not formerly accepted for inclusion in the Scottish list, was considered. In view of the increased knowledge of American bird-visitors, some of the former findings can safely be reversed. We recommend that the following four be accepted : eastern pigeon-hawk, black-and-white warbler, Baltimore oriole and American white-throated sparrow. Those we consider should not at present be included in the Scottish list are : eastern goshawk, red-shouldered hawk, passenger pigeon, ruby-crowned kinglet, red-winged blackbird and American white-winged crossbill, six in all. These last are not included in the list under species. There are many additions to area and county lists, and interesting breeding records.

Though no great immigration was recorded, unusual numbers of some species were noted. In autumn 1955 there were more black terns, green sandpipers and spotted redshanks in the Lothians than usual, while curlew-sandpipers and ruff were scarce (*Edin. Bird Bull.*, 5 : 74, 76, 77). In winter 1954-55, unusual numbers of barn-owls were recorded in Aberdeenshire (*Scot. Nat.*, 67 : 114).

* *Received 26th September* 1956

BIRDS NEW TO SCOTLAND

EASTERN PIGEON-HAWK *Falco columbarius columbarius*

A merlin from South Uist, collected by Meinertzhagen (*Ibis*, 1934 : 58) on 11th November 1920, is referred to this race by Meinertzhagen and Williamson (*Ibis*, 95 : 365). It has not previously been recorded for Scotland, and awaits confirmation by the B.O.U. Records Sub-Committee.

HUDSONIAN WHIMBREL *Numenius phaeopus hudsonicus*

A bird of this American race visited Fair Isle from 27th to 31st May 1955 (*Brit. Birds*, 48 : 379). It is new to Scotland.

WHITE-RUMPED SANDPIPER *Calidris fuscicollis*

This American sandpiper remained at Gladhouse Reservoir, Mid-Lothian, from 21st to 24th May 1955 (*Edin. Bird Bull.*, 5: 75). It is the first Scottish record.

[EASTERN BLUE-HEADED WAGTAIL *Motacilla flava simillima*

Two wagtails collected by Dr. Eagle Clarke on Fair Isle, ♀ 9th October 1909, ♂ 25th September 1912, have been referred to this race (*Brit. Birds*, 48 : 400). After considering this case, the committee does not feel qualified to confirm this identification in such a perplexing group.]

BLACK-AND-WHITE WARBLER *Mniotilta varia*

One found dead at Scalloway, Shetland, in mid-October 1936, and at first not considered to be a true migrant, may now be admitted to the Scottish list, subject to confirmation by the B.O.U. Records Sub-Committee. It is an American species (*Scot. Nat.*, 1937 : 46 ; *Brit. Birds*, 31 : 125).

BALTIMORE ORIOLE *Icterus galbula*

A bird of this species was caught alive but exhausted in Shetland on 26th September 1890, and another was said to have been seen the same day. We see no objection to this American species being admitted to the Scottish list, subject to confirmation by the B.O.U. Records Sub-Committee (*Zoologist*, 1890 : 457 ; *Brit. Birds*, 48 : 13).

White-throated Sparrow *Zonotrichia albicollis*

One reported seen in Aberdeen on 17th August 1867 (*Birds of West of Scotland*, 138), may have been an escaped bird, August being too early for its autumn migration. Another was shot on the Flannans on 18th May 1909 (*Ann. Scot. Nat. Hist*, 1909 : 246). We consider it should qualify for the Scottish list (*Brit. Birds*, 48 : 14), subject to confirmation by the B.O.U. Records Sub-Committee.

BIRDS NEW TO AREAS AND COUNTIES

Great Northern Diver *Gavia immer*

One found dead at Mugdock, 15th November 1954, and one at Craigmaddie, 23rd December 1954, are the first records for West Stirling (*Scot. Nat.*, 67 : 66).

White-billed Diver *Gavia adamsii*

One found dead at Spey Bay on 5th January 1955 is the first recorded for the Moray area and Morayshire (*Scot. Nat.*, 67 : 109).

Slavonian Grebe *Podiceps auritus*

One at Hogganfield on 2nd January 1954 is the first record for Lanark (*Scot. Nat.*, 67 : 66).

Black-necked Grebe *Podiceps nigricollis*

One at Hule Moss near Greenlaw, on 28th August 1955, was claimed as the first record for Berwickshire (*Edin. Bird Bull.*, 5 : 73), but there are previous records (see *Fauna of Tweed*, 242). It has proved to be a passage migrant in Shetland (*Birds and Mammals of Shetland*, 256).

Great Shearwater *Procellaria gravis*

Few every year, autumn to January, in Shetland (*Birds and Mammals of Shetland*, 250). This is the first record for Shetland.

Little Egret *Egretta garzetta*

A little egret near Bonar Bridge, on 22nd June 1954, is the first record for South-East Sutherland (*Brit. Birds*, 48 : 128),

one near Motherwell on 13th June 1954 is the first for Clyde and Lanark (*Scot. Nat.*, 67 : 66), and an adult on 20th May 1955 at Loch Hallan, South Uist, is the first for the Outer Hebrides and Inverness (*Brit. Birds*, 48 : 411).

Bittern *Botaurus stellaris*

One in South-East Sutherland, on 13th December 1954, is the first record for that area (*Scot. Nat.*, 67 : 110).

[Green-winged Teal *Anas crecca carolinensis*

The evidence is insufficient for one shot on Whalsay, no date, mounted and identified by Small (*Birds and Mammals of Shetland*, 220).]

European White-fronted Goose *Anser albifrons albifrons*

One caught Islay, in January 1955, is the first definite record of this race in the Inner Hebrides (*Scot. Nat.*, 67 : 112).

Greenland White-fronted Goose *Anser albifrons flavirostris*

A Greenland ringed bird was recovered at Montrose in November 1953 (*Scot. Nat.*, 67 : 112), the first definite record of this race in Angus.

Bean Goose *Anser arvensis arvensis*

The first definite record of this goose in Shetland is of one seen from 29th April to 7th May 1952 (*Birds and Mammals of Shetland*, 214).

Bewick's Swan *Cygnus bewickii*

Bewick's swans, ten in all, were seen on 6th February and 27th March on lochs near Rattray Head, and are the first recorded in Aberdeenshire (*Scot. Nat.*, 67 : 112).

Golden Eagle *Aquila chrysaëtos*

One at St. Kilda, on 26th May 1955, is the first recorded for that island (*Brit. Birds*, 48 : 454).

Icelandic Merlin *Falco columbarius subaesalon*

A female caught on Foula, 18th October 1954, was of this race : excluding Fair Isle, it is the first record for Shetland (*Fair Isle Bird Obs. Bull.*, 2 : 248).

Red-footed Falcon *Falco vespertinus*

A first-summer male is reported from Fair Isle, 4th to 12th June 1955. It is new to Shetland as well as Fair Isle (*Brit. Birds*, 48 : 542).

[Arctic Ringed Plover *Charadrius hiaticula tundrae*

One shot Whalsay, 4th September 1937 ; a record requiring further evidence of identification (*Birds and Mammals of Shetland*, 289).]

Northern Golden Plover *Charadrius apricarius altifrons*

Seen at Eaglesham in April and May 1954, new to Renfrew (*Scot. Nat.*, 67 : 69).

Wood-Sandpiper *Tringa glareola*

One on 25th May and several on 14th June 1954 on Foula (*Fair Isle Bird Obs. Bull.*, 2 : 250). Seen in May, June, August, September, in Shetland. Not previously recorded for Shetland except from Fair Isle (*Birds and Mammals of Shetland*, 286).

Spotted Redshank *Tringa erythropus*

Endrick Mouth, 25th April, 1st and 2nd May 1954. New to West Stirling and Dunbarton (*Scot. Nat.*, 67 : 69).

Knot *Calidris canutus*

A knot at Hamilton, on 9th November 1954, is the first record for Lanark (*Scot. Nat.*, 67 : 69).

Curlew-Sandpiper *Calidris testacea*

Three at Hamilton, on 24th September 1954, are new to Lanark (*Scot. Nat.*, 67 : 69).

Sanderling *Crocethia alba*

One seen in early July 1955 is new to Lanark (*Scot. Field*, Sept. 1955 : 16).

Scandinavian Lesser Black-backed Gull *Larus fuscus fuscus*

Four definite examples are recorded from Shetland, the first noted there (*Birds and Mammals of Shetland*, 314), and two at Aberlady, on 1st May 1955, are the first for East Lothian (*Edin. Bird Bull.*, 5 : 56).

Shore-Lark *Eremophila alpestris*

One at Monifieth on 6th December 1952 is new to Angus (*Scot. Nat.*, 67 : 115).

Chough *Pyrrhocorax pyrrhocorax*

The first record of the chough in Shetland comes from Exnaboe, Dunrossness, during the third week of March 1952 (*Birds and Mammals of Shetland*, 103). On the same page the occurrence of a chough about Kirkwall from 10th to 24th December 1951 is reported, the first record for Orkney.

Marsh-Tit *Parus palustris*

A pair were seen near Saltoun on 4th June 1955, the first record for Forth and East Lothian (*Edin. Bird Bull.*, 5 : 79).

[Black Redstart *Phoenicurus ochruros*

There is insufficient evidence for a bird of this species reported as seen at Torrance on 15th July 1955 (*Field*, 18th August 1955 : 304).]

[White-spotted Bluethroat *Cyanosylvia svecica cyanecula*

No evidence of identification is available for a white-spotted bluethroat found dead on Whalsay, 4th September 1930 (*Birds and Mammals of Shetland*, 173).]

Pied Flycatcher *Muscicapa hypoleuca*

One by Loch Lomond, 22nd May 1938, is claimed as a first record for Dunbarton (*Bird Study*, 2 : 191). There is, however, a definite previous record of a male seen on 24th August 1900 at Ardpeaton, Loch Long, by W. E. Evans and Miss Evans, both reliable observers (*British Association Handbook for the Clyde Area*, 161).

[Water-Pipit *Anthus spinoletta*

One seen near Loch Spiggie, 8th May 1950 ; it was in nuptial plumage. It was not *A. s. petrosus*, but the subspecies was not determined (*Birds and Mammals of Shetland*, 138).]

Grey-headed Wagtail *Motacilla flava thunbergi*

One seen at Rosyth Mud Flats, 3rd August 1955, is the first record for South Fife (*Scot. Nat.*, 67 : 120).

Hawfinch *Coccothraustes coccothraustes*

A male at Glendaruel on 4th June 1953 is new to South Argyll (*Glasgow and W. of Scot. Bird Bull.*, 4 : 10).

Pine-Grosbeak *Pinicola enucleator*

A pine grosbeak caught on the Isle of May, on 8th November 1954, is new to that island and to Forth (*Brit. Birds*, 48 : 133).

Little Bunting *Emberiza pusilla*

Two at Dunrossness, on 12th May 1948, are new to Shetland (except Fair Isle) (*Birds and Mammals of Shetland*, 124).

Lapland Bunting *Calcarius lapponicus*

A Lapland bunting was seen near Duns from 1st to 23rd January 1955. It is the first record for Berwickshire (*Edin. Bird Bull.*, 5 : 52).

Tree-Sparrow *Passer montanus*

Tree-sparrows at Thornhill in 1955 are new to East Stirling (*Edin. Bird Bull.*, 5 : 80).

BREEDING RECORDS

Leach's Petrel *Oceanodroma leucorrhoa*

Breeding plentifully Eilean Tighe as well as Eilean Mor, Flannans. Two burrows on Bearasay contained adult bird but no egg (*Scot. Nat.*, 67 : 109).

Sheld-Duck *Tadorna tadorna*

One pair bred on the Isle of May in 1936 (*Scot. Nat.*, 67: 75).

Sparrow-Hawk *Accipiter nisus*

Does not now breed in Shetland (*Birds and Mammals of Shetland*, 200).

Kestrel *Falco tinnunculus*

Does not now breed in Shetland (*Birds and Mammals of Shetland*, 198).

Herring-Gull *Larus argentatus*

One pair nested Tentsmuir in 1955 ; first for North Fife (*Edin. Bird Bull.*, 5 : 67).

Common Gull *Larus canus*

Small colony on islands on Loch Arklet, N.W. Stirling, in 1954. First record of breeding in Stirling (*Scot. Nat.*, 67 : 70).

Common Tern *Sterna hirundo*

New colony about 100 pairs, Rosyth Mud Flats, in 1955 (*Edin. Bird Bull.*, 5 : 77). First breeding at Gladhouse, 1955 (*Edin. Bird Bull.*, 5 : 69).

Sandwich Tern *Sterna sandvicensis*

New colony 15-20 pairs, Rosyth Mud Flats, in 1955 (*Edin. Bird Bull.*, 5 : 77).

Green Woodpecker *Picus viridis*

Bred near Penicuik 1955 ; first breeding record for Forth (*Edin. Bird Bull.*, 5 : 78).

Pied Flycatcher *Muscicapa hypoleuca*

Satisfactory notes from Perthshire of the breeding of this species in 1954 (*Scot. Nat.*, 67 : 71, 118).

Crossbill *Loxia curvirostra*

Several records are given of the breeding of this bird in Aberdeenshire (*Scot. Nat.*, 67 : 121) where there were previously only two positive records.

Linnet *Carduelis cannabina*

Does not now breed in Shetland (*Birds and Mammals of Shetland*, 115).

Tree-Sparrow *Passer montanus*

Breeding near Port of Monteith Railway Station, 1955, the first breeding record for East Stirling (*Edin. Bird Bull.*, 5 : 64). They were also found nesting near Thornhill, in South Perth, in 1952-3 (*ibid.*, 80). The discovery of a number in Ayrshire is important and it would be interesting to know if they breed there (*Scot. Nat.*, 67 : 71).

In the *Scottish Naturalist*, 67 : 72, there is a valuable paper by Dr. W. J. Eggeling on the breeding birds of the Isle of May, showing the fluctuations in number on that island.

PIED FLYCATCHERS IN PERTHSHIRE *

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Nests in 1955 and 1956

In 1955, no nests of the pied flycatcher (*Muscicapa hypoleuca*) were found in Perthshire. The weather was cold from early May until about the 27th, during the time when pied flycatchers arrive. The weather from about 5th to 20th May probably decides whether birds coming up the west coast will face the passes over to the Tay drainage. In 1951, the only other year when we had none since they first nested in 1950, conditions were similar. In 1951 and 1955, snow-patches on the hills were also more extensive and lay a longer time.

In 1956, migrants were all late, redstarts (*Phoenicurus phoenicurus*) and spotted flycatchers (*Muscicapa striata*) not arriving in numbers until the middle instead of the beginning of May. Pied flycatchers were also late, as usual about ten days after the redstarts. On 25th May, about the usual laying time of pied flycatchers, only one box was occupied at Loch Tay, containing a half-made nest. The box at Drummond Hill in Glen Lyon (used later on), was also empty on 31st May, but on 30th May I found a nest with four fresh eggs at Falls of Tummel. On 10th June at Loch Tay, the nest which had been half-made contained five pied flycatcher eggs and another 40 yards away had four eggs. By 27th June, the young had flown from the first nest, leaving an addled egg; the other held four nestlings about eight days old.

On the north side of Drummond Hill, the box that had been empty on 31st May contained three nestlings (which flew at once), and an addled egg, on 17th July. The first egg must have been laid about 13th June, so it was probably a re-nest. It was 6 feet high in a well-thinned 40-year-old larch plantation, with three or four fairly old but stunted beech nearby, much the same kind of situation as the 1952 nest in

* *Received* 18*th October* 1956

the same woods, a mile farther down the Lyon (Mackenzie, 1952; Campbell, 1955). It was at least 400 yards from the Lyon and its fringe of scrubby alder and oak.

The nest at Falls of Tummel was some 600 yards from and perhaps 500 feet above the water's edge. On 29th June, it contained four nestlings which flew at once, and an addled egg; probably the last egg was laid on 31st May.

All the boxes were of one type (Mackenzie, 1948; Cohen and Campbell, 1954). The 1956 sites provided the usual requirements (Campbell, 1955), except that while two were so close to Loch Tay that the tree-roots were lapped when the loch was very full, the other two were at least 400 and 600 yards from water. At Falls of Tummel the woods go to the water's edge, while on Drummond Hill there are fields intervening for 200 yards or more; but both sites are on or near boggy, wet ground, rich in insect life.

Possibly connected with the late dates, clutches were all small: five, five, four and four. Five and six are the usual clutch-sizes in this area, with one or two of seven.

Review of Nesting from 1950 to 1956

I have no boxes farther west than Drummond Hill, and none farther north than Falls of Tummel. These two plots have been reached, and to the north the Falls of Tummel seems to be the limit for colonisation of the Tay drainage from the west. The Garry is wooded, at any rate as far as Struan, but it then turns north into country that is mainly grouse-moor and deer-forest, devoid of trees. The likely route to the north is up Loch Linnhe and the Caledonian Canal, perhaps with a branch by Loch Laggan to the Spey.

I have had boxes on Lochtayside, Drummond Hill and Falls of Tummel since 1946. In view of the numbers of birds nesting since 1950, it seems unlikely that there were more than a few unmated stragglers before. Since then, we have the following records, with suggested routes:

1950 One nest, Lochtayside; Glen Dochart route. New extension of range (Mackenzie, 1950).

1951 No nests. Boxes put up at Strathtay (Mackenzie, 1952).

1952 Three nests. One in Glen Lochay, found by Dr. Eggeling, and two in Glen Lyon. One hen near Kinloch Rannoch. The Glen Lochay birds probably came up the River Lochay. The other two nests were one mile and four miles from the mouth of the Lyon; both may have crossed from Loch Tay by Fearnan and Fortingall, or down the Tay and up the Lyon. They could have come up Loch Awe by Tyndrum, but there is high ground on the way, nearly 1,500 feet. A slight spread north and east, two to three miles in each direction (Mackenzie, 1952).

1953 Two nests. One on Lochtayside, and one in the new boxes at Strathtay. A spread east by 9 miles, and north by 3 miles. Nestlings just flown were reported near the mouth of the Bran, Dunkeld. This would mean a further spread of 6 miles east (Mackenzie, 1954).

1954 One nest on Lochtayside, and one at Strathtay. The Lochtayside nest was preyed upon, and a nest from which young had flown was found in nearby conifers in September (Mackenzie, 1955).

1955 None found.

1956 Four nests. Two 40 yards apart on Lochtayside. One a mile farther up the Lyon than the 1952 nest. One at Falls of Tummel. The probable route for the latter was by Loch Etive, Loch Rannoch and Loch Tummel. A spread north of at least 5 miles.

Since the first nest was found on Loch Tay, I have put in two more sets of boxes to " catch " the birds; one at Strathtay has caught them, while Dunkeld House has not yet been reached. If they had come from the east, they must have passed many suitable plots, some more suitable than at Drummond Hill, where one nest was not in a normal site. (The description of this site in Campbell (1955: 182) is not quite correct. The larches had not been brashed or thinned, but I had cleared a flight-way into the box about 12-15 feet long and 6-8 feet high and wide, which made a tunnel clear of branches. I find all birds, except sometimes wrens and coal-tits, require this before they will use a box, unless it can be placed so that the entrance faces an opening such as a ride.)

There are several reasons for thinking the birds come up the warmer west coast. The Aberfoyle pair (Campbell, 1954)

was actually nearer the west than the east coast, and the probable route was via Loch Lomond. There is a gap in recorded nests north of the Lothians as far as my nests in Central Scotland. I have two nest-box plots in the east: Balcarres and Tentsmuir. Although I have had 270 bird nests in the latter, not one was of this species. To the west are 11 plots, all unused by flycatchers. Finally there are the four plots in and to the west of which all the nests have been found, and at least one nest has been found in every one of them. The dates of laying, though rather uncertain, also point the same way. In 1952, the Glen Lochay birds were earliest, the Fortingall lot next, and my Glen Lyon lot the latest, if only by a day or so. A good many birds have been seen round Oban and south of it, which is a good start for crossing into the Tay and Tummel drainages via Loch Fyne, Loch Awe and Loch Etive.

In two years, none were found, leaving five years with an average of about three nests known, of which all but four were in boxes. Judging from Dr. Eggeling's find in 1952, there may have been about three times this number, nine or ten in the best years. Probably most were in the Tay drainage, west of the Perth-Inverness road. One can have a small but regular population in a district without it being known. The nests were not in out-of-the-way spots, with one exception near a little-used road.

Had it not been for my boxes, only two nests, one hen, and a newly-fledged brood would have been recorded, and also probably one cock singing on Dr. J. W. Campbell's house in 1954. My boxes were there for another purpose, but they happened to be on the limit of distribution of the species. With woods in their present sound condition, boxes help to observe such an extension, as they provide a surplus of suitable nest-sites. Campbell (1954: 90) noted this, and I also noted it before in the Dean as well as in other parts of England and Wales.

Summary

In 1955, no pied flycatchers were known to have nested in Perthshire, but in 1956 there were four nests, the most recorded so far. The total, since the first nest was found in 1950, is

thirteen certain nests, and two probable nests (fledglings seen). Young flew from all but one nest.

The spread of the species in six years is traced from the original nest on the banks of Loch Tay down to Strathtay (12 miles), to the mouth of the River Bran 18 miles to the east, and to Falls of Tummel 10 miles to the north. The migration route is probably up the west coast and across into the Tay drainage.

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ZOOLOGICAL NOTES

The Vertical Range of some Littoral Animals on St. Kilda.—Waterston and Taylor, in their paper on the land and fresh-water molluscs of St. Kilda (1906), added a note that brittle immature specimens of *Littorina littorea* (L.) were found near the top of Ruaival at least 400 feet above sea-level. They also reported that Mr. Fraser noted " whelks " crawling on the dykes behind the manse. Later they found empty shells of this species and *Purpura lapilla* (= *Nucella lapillus*) on Mullach Mor.

In 1952 a survey was made of the marine fauna and flora of St. Kilda (Gauld, Bagenal and Connell, 1953), and again in 1956, when attention was paid to the littoral animals and plants, with emphasis on the extent of the marine influence on the island and on the above observation of Waterston and Taylor.

In 1952 and 1956, *Littorina littorea* was found only on the upper part of the mid-littoral zone in small numbers in Village Bay and Glen Bay. The accessible cliffs of Ruaival were carefully searched from low-water mark to the summit (at 444 feet) and no *L. littorea* were found. Other localities (including the walls behind the manse) were also examined but the species was found only on the shore itself.

Waterston and Taylor may have been correct, and *Littorina littorea* may now have returned to a more normal habitat. The significance of their record has been increased by the belief that it illustrates a fundamental ecological principle; the anomaly has been explained in terms of the possible absence of competing terrestrial species (Elton, quoted by Darling, 1947).

There are, however, other excellent examples of littoral animals being found high up inland on St. Kilda. Lack (1932) recorded *Petrobius brevistylis* Carp. up to 700 feet on Conachair. This was confirmed in 1952 (*P. brevistylis* was mis-identified as *P. maritimus* by Gauld, Bagenal and Connell, 1953), and also in 1956 when the species was found up to 800 feet on Mullach Geal. Carpenter (1913) recorded *P. maritimus* a short distance from the sea on Clare Island and at Howth Head in Ireland, but the range of *P. brevistylis* on St. Kilda seems exceptional.

Another example is *Littorina saxatilis* (Olivi). This species was found in 1956 on Ruaival in a fresh-water trickle among *Enteromorpha intestinalis*, and on damp soil under stones up to a height of about 95 feet. It may have been this species which Waterston and Taylor found and mis-identified. *Littorina saxatilis* in contrast to

L. littorea (which has planktonic eggs and larvae), is viviparous and more likely to be found inland or in exposed positions. The St. Kildan specimens were carrying embryos.

The range of some amphipods is also of interest on St. Kilda. In 1952 *Talitrus saltator* (Montagu) was recorded from under slates at the manse door (*c.* 22 feet). In 1956 the amphipods in this position were definitely *Orchestia gammarella* (Pallas). This confirms the observations of Scott (1956), and it is agreed that *T. saltator* was probably a mis-identification. On Ruaival, *O. gammarella* was found under a piece of wood at a height of 350 feet above sea-level. This species is also viviparous and was carrying embryos. Although Reid (1947) stated that *O. gammarella* is found " quite commonly under stones on damp soil several hundred yards from water ", the St. Kildan range of up to 350 feet is probably exceptional.—T. B. Bagenal, Millport.

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Spiders and Harvestmen recorded from the Isle of May.—This list has been compiled from the sources cited. The naming and arrangement of the spiders follow Locket and Millidge (1951-53) ; the names for the harvestmen are those used by Bristowe (1949).

SPIDERS (ARANEAE)

Dyctinidae
Ciniflo fenestralis (Stroem)

Dysderidae
Harpactea hombergi (Scop.)
Segestria senoculata (Linn.)

Agelinidae
Textrix denticulata (Oliv.)
Tegenaria domestica (Clerck)

Tetragnathidae
Pachygnatha degeeri Sund.

SPIDERS (ARANEAE)—*contd.*

Gnaphosidae
Drassodes lapidosus (Walck.)
D. signifer C. L. Koch

Thomisidae
Xysticus cristatus (Clerck)

Salticidae
Salticus scenicus (Clerck)

Lycosidae
Lycosa purbeckensis (O. P.-Cambr.)
L. monticola (Clerck)
L. pullata (Clerck)

Argiopidae
Meta merianae (Scop.)
Zygiella atrica (C. L. Koch)

Linyphiidae
Cornicularia vigilax (Bl.)
Oedothorax apicatus (Bl.)
Erigonella hiemalis (Bl.)
Poeciloneta globosa (Wid.)
Bolyphantes luteolus (Bl.)
Lepthyphantes leprosus (Ohl.)
L. tenuis (Bl.)
Mengea scopigera (Grube)

HARVESTMEN (PHALANGIDA)

Phalangidae
Nelima silvatica Sim.
Oligolophus agrestis Meade
Phalangium opilio Linn.

W. J. Eggeling, Nature Conservancy, Edinburgh.

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Little Grebes in Shetland.—*The Handbook* and the *Popular Handbook* both refer to the little grebe (*Podiceps ruficollis*) as " only a winter visitor to the Shetlands ", and the Venables in *Birds and Mammals of Shetland* state that their earliest record for the species was 13th October and their latest 3rd April. It is, therefore, of some interest that on 12th July 1955, I watched two little grebes continually diving in a small reedy arm of Loch Cliff, about a mile from Burrafirth in the island of Unst. I was able to remain for only 15 minutes, and during that time saw no evidence that the birds had bred.—Alex Tewnion, Aberdeen.

Leach's Petrel in Renfrewshire—a correction.—Dr. J. A. Gibson has pointed out to us that the Leach's petrel (*Oceanodroma leucorrhoa*) found at Househillwood, Glasgow, S.W., on 30th October 1952, and recorded under "Lanark" in *Scot. Nat.*, 65: 186, ought correctly to have been ascribed to Renfrewshire. It was stated (*loc. cit.*, p. 167) that there were no records for the County of Renfrew and this requires to be amended also.—Editors.

Manx Shearwaters nesting in the Clyde Area.—The Manx shearwater (*Procellaria puffinus*) is a common visitor to the Firth of Clyde, often in flocks of considerable size, but has not hitherto been proved to nest within the Clyde area. I have long suspected, however, that shearwaters might nest on Glunimore Island (*Glas. and W. of Scot. Bird Bull.*, 2: 39), but it was not until 1955 that I was able to prove breeding.

Glunimore is a small rock-stack, 90 feet high, lying some two miles off the south-east tip of the Kintyre peninsula, and about half-a-mile equidistant from Sheep Island and Sanda. It supports several colonies of sea-birds, including a small but thriving puffin colony, and the top of the stack is honeycombed with burrows. During the last 10 years I have made seven visits to Glunimore, and although I was never able to spend a night there, I was several times impressed by the number of shearwaters to be seen around the island in the evening. Moreover, in June 1953 two friends of mine, Neil Paterson and Alastair MacArthur, visited Glunimore and found an adult shearwater near the mouth of a burrow; it seemed dazed, and when released flew straight out to sea.

All this made me strongly suspect breeding, and on 2nd September 1955 I landed again on Glunimore and after an hour's work managed to dig out two nearly fully-fledged young Manx shearwaters. From the numbers of birds seen around the island on previous occasions I should guess that about a dozen pairs nest.

This is the first breeding record for the Clyde area. The nearest known nesting-site is on Rathlin Island, Northern Ireland, twenty-five miles due west.—J. A. Gibson, Paisley.

Sooty Shearwater in the Clyde Area.—On 16th July 1955, when sailing from Girvan to Ailsa Craig, I saw a sooty shearwater (*Procellaria grisea*). We were about half-way across when I saw the bird dipping between the wave-troughs some 100 yards away on the starboard side, and even at that distance its large size was apparent. We stopped the boat and the shearwater passed only

some fifty feet astern. It was about the size of a fulmar and had uniform sooty-black plumage, although as it passed immediately behind us we got a glimpse of the pale line under the wing. There are at least two other records from the Clyde area; one off the Mull of Kintyre on 2nd September 1932, and one near Pladda on 25th August 1936.—J. A. Gibson, Paisley.

Behaviour of Ptarmigan with Young.—On 10th June 1956 Michael Campbell Penney and I came across a brood of young ptarmigan (*Lagopus mutus*), probably not more than twenty-four hours old, on a steep scree slope near the summit of one of the Mamores above Kinlochleven. The female was actually brooding three of the young when we flushed her. She ran off to a distance of about 10 yards from us, where she proceeded to go through the motions of dust-bathing in a runnel of small grit that ran through the scree slabs at this point. The performance was a pretty complete one, even down to the occasional pause for a vigorous scratch, but it was of course completely out of place in the circumstances and was evidently a form of " displacement activity "—a resultant of the two mutually inhibiting drives to incubate and escape.

The sequel is also worth recording. We retired to a distance of some 50 yards and watched the bird make her way back to the spot from which we had flushed her, crooning quietly like a broody hen. Suddenly the crooning changed to a louder, querulous, rather jackdaw-like note, and immediately little yellow heads popped up all over the scree slope and the chicks made their way towards the mother. This call-note appears to be the " harsher ' kwor-a ' " described by Nethersole-Thompson in *The Handbook*, 5: 229, and it evidently serves as a most effective rallying call for the young birds.—D. G. Andrew, Edinburgh.

This appears to be the first record of displacement dust-bathing in ptarmigan.

The call noted above is perhaps not the same as the harsh ' kwor-a ' recorded by Nethersole-Thompson. It seems to us lacking in harshness, and very high-pitched, resembling one of the commonest calls of the jackdaw; we noted it as a " high-pitched ' kee-ah ' ". A plaintive call ' ee-ac ', heard from a female during the display time (J. G. Millais, 1892, *Game Birds and Shooting Sketches*), was almost certainly the same call. Seton Gordon (1912, *Charm of the Hills*, 233), who once heard it in November, decided that the bird was probably immature with an improperly developed voice, but we have often heard this call from adult females at all

times of year. We noted it most often during spring display from January onwards, a few times when females were disturbed with young, and also at various other times in winter and autumn.—EDITORS.

Ruff in Lewis.—On 19th September 1956 I watched a ruff (*Philomachus pugnax*) at the edge of a marshy pool near the village of Steinish, on the outskirts of Stornoway. I was able to approach to within 20 yards of the bird and had a perfect view in bright sunlight through a 12x binocular. It continued to preen during my approach, and looked up only when the more nervous greenshanks, redshanks and lapwing nearby took flight. A description was scribbled down at the time, and this was sent to the editors. The greyish legs, black-edged white tail and rump (seen only briefly during preening), buff neck and breast, black-brown "scaly" wings, the size—bigger than a golden plover and the same shape—and the long neck and upright posture when alarmed, left me in no doubt about the identification. The bird eventually flew off, and I noticed the quick tern-like wing-beat, which identified it even at a distance among other birds.—W. A. J. CUNNINGHAM, Stornoway.

The ruff is a scarce autumn passage migrant to the Outer Hebrides. It has been observed on only a few previous occasions in Lewis, since the first record of one shot on 6th September 1892 (*Ann. Scot. Nat. Hist.*, 1893 : 46).—EDITORS.

A yellow-legged Herring-Gull in Shetland.—At about 8.30 p.m. on 25th June 1956, while standing on the deck of the motor vessel *Earl of Zetland*, then docked at Baltasound, Unst, I saw a strange gull among the fulmars and common, herring, and lesser black-backed gulls which were swimming and flying near the ship. This bird so closely resembled the other herring-gulls (*Larus argentatus*) that at first I was inclined to ignore it, but when it flew very close towards the ship I noticed that its legs were yellowish in colour. It circled around for about 15 minutes, several times dipping down towards the sea and alighting, lowering its legs to do so. The gull was so near most of the time, sometimes gliding and almost hovering up to 12 or 15 feet away, that despite a dull, cloudy sky, binoculars were unnecessary.

The feet and tarsi were a bright yellow in colour, almost as bright as those of the lesser black-backed gulls (*Larus fuscus*) which

continually hovered over the ship and provided excellent opportunities for comparison. There was no noticeable difference in colour shade between the feathering of its mantle and back and that of herring-gulls present, although the white tips to the primaries seemed to be even purer white, accentuating the darkness of the black spots. The red spot on its bill appeared to be less bright than in the other herring-gulls. From some angles, particularly when gliding up to pass me at a distance of 20-30 feet, it appeared to be slimmer than the other herring-gulls, although no difference could be detected in head-on flight.—Alex. Tewnion, Aberdeen.

Mr. Tewnion has discussed this interesting observation with us, and agrees that the case for identifying the bird with the Scandinavian race, *L. argentatus omissus*, is not perfectly clear. *Omissus* averages a longer wing than *argentatus*, and, furthermore, our home-bred birds are the palest of all the herring-gulls, *omissus* being distinctly darker on the mantle ; but the Unst bird was if anything smaller, and definitely not darker. *L. argentatus cachinnans* (Caspian Sea, etc.) perhaps answers the description better, though it does not now appear on the British list. The yellowing of the legs, which is an inconstant or variable character in *omissus* and some of the other races, is presumably due to quite a small difference in the genetic or physiological constitution of the bird, and might conceivably occur as an abnormality in any herring-gull. In a very difficult group of birds like this, if there is any reasonable doubt about a sight record it seems to us unjustified to make a definite identification.—Editors.

Glaucous Gulls inland in Renfrewshire.—From 7th to 11th March 1955 there were two glaucous gulls (*Larus hyperboreus*) on Balgray Dam, East Renfrewshire. Balgray was frozen at the time, and the glaucous gulls kept company with a small flock of herring-gulls that had congregated on the ice near the middle of the dam. The ice thawed at the end of the week and nearly all the gulls had left the dam by 14th March. A single glaucous gull was seen at Waulkmill Glen Dam on 15th October 1955; I saw it twice on 16th October and it was still present on the morning of the 17th.—J. A. Gibson, Paisley.

Other occurrences of glaucous gulls inland in Scotland were recorded recently (*Scot. Nat.*, 68 : 117).—Editors.

Little Auk inland in Renfrewshire.—On the morning of 16th December 1955 I saw a little auk (*Plautus alle*) on Waulkmill

Glen Dam, East Renfrewshire. I watched the bird for about half-an-hour. It was being mobbed by a large flock of herring-gulls, which drove it up and down the south-west bay of the dam; it dived repeatedly but made no attempt to fly. When I visited the dam in the afternoon there was no sign of the little auk and the gulls were silent.—J. A. Gibson, Paisley.

Snowy Owl in the Cairngorms in summer.—A snowy owl (*Nyctea scandiaca*) was seen during the summer of 1953 on the same Cairngorm plateau where one (probably the same bird) appeared in 1952 (*Scot. Nat.*, 64 : 176 ; 65 : 129). Mr. Alex. Tewnion has described the 1953 occurrences (*Cairngorm Club J.*, 89 : 25). The owl was first seen by four Cairngorm Club members on 19th July, about half a mile south of the corrie it seemed to frequent most in 1952. They were able to approach to about 20 yards from the bird. Several other parties later saw the owl, the last recorded on 13th September, near the north end of the plateau. On that day two climbers found in one small area many pellets of fur and feathers, the skeleton of a blue hare, picked clean, and several skeletons of grouse-like birds, probably ptarmigan. Though none of these climbers was an ornithologist, their descriptions, which we also heard, were accurate and unquestionably referred to the snowy owl. Having seen many snowy owls in the Arctic since 1952, we consider it almost certain that the Cairngorm bird was an adult male.

—Editors.

Crested Tit in South-east Sutherland.—The crested tit (*Parus cristatus*) has reached Sutherland. In early October 1956, I was informed by a woodman, who was employed at tree-thinning operations in a conifer wood near Dornoch, that on several occasions he had seen a strange little bird, usually appearing with the tits, in search of crumbs, while the woodmen were having their midday meal. He described the bird as being about the size of a sparrow, and particularly noted two distinctive features, a prominent crest and a black neck collar.

On my first visit to the area I failed to locate the bird, but I eventually tracked it down after a prolonged search on 13th October 1956. The part of the wood where it was seen consists of mature Scots pines, including a few dead and decaying trees, interspersed with patches of alder bog—an ideal breeding habitat for the species.

There does not appear to be a previous record of the crested tit for Sutherland, but the most recent authorities (Baxter and Rintoul, 1953, *The Birds of Scotland*, 132) and (Bannerman, 1953, *The Birds*

of the British Isles, 2 : 191) both refer to its spread in the adjoining district of East Ross.—D. Macdonald, Dornoch.

Crested Tits in Plantations.—In September 1949, I put up about 50 nest-boxes in some 2,000 acres of conifer plantations, within the normal range of the Scottish crested tit (*Parus cristatus*). The plantations were of Scots pine (*Pinus sylvestris*), varying from 15 to 30 years old, but there were other conifers, especially *P. contorta*. I was unable to re-visit the place until September 1952, but was told that one or two pairs of tits had used the boxes each year.

During my visit I found several tits' nests in the boxes. Two or three were apparently of coal-tits (*P. ater*), from which the nestlings had flown, and a great tit (*P. major*) had been sitting on four eggs. There were five or six nests of moss and grass (some from previous years). One that had been deserted contained five heavily marked eggs, probably a crested tit's.

In September 1952, I also tried calling, to see if I could get any idea of numbers. The method is an old one (using a beech leaf between the thumbs) known as " blatten " in Germany, where it was used to call up roe deer. I have used it in Burma to call deer—a point to remember being that it may also call a tiger. In August 1947, I was with the District Forest Officer in High Meadow, Forest of Dean, where the bird population is reputedly low. In about ten minutes of calling, I collected between 100 and 200 birds : all the local species of tits, flycatchers, willow and other warblers, robins, blackbirds, thrushes etc., with one or two jays and magpies, possibly hoping for an easy meal. Finally, the only pair of buzzards (*Buteo buteo*) in the Dean appeared overhead, calling continually. My companion had not seen them for two or three years ; they may have come to my call, or possibly the noise made by the other birds may have attracted them. A fallow deer also appeared for a moment.

For crested tits in the Scottish plantation, I drove along the various roads and rides, stopping at intervals of 400 yards and calling. Stopping places had to be selected mostly in older plantations, as little can be seen in the very thick younger ones. No concealment was necessary, as long as I kept still. Calling was continued for five to ten minutes, as it took some time for birds to arrive. Usually there was nothing to be seen for the first minute or two ; then birds could be heard and seen approaching. Judging from the distances between stops, and the composition of the flocks,

it is unlikely that any birds were counted twice. Probably all birds in the area were not seen, but they came most times. Usually birds coming up made a good deal of noise, but sometimes I suddenly saw individuals or even groups which were quite silent. Many were quite fearless, and I had a number, including about a dozen crested tits, within six feet, or sometimes three feet, of my head. One perched on my hat.

During six hours of calling, in about 1,000 acres, the following were seen :—

Pheasant *Phasianus colchicus*	1	Blackbird *Turdus merula*	1
Great Tit *Parus major*	13	Robin *Erithacus rubecula*	3
Blue Tit *Parus caeruleus*	4	Willow-Warbler *Phylloscopus trochilus*	3
Coal-Tit *Parus ater*	Approx. 180	Goldcrest *Regulus regulus*	6
Crested Tit *Parus cristatus*	28	Bullfinch *Pyrrhula pyrrhula*	5
Tree-creeper *Certhia familiaris*	1	Chaffinch *Fringilla coelebs*	2
Song-Thrush *Turdus ericetorum*	1		

There were in addition perhaps a hundred small birds heard but not identified.

Calling is perhaps not an accurate census method, but it serves as a quick way of roughly estimating the numbers. From walking through these woods, I should have put the population at a much lower figure, about a quarter of that seen with calling.

The method has not yet been fully worked out : the range of the call is not known, but it is at least 100 yards, perhaps 200, depending on the wind and the nature of the woods. If birds are not seen, they may not be absent, as calling is not always successful. I had best results in August and September, and I think the noise simulates that made by a young bird in trouble. Sometimes I got birds, especially tits, to come in winter, but I do not remember seeing any in the breeding season.

Baxter and Rintoul (*Birds of Scotland*, 1953) stated that after the breeding season, crested tits occasionally associate with other species. In this locality, there were more tit-flocks with crested tits than without them. Typical lots were ten coal-tits, three great tits, one crested tit; twenty coal-tits, two great tits, five crested tits, and one each of goldcrest, willow-warbler, chaffinch, and pheasant. In some 20-year old Scots pines right on the sea edge of the dunes, I found a flock of at least twenty coal-tits, five or more crested tits, one tree-creeper, two goldcrests and a willow-warbler.—J. M. D. Mackenzie, St. Andrews.

The exact locality where the crested tits were seen has not been published, as these birds are still subject to persecution by egg-collectors. It lies within the Moray faunal area.—Editors.

Redstarts nesting in East Renfrewshire.—A pair of redstarts (*Phœnicurus phœnicurus*) were in my grounds in 1956. I did not find the nest, but saw single birds several times during July, and adults feeding young birds in early August. A very few pairs of redstarts nest in West Renfrewshire but this is the first time I have known of a pair nesting in the east of the county.—J. A. Gibson, Paisley.

Even if young passerine birds are observed being fed by adults, it is difficult to establish for certain a breeding record for that locality, as there is always a possibility that they may have moved from elsewhere. However, Dr. Gibson informs us that the young redstarts, when first seen, were newly-fledged, and must have been almost just out of the nest. One of the young, which he almost caught, had a flight range of only twenty yards. The locality where the redstarts were seen contained the only large piece of woodland for a considerable distance around.—Editors.

Probable Lapland Bunting (*Calcarius lapponicus*) **in Aberdeenshire.**—On 30th September 1956, when I was on the moor of Forvie and approaching the northern boundary, not far from the Sand Loch at Collieston and about ¾ mile from the sea, I flushed a small bird at a distance, which flew off until it was finally lost to sight. Having a strong suspicion of its identity, and of the difficulty there would be in establishing this with certainty, I stood where I was and wrote down the following details :—" Bunting flushed at a distance, flew far off, irregular flight. Call *tik-it-ik*, *tù*, the *tu* very liquid. Strongly suggested Lapland bunting: size (and shape) would be right, smaller than skylarks (flying at the time); linnets numerous in same area." On hearing the " *tu* ", my first thought was " Baffin Island ", and the next " longspur ", the name by which this bird is best known to me. (I spent about five months in 1950 and 1953 in parts of Baffin Island where it was to be seen and heard abundantly at all hours of the day, and have met with it on a number of other occasions since 1931 in Canada, Lapland and Fair Isle. I find the " *tu* " or " *te-ou* " frequently referred to in my earlier notes.)

On returning home I first consulted Hollom's *Popular Handbook* (1952), and read of the Lapland bunting on page 413: " It usually occurs in treeless country in company with sky-larks or mixed flocks of finches and buntings. . . . Flight is undulating. . . . The chief note of migrants in autumn is ' ticky-tick-teu ', the

final note being a full melodious descending whistle ". This so perfectly matched my own observations, as to the habitat, companions, flight and call-note—the last being identical except for the spelling—that it seems justifiable to publish this note. The same confirmation is of course to be found at greater length in Witherby's *Handbook* (1: 145-146, 1938). The Lapland bunting has never been recorded in " Dee ".—V. C. Wynne-Edwards, Aberdeen.

White-billed Diver in East Lothian.—A white-billed diver (*Gavia adamsii*) stayed on the Gosford-Aberlady coast, East Lothian, from February to April 1956, in the same area where one was observed (*Scot. Nat.*, 68: 57-58) in November 1955. The immediate question is whether or not it was the same individual. This cannot be decided conclusively, because of the differences in colour of plumage and bill between the November bird and the February one.

On 19th February 1956, with Mr. K. S. Macgregor, we approached very near the diver. There were no large white spots on the plumage, only very small light dots; (the November bird had several large white, or off-white, spots on its back and scapulars). The bill was bluish-green at the base, shading to white at the tip, with only a faint suggestion of yellow; (the bill of the November bird was dull straw-yellow in colour). Later, on 24th March, Mr. D. G. Andrew noted at close range that the bill colour was a bright varnished yellow on the front of the upper part, and bluish-white underneath. This agreed with a further description made on 8th April, but the following week the bill seemed dull yellow with a darkish base. The colour of the back and scapulars remained the same throughout March and April. On the few occasions when we saw the bird raise itself and flap its wings, heavy moult was apparent, as there were hardly any primaries and only a few well-developed secondaries.

On 15th April, through a 40 × telescope, we watched the diver bring up an eel after a long dive. The eel, about a foot long, was held across the bill, and the diver struggled for some time before it finally managed to get the eel's head in its mouth. Then the eel wrapped itself around the bill, and the bird had great difficulty in swallowing it.

The white-billed diver was seen mainly in Gosford Bay. It was last seen there on 29th April 1956.—Frank D. Hamilton and Kathleen C. Hogarth, Edinburgh.

BOOK REVIEWS

The birds of the island of Arran. By J. A. Gibson. Rothesay : Bute Newspapers, 1956. Pp. 38. 1s.

This is a reprinted version, with slight modifications, of a paper already published by Dr. Gibson (*Trans. Buteshire Nat. Hist. Soc.*, 14, 1955). The booklet is attractively produced and we are glad to hear it has sold so well. It will be invaluable for anyone studying Arran birds in the future.

There is space to mention only a few interesting facts from the systematic list. Fulmars have been breeding at Drumadoon cliff since 1948. Gannets have not yet bred on Holy Island. Herring-gulls nest at some of the Arran hill-lochs. We are pleased to know that golden eagle and common buzzard have increased this century, and that the hen-harrier reared young in 1953. Many vague and unreliable records from the past have been treated with judicious criticism. One wonders whether it is worth recording, in the absence of specimen data, that some redshanks in the winter flocks in Arran may belong to the Iceland race, or that some of the wintering song-thrushes and hedge-sparrows may possibly be of the continental races. In an introduction that also includes a fairly detailed history of ornithology in Arran, some brief mention of the characteristic physical features and climate of the island would have been a valuable addition ; no guide-book forms a better substitute than a selective account on topography written by the ornithologist who really knows the area.

A. W.

Rockall. By James Fisher. London : Bles, 1956. Pp. 200, illustrated. 18s.

Apart from the scientific value of having all that is known of Rockall collected into one volume, there is considerable drama in the tale that James Fisher tells, from the discovery of this most isolated small rock in the world, to his own sensational landing on it, winched from a helicopter on to a six-foot square on Hall's Ledge—" a smooth guttered slab plunging 50 feet to the sea ".

His downward view, as he spun like a spider on its thread, was a three-dimensional enlargement of all the photographs he had carefully studied. That was on 18th September 1955, the second time in 144 years that men had stood on top of this extraordinary projection on a reef that has been a source of so many shipwrecks. With the flying of a Union Jack, the cementing of a plaque of annexation and the firing of a twenty-one gun salute, Rockall became part of Britain that day, with Commandos climbing like cats over the alga-covered granite, collecting rocks, algae, lichens, gouging periwinkles out of cracks with tweezers, and even roping down to brave the waves so that they could snatch a piece of oar-weed. No traces of barnacles or limpets were found.

That is the exciting culmination of an adventure story whose interest never flags, from the daring landing by Basil Hall in 1811, to Fisher's own attempt in the yacht *Petula* in 1949 from Londonderry—265 miles rhumb-line distance—at the end of which they recorded the only black-headed gull ever seen on Rockall Bank. But no landing was possible, though photographs taken and observations made were of considerable value.

How tiny a point Rockall was, they realised, when fulmars circled it once, twice, as if it were a ship, then passed on. Somehow, that a fulmar could pass it as a ship established its smallness and loneliness, more than words, or measurements, or marks on a map.

That was one journey. There is another, by air, of 1,534 miles from Stranraer to Rockall by Sunderland flying-boat with Eric Hosking and Robert Atkinson as photographers, looking at fulmar colonies and seal skerries all along the route, on a glassy calm day when it was possible to skim round Rockall, flaps down, at 100-200 feet above the sea. There were no guillemots, either on the rock or on the sea, despite the date, 30th July. Fisher concludes that guillemots must be unsuccessful in many years, and that this species is the only possible breeding bird of Rockall.

Plants, intertidal zoology, geology, and some very interesting ornithology of this remote area of the North Atlantic make this a most satisfying book, especially as photographs are good and there is an excellent bibliography.

T. W.

The World of Plant Life. By Clarence J. Hylander. New York and London : The Macmillan Company, Second Edition, 1956. Pp. 653 62s. 6d.

This is an expansive and lavishly produced book, printed on glossy paper and copiously illustrated: technically a magnificent example of American publishing. It aims to stimulate the non-scientific reader in the United States to enjoy the tremendously varied plant life of his country, by offering him a comprehensive survey of the whole plant kingdom in language largely free from scientific terminology. This is certainly a task of some magnitude for an author to attempt, but Dr. Hylander covers 653 large pages and offers a vast amount of information on the appearance, habits, habitats and uses of the examples he selects.

Naturally this book will appeal mainly to the American public, and its sale has justified the preparation of a second edition, but it is worthy of the attention of at least some British naturalists for the following reasons:—

Firstly, because it contains accounts of the natural life of plants which to most British readers are known only in garden or greenhouse—as well as of many which will be entirely unfamiliar.

Secondly, because of its fine series of 190 full-page photographs of plants. Many of these are most beautiful and informative, though not all approach the same high standard of reproduction. A large number are close-ups, and while these are often effective, they are sometimes misleading in illustrating only a small portion of a plant or giving a false

impression of size. Many of the author's line illustrations are also attractive in their clarity of outline, but some are too small to show the necessary detail with accuracy and all suffer from the lack of descriptive captions or labelling.

Thirdly, the text deserves the critical interest of British readers. Apart from the introduction, the book consists of a systematic survey of all the major groups in the plant kingdom, in each of which some examples are selected for description. Nearly three-quarters of the book is devoted to flowering-plants, covering a large number of families. This approach seems to the reviewer to fall between two stools: in spite of the publishers' claim on the jacket, such a book cannot serve as an aid to identification; yet a great deal of descriptive material is included which makes continuous reading difficult and turns every page into a miscellaneous collection of facts. This is the kind of book to be dipped into for a variety of fascinating information, rather than to be read through.

Finally, it is a pity that an author of Dr. Hylander's qualifications should be guilty of " playing to the gallery " when dealing with general topics such as those he chooses to entitle " War among plants " and " Plant co-operation ". It is surely possible nowadays to write attractive popular accounts of biological subjects without injecting such emotional colour as " . . . it (the struggle for survival) is a grim warfare without truce, with life as the reward to the victor and death to the luckless loser ".—C. H. G.

NOTICE TO CONTRIBUTORS

THE SCOTTISH NATURALIST is devoted to the study of Scottish Natural History, and is therefore concerned with all the many aspects, zoological, botanical, geographical, topographical and climatic embraced by this title.

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Manuscripts must be clearly written ; whenever possible they should be typed, double-spaced, on one side of the paper, and with adequate margins. Except in headings and titles, English names of animals and plants should appear without initial capitals, *e.g.* crested tit, red admiral, but Planer's lamprey, Scots pine. Scientific names should be given wherever they may be helpful to readers, especially to naturalists abroad. Trinomials should be avoided except where essential to the context. Authorities for scientific names should be given only where there is risk of ambiguity. The Editors will always assist in cases of difficulty over nomenclature.

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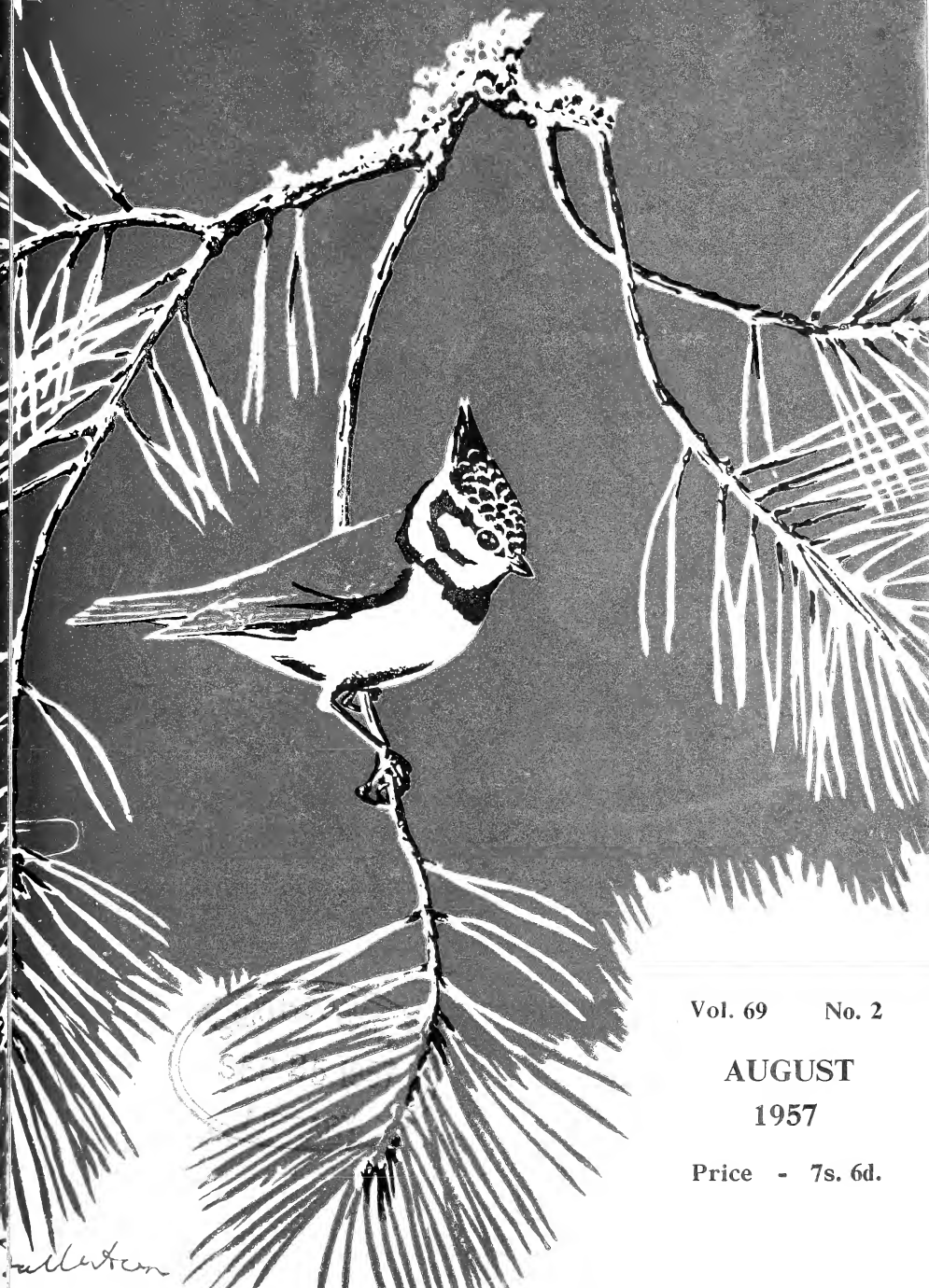
THE SCOTTISH NATURALIST



Vol. 69 No. 2

AUGUST
1957

Price - 7s. 6d.

The Scottish Naturalist

With which is incorporated

The Annals of Scottish Natural History

EDITED BY

ADAM WATSON,

WITH THE ASSISTANCE OF

V. C. WYNNE-EDWARDS, JAMES W. CAMPBELL, and WINIFRED U. FLOWER

All business communications should be addressed to Oliver & Boyd Ltd., Tweeddale Court, Edinburgh, 1.

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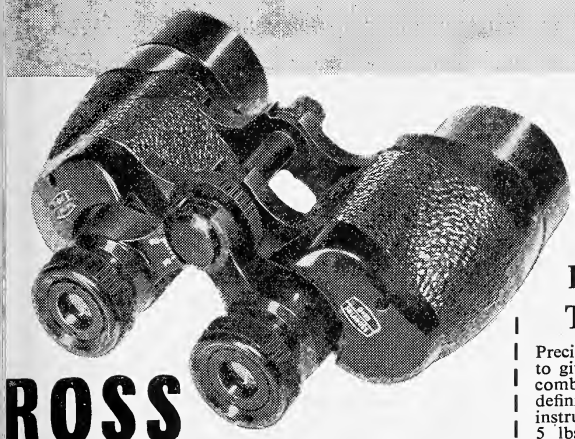

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The Scottish Naturalist

Volume 69, No. 2 1957

EDITORIAL

The *Scottish Naturalist* has for long been in difficulties ; and subscribers will have noticed that since the inception of the latest series of the journal in 1948 (after its abeyance during the war years), several changes in policy have been made to try and alleviate or remove these difficulties. In 1956 alone, there were no less than two such changes. The difficulties had been ever-increasing for years, and by now no one should have any illusions left about how easy-going the future journey of our journal is likely to be. Basically the problems remain the same as before, and the only change to note here is that the main burden of editorial work has been shifted to another individual. Other than this our editorial policy remains unchanged.

In past years, our main troubles have been long delays in publication, sometimes due to lack of sufficient worth-while material. This situation reached a crux in 1955, and readers will have noticed that the 1955 numbers were all published in one rather short volume in April 1956. After great delay, the last two numbers for 1956 were rushed through at the turn of the year. There was still not enough good material coming in to give us a good " breathing-space ", but at last the tide turned early in 1957. The first number for 1957 appeared right on time, and our policy will be to continue this happy state of affairs. More and more good material is now being sent, and if this continues there is certainly no doubt whatsoever that the journal will keep coming out on time. We now have sufficient material in hand for two numbers ahead, and very soon we will have enough for a year. It should then be possible to carry out a more extensive selection of what is to be published, and for

this we hope to receive the comments and preferences of our subscribers.

Now that there is far more good material coming in, and no delays in publication, it might seem that the future of the journal would be assured. This is not so, as our publishers have been running the journal at a loss for some considerable time. During these difficult years in the past, the circulation dropped to a half of its post-war peak, and unless we regain many of these lapsed subscribers it is very likely that the publishers will be unable to continue with the journal beyond the end of the present year. Fortunately, however, the speed-up in publication has brought in a few more subscribers, and the recent appeal for new subscribers has met with considerable success. 50 new subscriptions have been taken up in the past 8 weeks alone. This is very satisfactory news, but efforts will have to be redoubled in order to make the position of the journal really secure.

We assure all these new subscribers and others that there will be no future failures due to publication delays, as long as we are given enough good material (a condition that happily now seems more than fulfilled). Certainly both the remaining numbers for 1957 will appear on time, as scheduled, in August and December. With the present situation, we can do no more than this, but if we were given a great boost from new subscribers, there would be more money's worth in the journal than there is today. It would then be possible to increase the number of pages considerably without increasing the subscription, possibly even to the extent of having the *Scottish Naturalist* a quarterly journal. With such an aim ahead, the only way to drive forwards is for every subscriber to help personally. We therefore ask every subscriber to make a great effort to find at least one new convert to our journal, and thereby make certain of its survival.

SPECIMENS OF CHAR FROM SHETLAND AND THE FAROES*

M. A. Swan
Edinburgh

Tudor (1883) stated that the Loch of Girlsta in Shetland was said to hold not only good trout but also char. So the Shetland char was known for some time before its description by Tate Regan (1909). Tate Regan reported it as a new species (*Salvelinus gracillimus*) mainly because it was so slender (the depth of its body was contained $5\frac{1}{2}$ to $6\frac{1}{2}$ times in the length measured from the snout to the base of the caudal fin). Later (1911) he described it as more elongated than any other char. These descriptions were based on study of four male specimens, now in the British Museum. He also noted a local report that Girlsta was the only loch in Shetland where char had been found. Since then, so far as I am aware, no further work has been done on the Shetland char.

In 1954, the general opinion in Shetland was that the Girlsta char was extinct, as there had been no authentic record for several decades. In 1955, Mr. L. S. V. Venables told me that he thought Mr. Charles Arthur had caught the last undoubted char when a boy. On returning to Shetland in 1956 from the Faroes, where I had taken specimens of the Faroe char, I decided to try for the Shetland char also.

Girlsta is $1\frac{1}{2}$ miles long, about a third of a mile broad, and it has a mean depth of 31 feet, a maximum depth of 74 feet, and a volume of 308 million cubic feet (three times that of any other loch in Shetland). Its basin has approximately parallel contours, and slopes evenly on all sides to the deepest water in the middle. There are beaches of small grey stones on the east and west sides, and a beach of fine yellow gravel at the north end. It is fed by only one small burn entering near the south end (Murray and Pullar, 1910). It is a poor loch for

* *Received 6th November* 1956

brown trout and so is seldom fished, but an occasional " ferox " trout has been caught. I went over it with Mr. Arthur, who told me it was his father who had caught the last char while fishing from the north shore. If char were present, the stretch of gravelly shallow running out from the beach at the north end seemed to me the most likely place in which to find them spawning ; or, if spawning had not yet occurred, in the deep water close by. With the permission of the Shetland Angler's Association, I set a net in the north-east corner of the loch. Next morning, on the 26th September, the net held 58 char and three small brown trout.

These Girlsta char were beautiful fish. On many of them the belly, fins, and pale round spots were becoming suffused with the orange colour that accompanies maturation of the gonads. Some were more silvery, and in a few of these a small cluster of ova protruded from the vent, probably as a result of their struggles in the net. Milt was not exuding from any. Obvious features were : the small, pointed head, the large number of obvious parr-marks still present on these nearly mature fish, and the absence of the slenderness that had led Tate Regan to give them specific rank. All were more or less damaged by the netting, so that in some the depth was slightly increased by swelling, in others slightly reduced by constriction; but these effects must have nearly balanced one another, and I do not think they were sufficient to falsify the depth measurements. However I kept only the ten least damaged fish for detailed description. On all the fish, I measured the overall length and the greatest depth (usually just in front of the first dorsal fin). Only after I had already discarded many fish, did I appreciate that Tate Regan had measured the standard length (from the snout to the base of the caudal fin), so I also re-measured the ten selected char to obtain figures comparable with his.

My specimens of Faroe char were caught towards the end of July 1956. The Faroe char occurs only in Leynavatn, which is 48 metres deep and situated on the main island of Stromö. It is the darkest char I have yet seen, except for the dwarf variety living in the water-filled clefts in the lava at the north end of Thingvallavatn in Iceland. The Faroe char is so dark above the lateral line that the parr-marks and pale round

spots occurring there are almost invisible ; though they are more obvious below the lateral line, the dusky colour extends well down the sides, leaving only a narrow strip of white abdomen. There is a tinge of red on the fins of only one specimen. They are slender fish and their measurements were taken for comparison with those of the Shetland char. In a list of Faroe animal names they are called *Salvelinus alpinus faroensis* (Jensen *et al.*, 1935-42).

TABLE I. MEASUREMENTS OF SHETLAND AND FAROE CHAR

Number	*Ratio of depth to standard length*		*Overall length*	
	average	*range*	*minimum*	*maximum*
4 Shetland char (1909)	not given	1 : 5·50-6·50	150 mm.	200 mm.
10 Shetland char (1956)	1 : 4·44	1 : 4·01-4·70	193 mm.	235 mm.
10 Faroe char (1956)	1 : 5·53	1 : 4·97-6·12	174 mm.	207 mm.

	Ratio of depth to overall length		*Average overall length*
	average	*range*	
58 Shetland char (1956)	1 : 5	1 : 4·21-5·57	216 mm.

Tate Regan stated that a ratio of depth to length of 1 in 4-5 is rarely exceeded by any British char except the Girlsta char. The above figures show that the ratio of depth to length in my specimens of Girlsta char is well within the above range (it is nearer 1 : 4 than 1 : 5). As it is no exception to the general rule, the term *gracillimus* seems inappropriate. The figures for ratio of depth to overall length of my Shetland specimens little more than touch Tate Regan's figures for ratio of depth to standard length.

The average overall length of my Girlsta char (216 mm.) is the same as Sir J. G. Maitland gave for *Salvelinus struanensis ;* and the maximum length of 235 mm. is more than in S. *lonsdalii*, *S. obtusus*, *S. orcadensis*, the char of Loch Doon and a few others.

Summary

The Girlsta char is not extinct but appears to be thriving. It has a rather deep body and its title to specific rank is therefore questionable. It is not a particularly small race. The Faroe char is more slender than any recorded British char.

Acknowledgements

The detailed taxonomic study of these Shetland and Faroe char will be done by Mr. G. F. Friend, Department of Zoology, Edinburgh University. I have to thank him for his willing consent to the publication of this preliminary report. I have also to thank Mr. C. Mitchell, Mr. J. Johnston and Mr. J. R. L. Shewan (all of the Shetland Anglers' Association), and Mr. C. Arthur for their help while I was in Shetland.

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THE MAMMALS OF THE ISLE OF MAY *

W. J. Eggeling
Nature Conservancy, Edinburgh

The only two non-domestic mammals breeding on the Isle of May are the rabbit and the house-mouse. Seals frequent the shores, and other wild mammals are recorded only very occasionally.

Rabbits (*Oryctolagus cuniculus*) were on the adjoining mainland in 1264, but the first mention of them on the May was in 1329, when the King's Chamberlain paid 8s. to four men going there to catch them. In 1549, when the island passed from the Priory of St. Andrews to lay ownership, it had been "spoiled of its rabbits" (from which the main revenue had previously accrued) by the destruction of the warrens by the English. The next reference is not till 1803 (Sibbald's *History of Fife and Kinross*) when the pasturage, including the use of the rabbit warren, was let for £26 a year. In 1884, when there were six milking cows, a horse and three donkeys on the island, and "abundant sweet pasturage for some sixty sheep", rabbits must still have been under control. They were said to be confined to hollows among the rocks and near the cliff-edge. This is very different from more recent times (especially the early 1950s), when in the absence of domestic stock and of cultivation they were swarming everywhere, and grazing the turf so short that it was difficult to find any flowering specimens. Then, in March 1955, myxomatosis broke out (almost certainly introduced by a gull), and by October 1955 it seemed that every rabbit had died. However, a small number did survive, and the population will no doubt build up again rapidly unless checked.

According to H. W. Robinson, a single brown hare (*Lepus europaeus*) was seen on the island on 4th July 1897, but this record may be doubtful, for lack of confirmation.

* *Received 30th November 1956*

The only rodents on the May are house-mice (*Mus musculus domesticus*). According to Southern, they are of the same large form as on many other islands round Britain. Though common, they are not often seen except in winter. From early summer to late autumn they live almost entirely out-of-doors, and then in late September and October some move into the houses. But many spend the winter outside, as can be seen if there is snow on the ground, when their tracks are everywhere. Mice were more abundant when there was a bigger human population, more stock, and more cultivation than today. In the latter part of last century one of the lighthouse keepers wrote: " We have no rats but legions of mice ", and Miss Rintoul and Miss Baxter recorded a " plague " of mice when they first visited the island in 1907. They noted further (*Vertebrate Fauna of Forth*) that the introduction of cats had materially reduced the numbers of mice. There are no cats on the island now, nor have there been for many years.

When Miss Rintoul and Miss Baxter asked on their first visit whether any rats occurred they were told that two which had landed from a ship had been promptly killed. There is also a note in the Observatory Log about the remains of a large brown rat (*Rattus norvegicus*) found on the North Ness in 1955 and believed to have been washed in from the sea.

There is a tradition that the grey or Atlantic seal (*Halichoerus grypus*) used to breed on the May, but it certainly does not breed there now*, though up to about fifteen at a time can almost always be seen around the rocky coast of the North Ness. In the early months of the year quite small young appear among them, having probably come from the Farne Islands, the nearest breeding colony and the only one on the east coast of Britain. These grey seals often haul out on the rocks and with care can be approached quite close.

Common seals (*Phoca vitulina*) are seen off the coast from time to time, but only rarely come on to the rocks. This is not surprising, as they do tend to prefer mudbanks and sandbanks rather than rocky shores.

* Since the above was written, the Principal Lighthouse Keeper on the May, Mr. W. Watt, saw a white-furred seal pup in mid-December 1956, in a cove on the west side of the island. He was able to pick it up and show it to his wife, and he estimated its weight at 28-30 lb. It cannot have been more than 2-3 days old. This is the first definite record of a grey seal breeding on the island.

William Evans (1892) stated that the grey seal " frequently visits, if indeed it does not habitually frequent, the seaward portion of the Firth of Forth ", though the only definite record was Robert Walker's statement that " it may be seen . . . along by the Carr Rock chiefly in summer ". Walker himself considered the grey seal to be the most abundant seal on the east coast of Scotland about 1873, but twenty years later Evans doubted this. Throughout the period that Miss Baxter and Miss Rintoul regularly visited the May, from 1907 to 1933, they saw far more common seals than grey seals.

Sir Robert Sibbald (1710) wrote of the " *Phoca*, or *Vitulus marinus*, the seal: our fishers call it a selch ", and of the May that " many seals are slain upon the east side of it ". Such slaughter was probably no new thing, for we know from the Accounts of the High Treasurer of Scotland that 13s. were paid on 8th March 1508 " to the heremyt of Maij that brocht ane selch to the King ". Evans refers to these quotations as if the seals on the May were undoubtedly common seals. But the tradition is that it was the grey seal that used to breed on the May. And even now, with modern weapons and fast boats, it would be far from easy to kill common seals off the island and recover their bodies. Yet recovery of the corpses must have been essential, as the fishermen of 1710 were killing seals for trade. It seems more probable that the seals were grey seals, killed ashore in a nursery or when basking on the rocks.

Whatever the situation in the past there has recently been a big increase in the number of grey seals frequenting the May, as in the Forth generally, and also the Tay and Eden. Probably this is associated with the great increase during the past twenty years of the Farne Islands colony.

The only other wild mammal recorded from the May is a small bat—probably the pipistrelle (*Pipistrellus pipistrellus*)—which has been seen occasionally in summer. The whales and porpoises seen from time to time off-shore are outside the scope of this account.

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A LIST OF THE BUTTERFLIES AND MOTHS RECORDED FROM THE ISLE OF MAY *

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This list has been compiled from sources listed in the references, along with a few unpublished observations from the Bird Observatory records. The naming and arrangement follow the *Indexed Check-List of the British Lepidoptera* by I. R. P. Heslop (Watkins and Doncaster, London, 1947).

BUTTERFLIES

Pieridae

1. *Pieris brassicae* (Large Garden White). Sometimes breeds. Not uncommon as a migrant.

2. *Pieris rapae* (Small Garden White). Not uncommon.

3. *Pieris napi* (Green-veined White). Not uncommon. Can occur only as a migrant, as its food plants are absent.

Nymphalidae

4. *Aglais urticae* (Small Tortoiseshell). Common; chiefly a migrant but sometimes breeding.

5. *Nymphalis io* (Peacock). Immigrant. Two on 6th September 1949 (Baxter and Rintoul).

6. *Vanessa cardui* (Painted Lady). Numerous occurrences, including 9 on the afternoon of 16th August 1912; " that they were immigrants from abroad, I have no doubt " (Evans, 1912); 3 on 19th September 1920, " 2 quite perfect and to all appearances newly hatched, 1 slightly worn " (Rintoul and Baxter); several on 29th August 1933, " all in beautiful condition, no rubbed or ragged specimens among them " (Grimshaw).

7. *Vanessa atalanta* (Red Admiral). Many records, including 8-9 on 19th September 1920 (Rintoul and Baxter), 10 in beautiful condition on 30th September 1929 (Baxter),

* *Received 1st December 1956*

and about 20 on 2nd September 1933 (Grimshaw). A common immigrant in Scotland.

SATYRIDAE

8. *Maniola jurtina* (Meadow-Brown). One caught near the Low Light in July 1936, " probably driven over by wind " (Callan).

LYCAENIDAE

9. *Polyommatus icarus* (Common Blue). One seen in the Holyman's Road in July 1936, " probably driven over by wind " (Callan).

All nine butterflies so far reported from the Isle of May are known to migrate. The garden-whites are well-established British species whose populations are reinforced regularly by vast swarms from the Continent. The same is true to a smaller extent of the green-veined white and the lesser tortoise-shell. The red admiral is an example of a common British butterfly which could not maintain itself in this country without frequent influxes from abroad. This applies also to the painted lady; although its migrations are not so regular, considerable numbers appear every year. The peacock is extending its range in Britain, but is also a partial migrant. Both the meadow-brown and the common blue have been captured at light-vessels as migrants.

MOTHS

SPHINGIDAE

10. *Herse convolvuli* (Convolvulus Hawk). A migrant from the Continent. One male on 30th August 1914 " may be assumed to have crossed the North Sea " (Evans, 1914-15).

11. *Macroglossum stellatarum* (Humming-bird Hawk). One on 15th June 1899 (Evans, 1899). A moth whose existence in Britain depends on migration from southern France in spring and summer.

NOTODONTIDAE

12. *Cerura vinula* (Puss). One male in the third week of April 1912.

13. *Pheosia tremula* (Greater Swallow Prominent). One male on 1st June 1911.

ARCTIIDAE

14. *Spilosoma lubricipeda* (White Ermine). Three males on 1st June 1911.

15. *Arctia caja* (Garden Tiger). One male on 25th July 1912 and several more recent records, including 1 on 15th July 1956.

16. *Callimorpha jacobaeae* (Cinnabar). One female on 7th June 1911; 1 male on 27th May 1912. A resident British species which may also reach our shores as a migrant.

CARADRINIDAE

17. *Cryphia perla* (Marbled Beau). One male in mid-July 1914.

18. *Cryphia muralis* (Marbled Vert). One at light in July 1936 (Callan).

19. *Agrotis segetum* (Turnip Dart). Several records.

20. *Agrotis exclamationis* (Heart and Dart). Several records.

21. *Agrotis ipsilon* (Dark Dart). Many records. The British population of this moth is much reinforced by immigration.

22. *Euxoa nigricans* (Garden Dart). Several records.

23. *Euxoa tritici* (White-line Dart). Several records.

24. *Euxoa obelisca* (Square-spot Dart). A good many records.

25. *Lycophotia varia* (True Lovers' Knot). Several records.

26. *Peridroma porphyrea* (Pearly Underwing). One male and one female at the lantern on 26th and 27th September 1913. Another moth whose British population is much augmented by immigration.

27. *Ammogrotis lucernea* (Northern Rustic). Many records from the light.

28. *Graphiphora augur* (Double Dart). One female in mid-July 1914.

29. *Amathes baja* (Dotted Clay). Single males in 1913 and 1914.

30. *Amathes c-nigrum* (Setaceous Hebrew-character). Several records.

31. *Amathes xanthographa* (Square-spot Rustic). An abundant species; many records of large numbers at the light.

32. *Diarsia festiva* (Common Ingrailed Clay). Several records, all of var. *conflua* (Evans, 1914-15).

33. *Diarsia rubi* (Small Square-spot). One female in the latter part of July 1914.

34. *Ochropleura plecta* (Flame Shoulder). Three occurrences in 1913 and 1914.

35. *Axylia putris* (Flame Rustic). One female in the second half of June 1914.

36. *Triphaena comes* (Lesser Yellow-underwing). Several records.

37. *Triphaena pronuba* (Common Yellow-underwing). A frequent visitor to the lantern but not in large numbers (Evans, 1914-15).

38. *Triphaena janthina* (Lesser-bordered Yellow-underwing). Several records, all of males.

39. *Mamestra brassicae* (Cabbage Dot). A good many records.

40. *Melanchra persicariae* (White Dot). One at the lantern on 9th September 1907 (Baxter).

41. *Diataraxia oleracea* (Bright-line Brown-eye). Several records.

42. *Hadena nana* (Light Shears). Several records.

43. *Hadena conspersa* (Common Marbled Coronet). Many records.

44. *Cerapteryx graminis* (Antler). Many occurrences. Resident.

45. *Eumichtis adusta* (Dark Brocade). Several records.

46. *Luperina testacea* (Flounced Rustic). A good many records.

47. *Thalpophila matura* (Straw Underwing). One female in the third week of July 1914.

48. *Procus strigilis* (Marbled Minor). One male (dark variety) in July 1914.

49. *Procus fasciuncula* (Middle-barred Minor). A number of records, all of males.

50. *Apamea obscura* (Dusky Brocade). One male in July 1912.

51. *Apamea sordens* (Rustic Shoulder-knot). One male on 21st June 1914.

52. [*Apamea unanimis* (Small Clouded Brindle). One at the lantern on 10th September 1907 (Grimshaw). Placed in square brackets because Evans (1914-15) having seen the specimen, which was in poor condition, considered the identification doubtful.]

53. *Apamea secalis* (Common Rustic). A number of records.

54. *Apamea crenata* (Cloud-bordered Brindle). Two in the summer of 1909.

55. *Apamea monoglypha* (Dark Arches). The commonest and most frequent visitor to the lantern, recorded on very many occasions. Numbers are greatest from about mid-July to mid-August, when between one and two hundred have frequently been captured in a night. Both sexes are represented but males predominate (Evans, 1914-15).

56. *Dasypolia templi* (Brindled Ochre). Many records, including large numbers (up to 80 in a night) in 1913.

57. *Antitype chi* (Grey Chi). One male in the third week of September 1912.

58. *Phlogophora meticulosa* (Large Angle-shades). Numerous occurrences.

59. *Celaena haworthii* (Haworth's Crescent). One male on 14th August 1911.

60. *Hydracia micacea* (Rosy Ear). A number of records.

61. *Rhizedra lutosa* (Large Wainscot). Two males on 3rd October 1913.

62. *Leucania pallens* (Common Wainscot.) Several records.

63. *Leucania impura* (Smoky Wainscot). One male and one female in mid-July 1914.

64. *Caradrina morpheus* (Mottled Wainscot). A few caught at sugar in July 1936 (Callan).

65. *Caradrina clavipalpis* (Pale Mottled Willow). Many records.

66. *Petilampa minima* (Small Dotted Buff). A good many occurrences, mostly of males.

67. *Amphipyra tragopoginis* (Mouse Wainscot). A good many records.

68. *Cosmia trapezina* (Dun-bar). One female in the third week of September 1912.

69. *Omphaloscelis lunosa* (Lunar Underwing). A common visitor to the lantern.

70. [*Agrochola lota*. Included in Evans' lists (1914-15) on the authority of Grimshaw, but in fact listed in the latter's paper as *A. macilenta*.]

71. *Agrochola macilenta* (Yellow-line Quaker). One on 26th September 1907 (Grimshaw).

72. *Agrochola circellaris* (Brick). A number of records.

73. *Conistra vaccinii* (Common Chestnut). One on 9th September 1907.

74. *Eupsilia transversa* (Satellite). One male on 25th October 1913.

75. *Xylena exsoleta* (Cloudy Sword-grass). One male (very worn) on the night of 8th May 1911; two males in the spring of 1913.

76. *Oxylena vetusta* (Red Sword-grass). One on the night of 14th November 1912.

77. *Cucullia umbratica* (Common Shark). One male on 26th July 1913.

Plusiidae

78. *Polychrisia moneta* (Silver Eight). One in July 1936 (Callan). A colonising species.

79. *Plusia chrysitis* (Common Burnished Brass). One male on the night of 28th July 1911; one male on the night of 12th July 1914. May breed on the island.

80. *Plusia pulchrina* (Beautiful Golden Y). One male on the night of 7th July 1914.

81. *Plusia gamma* (Common Silver Y). As this moth maintains itself in Britain only by immigration, it is not surprising that there are many records of it as a migrant, though it probably breeds on the island also. Its movements are often associated with those of the painted lady butterfly. Evans (1914-15) gives examples of " rushes " at the lantern, for instance in the third week of September 1908, on 26th September 1909, and on 10th and 13th September 1910. Miss Baxter and Miss Rintoul noted " crowds " on 16th September 1908, " hundreds " on 19th September 1920 (mostly perfect specimens) and large numbers on many other occasions. Males as a rule appear at the lantern in greater numbers than females.

Geometridae

82. *Lygris testata* (Common Chevron). Two on 23rd September 1907 ; one in mid-August 1911.

83. *Lygris populata* (Northern Spinach). One specimen obtained in July 1936 ; " no food plants, therefore must have been driven over in a storm " (Callan).

84. *Dysstroma citrata* (Dark Marbled Carpet). One female on the night of 15th August 1913.

85. *Chloroclysta mista* (Autumn Green Carpet). One male on 26th October 1912 ; one male on 26th September 1913.

86. *Thera variata* (Grey Spruce Carpet). Four records in the years 1911-13.

87. *Xanthorhoë fluctuata* (Garden Carpet). Much the commonest Geometer at the lantern, occurring from the end of April to the end of September (Evans, 1914-15).

88. *Colostygia didymata* (Small Twin-spot Carpet). One male in the second week of August 1913. Many in July 1936 (Callan).

89. *Oporinia dilutata* (November Carpet). One on 23rd September 1907; one in October 1912; one in September 1914.

90. *Operophtera brumata* (Common Winter). One male on 3rd November 1912; another in December 1912.

91. *Pelurga comitata* (Dark Spinach). A number of records.

92. *Euphyia bilineata* (Yellow Shell). Six in July 1914. Common in July 1936 (Callan).

93. *Lyncometra ocellata* (Purple-bar carpet). One male on the night of 12th July 1914.

94. *Perizoma alchemillata* (Small Rivulet). One on the night of 28th July 1911.

95. *Hydriomena furcata* (July Highflyer). One female on 10th August 1911, at a window.

96. *Eupithecia assimilata* (Currant Pug.) One in mid-June 1911.

97. *Erannis aurantiaria* (Scarce Umber). One in the morning of 16th November 1912.

98. *Erannis defoliaria* (Mottled Umber). One (unbanded variety) in December 1913.

99. *Opisthograptis luteolata* (Sulphur Thorn). One male at the end of June 1910.

Pyralidae

100. *Eudoria angustea* (Narrow-winged Grey). Several records.

101. *Scoparia dubitalis* (Hoary Grey). One on 22nd July 1912 ; one in July 1914.

102. *Nomophila noctuella* (Rush Pearl). Two males on the night of 16th September 1914.

103. *Aphomia sociella* (Green-shaded Honey). One female on the night of 12th July 1914.

CRAMBIDAE

104. *Crambus pratellus* (Dark-inlaid Grass-veneer). One on the night of 21st June 1914.

105. *Crambus perlellus* (Yellow Satin Grass-veneer). Several records.

106. *Crambus culmellus* (Straw-coloured Grass-veneer). Several records.

107. *Crambus geniculeus* (Elbow-striped Grass-veneer). One on 13th September 1888.

108. *Crambus tristellus* (Common Grass-veneer). A number of records.

TORTRICIDAE

109. *Pandemis heparana* (Dark Oblique-barred Twist). One male on 16th August 1913.

EUCOSMIDAE

110. *Polychrosis dubitana* (Shore Doubtful Marble). Several on 22nd July 1897.

111. *Endothenia antiquana* (Blotched Marble). One in July 1911 ; one in July 1914.

GELECHIIDAE

112. *Mniophaga desertella* (Common Sandhill Groundling). Recorded in July 1897.

113. *Phthorimaea marmorea* (Beautiful Marbled Groundling). Recorded in July 1897.

OECOPHORIDAE

114. *Endrosis sarcitrella* (White-shouldered Tubic). One on 24th September 1910 ; one in June 1911 ; one in September 1911.

115. *Borkhausenia pseudospretella* (Large Common Tubic). One on 7th June 1911 ; one on 28th July 1910.

116. *Depressaria alstroemeriana* (Alstroemer's Flat-body). One on 2nd September 1910.

PLUTELLIDAE

117. *Plutella maculipennis* (Grey Diamond-backed Smudge). One on 20th October 1911.

HEPIALIDAE

118. *Hepialus lupulina* (Common Swift). One on 8th June 1911.

119. *Hepialus humuli* (Ghost Swift). Several records.

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'NORTHERN' GOLDEN PLOVERS IN MIDLOTHIAN DURING SPRING*

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Although the northern race of the golden plover (*Charadrius apricarius altifrons*) is so numerous in Scotland and so easy to identify in summer plumage, the Scottish literature about it is very generalised. The *Vertebrate Fauna of Forth* (Baxter and Rintoul, 1935, p. 278), gives two definite records: one (out of a flock), on 4th September 1928, in East Fife; and one killed at the Isle of May lantern on 7th May 1909. In *The Birds of Scotland* (Baxter and Rintoul, 1953, p. 593), there are no definite records from the Lothians and very few from the East Coast, the inference being that this sub-species is more plentiful in West Scotland and the Islands.

To obtain a more detailed picture of the status of this race in Midlothian, further records from the spring are listed below. These include all records previously published in the *Edinburgh Bird Bulletin* (1: 51, 60; 2: 50; 3: 51; 4: 48, 61). Messrs. D. G. Andrew and T. Boyd have also very kindly let me have their notes about definite or suspected northern birds.

There are many reports of golden plovers " on the hill " in every winter month when the weather is mild, and probably many of these are of the local breeding stock. These birds are mainly flocked together and in winter plumage, but some of the records show the time when they assume breeding plumage and territory. In 1953, from a moor near Gladhouse Reservoir, two birds were flushed on 25th January and went right away, heading north to lower ground. On 15th February, four were there, two in summer and two in transition plumage, and they stayed on the moor and later bred. On 21st February 1954, a pair in full summer plumage was in a territory on the same moor. On Jeffrey's Corse, at an altitude of 1,750 feet on

* *Received 15th January* 1957

Table 1. Golden Plovers in Spring at Midlothian Reservoirs.

Date	*Number seen*	*Place*	*Notes*
4.3.56	140	H	1 with some black on belly, mainly W.
7.3.53	21	T	All W.
11.3.56	18	Cr	Some, perhaps all, W.
11.3.56	65	H	Mainly W, but at least 2 with some black.
12.3.53	14	Cr	Including 9 N (TB).
15.3.53	150	G	1 recognisably N, many W, many with some black.
16.3.51	50	H	2 sufficiently advanced to be obviously N (DGA).
21.3.48	30	T	2 definite and 4 probable N (DGA).
28.3.54	100	Cr	A few N, most in W (TB).
28.3.54	110	H	A few definite N (TB).
29.3.48	20	H	1 definite N (DGA).
29.3.53	4	G	2 N, 2 with some black.
5.4.53	30	G	Many definite N, but none in full plumage ; many with some black.
8.4.56	125	H	10 per cent. full N, many obviously N ; over 50 per cent. could be either race.
9.4.55	75	T	10 per cent. full N plumage, 10 per cent. W.
10.4.55	50	G	Some W.
11.4.54	3	T	2 definite N (TB).
11.4.54	20	H	2 definite N (TB).
12.4.53	20	H	15 definite N (TB).
13.4.52	85	G	All apparently in full N plumage.
14.4.54	70	G	Some definite N, none in complete N summer plumage.
15.4.56	185	G	15-20 per cent. in full N plumage.
17.4.55	70	G	1 full N plumage, several W, most in transition.
19.4.52	190	T	Great majority N, but some not distinct from southern (DGA).
21.4.56	180	G	25-30 per cent. in full N plumage, more than 50 per cent. recognisably N.
22.4.46	30	Cr	All N—and also 10 at Listonshiels (DGA).
24.4.55	25	G	None in full plumage, most with black oval on belly and a winter throat and head.
24.4.54	40	C	Mostly N (TB).
25.4.54	100	T	Obviously many N (DGA).
26.4.53	38	H	24 definite N (TB).
30.4.55	30	G	Blackish on face and throat on 2 of them.
1.5.54	100	T	90 definite N (TB).
2.5.54	20	G	Obviously many N (DGA).
6.5.56	40	G	2 in N plumage, many with very poorly developed summer plumage, and very little black underneath. A few with some black on face.
9.5.53	28	T	8 definite N ; rest in very poor plumage (TB).

the Moorfoots, four pairs and a party of three were seen, all in full summer plumage and in territory, on 28th February 1953. After a severe spell in the spring of 1955, with extensive snow-drifts giving a 50 per cent. cover (but thawing rapidly), two flocks of 40 golden plovers, one at Gladhouse and the other nearby, were seen on 6th March. All were apparently in full summer plumage, and by the following week they had either moved on or dispersed locally. In a flock of 40 at Cobbinshaw Reservoir, on 20th February 1954, some were in full summer plumage, but most in transition plumage.

The records of those birds presumed to be *altifrons* are mainly casual notes taken at irregular intervals. But they do indicate that *altifrons*, with its much later breeding period, acquires summer plumage much later than *apricarius*. To amplify this, the records are arranged on page 85 in daily succession, irrespective of the year of observation. Localities are designated: C—Cobbinshaw Reservoir; Cr—Crosswood Reservoir; G—Gladhouse Reservoir; H—Harper-rig Reservoir; T—Threipmuir Reservoir. N refers to " northern race " and W to " winter plumage ". TB and DGA refer to notes by T. Boyd and D. G. Andrew.

Another favoured place seems to be in an area near Fala Flow where there were 200 (several in full northern summer plumage and some in winter plumage) on 21st March 1953. They were seen there a fortnight later by W. Brotherston, who has since seen them there every spring. Spring records of *altifrons* in the *Edinburgh Bird Bulletin* (except those from Gladhouse) are mainly from Aberlady and obviously refer to birds on passage. These are of single birds on 8th April 1951 (in a flock of 150 in winter plumage), 13th April 1952, 26th April 1953, two on 9th May 1954, and a flock of 55 on 4th April 1954. This last flock comprised about " 10 in perfect plumage, 20 almost, 10 half-way, while the rest were still in winter garb " (F. D. Hamilton, *personal communication*). On 9th May 1951, Dr. R. S. Weir saw a single northern golden plover near Dunfermline.

The *Handbook of British Birds* gives the spring moult of both *apricarius* and *altifrons* as " Feb. to May ". The above notes on the plumage of the two races suggest that, in Midlothian, they may generally be differentiated by the beginning of March.

By then, most local breeding birds have acquired full summer plumage and are engaged in territorial activities if the weather is mild. Flocks occur only during or immediately after wintry spells. *Altifrons*, on the other hand, are at that time all in flocks and in winter plumage, and relatively few individuals can be satisfactorily identified as northern at the end of March. There are only a few exceptions to this ; e.g. nine northern out of fourteen on 12th March and perhaps the 55 on 25th March,* of which more than half were recognisably northern. Many observations (*Brit. Birds*, 42 : 379-384, 397 ; 43 : 362-363 ; 45 : 105-106) show the same general pattern of spring moult, though the great flocks of *altifrons* seen by Dr. E. V. Baxter on North Uist, on 8th-9th April 1934, were " the finest plumaged she has ever seen ".

By no means all breeding *altifrons* have the strongly-marked " white-band " pattern and females tend to be less distinct than males (*Brit. Birds*, 42). In the records given here " full northern plumage " refers only to those birds with a black throat and face and a surrounding broad white band ; undoubtedly many of the " intermediates " would be the less conspicuously marked individuals. With such a gradation of plumage and moult, it is impossible to be sure that all of these birds were *altifrons*, but my impression is that there is little mixing of the forms in Midlothian. In the later and smaller parties, numerous birds have a retarded summer plumage, many of them still retaining the winter plumage on head and neck. Many of them may be first-year birds, and some of them possibly *apricarius*. I have no records of flocks in winter plumage in late February, and the evidence suggests that *altifrons* is mainly a passage migrant in Midlothian, returning from early March and lingering till the end of April, with individual flocks staying perhaps from four to six weeks. As they occur in the same few fields year after year it seems unlikely that any big numbers would be overlooked. The concentration of reports from within a mile or so of the better known reservoirs probably shows the intensity of bird-watching there rather than the area frequented by the birds, but the distribution of the flocks between 750 and 1,000 feet altitude is very

* *Erratum*. This date should be 4th April ; therefore this flock was not an exception.

marked. This includes the higher ground skirting the hills, and much of the pasture (including both rough and resown grass) favoured by the birds. One record suggests that a few may pair up before leaving this country. On 27th April 1953, near Loch Mahaick, Perthshire, there were nine northern birds, five of them in full northern summer plumage and four less well marked. Two of the latter (which we presumed to be females) fed close to two of the full plumaged birds, and seemed to be paired with them.

THE SO-CALLED 'NORTHERN GOLDEN PLOVER' *

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I have had under observation for two or three years, as opportunity offered, the question of the status of the northern golden plover (*Charadrius apricarius altifrons* Brehm, 1831) ; and, though I might have preferred to wait for two or three more seasons before drawing conclusions, it seems on the whole desirable to offer some comment now, as a sequel to Mr. Smith's foregoing paper on the northern golden plover in Midlothian.

At least in the western part of its range, including the British Isles, Faroe and Iceland, trinomial designations cannot, I believe, be satisfactorily applied to this species. I have not studied the situation as it affects Fennoscandia and the U.S.S.R., and must make it clear that these regions are excluded from my observations. Throughout the western range the species is variable in plumage, and individuals which might very reasonably be identified as *altifrons*, as described and figured in our standard reference works, can be found breeding throughout the whole of this range ; so can birds answering to the current conception of *apricarius*, or *oreophilus* as it was known at one time.

It seems to be a question of high-plumage and low-plumage polymorphism. Of the pre-nuptial moult, Yarrell (1882-84, vol. 3, p. 272) says : " Male birds are generally observed to have an alteration in colour of their feathers more rich and perfect than that of the females ; but this is not always the case, as the extent of the change appears to depend on the constitutional vigour and powers of the individual bird, whether male or female, and specimens of the latter sex are occasionally seen in summer dress as rich and as perfect as that of the finest male ". There is a continuous series of variation from the " lowest " birds, which have black (sometimes flecked with

* *Received 8th February* 1957

white) only on the lower breast, to those in which this ventral area is broadly connected by a black band up the front of the neck to the black sides of the face, the whole being brightly outlined in white. The extremes are poles apart, but there is no line to be drawn anywhere to divide them in half, and, as I have said, western breeding populations appear always to include in varying proportions the greater part of this range of variability. In support of this statement I am going to quote from representative observations of others, and refer to my own preliminary observations in Scotland.

Starting in the north-west, in north Iceland, Yeates and Jeans (1949, p. 9) wrote of *altifrons:* " This very handsome sub-species varies considerably in the amount of black on its underparts. A very large proportion were, however, very dark indeed, but we saw a few individuals no better marked than the southern race ".

Next, Williamson (1948, p. 90) writes : " The observations in this paper refer to golden plovers breeding in the Faroe Islands, and, since this area was selected by C. L. Brehm as the type-locality of *Pluvialis apricaria altifrons*, it must be presumed that, in the main, they concern the northern race. It is necessary to point out, however, that not all the birds studied could be assigned to the race on morphological characters seen in the field—hence my use of the specific designation in the title. A number of Faroese breeding birds appear never to attain the full black front—underparts, chin, lores and forehead —of typical *altifrons*, nor do they show the characteristic white band bordering this black. Some are, in fact, quite indistinguishable from birds of the southern race, whilst others could perhaps best be described as intermediates. It can be said, however, that most Faroe breeding birds have affinities with typical *altifrons*, so far as the characters can be assessed in the field ".

In *British Birds* for December 1949 there appears an article by Fisher, Ferguson-Lees and Campbell on the breeding of *altifrons* on St. Kilda, followed by " A note on racial variation in golden plovers " by Tucker, and a fine collection of fifteen photographs of breeding birds taken in Lapland, Iceland, Scotland, England and Wales. Tucker's note draws special attention to the fact that one of the photographs (Pl. 81, lower),

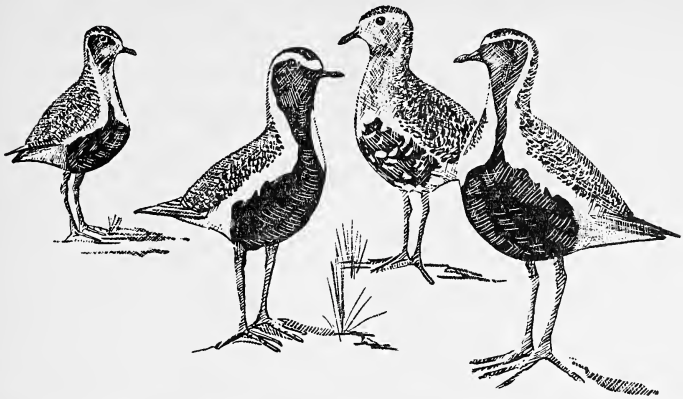

FIG. 1.—This sketch is intended to illustrate the extreme "northern" and "southern" varieties, and two intermediate forms.

taken by Salmon in Breconshire, South Wales, shows a bird "which would pass for a typical example of the northern form". In the 1948 St. Kilda record both birds were of the northern type; but there is another St. Kilda record by Bagenal (1953, p. 21) in 1952, in which only one of four birds seen showed this type of plumage.

As well as these breeding records on St. Kilda and in South Wales, birds which resembled *altifrons* have been recorded breeding in Sutherland and Easter Ross (Jenkins, 1952; Hewson, 1952); and Chapman (1924, p. 261) gives a characteristically charming sketch of one ("the male unusually black") breeding near Elsdon, Northumberland, in 1921.

Coming to my own observations, as yet very limited in number, I can say that in Aberdeenshire one could match every one of the photographs in volume 42 of *British Birds*, with the possible exception of Plate 76. I am referring to the black parts of the plumage, with their more or less distinct border of white, and not to the colouring of the upper parts, which I have not studied. I have found it useful to pay particular attention to the black of the face and neck, since it is more conspicuously variable than that of the underparts. Extreme "northern" birds have the sides of the face jet-black, and the throat black also, but more typically the face is the slightest bit sepia or sooty compared with the underparts.

This is joined to the ventral black patch by a band down the front of the neck, at the " northern " extreme perhaps 2 cm. ($\frac{3}{4}$ inch) wide (but never as wide as is shown in Peterson, Mountfort and Hollom's *Field Guide*, Pl. 30, p. 95) ; more typically it is quite narrow (1 cm. or less), and in the southern form often entirely obsolete. I find some birds with this black neck strip present but hardly any black on the face, and some with black on the face but no neck strip ; these are among the many intermediate forms, between what I describe for convenience as " northern ", having continuous black from the eyes right to the belly, and the lowliest " southern " extreme, which has no black anywhere except on the lower breast. Incidentally, one needs to view the individual bird both from front and side to see the complete pattern. The white border, which does so much to set it off, is apparently developed to a degree closely corresponding to the amount of black present.

Judged on this basis, not less than half the golden plovers nesting in the Cairngorm area are " northern " in type. On a brief visit to Lewis in June 1956, I noticed two " northerns " in five birds carefully examined on their breeding grounds.

I hope this is sufficient evidence to make it clear that we should not any longer attempt to identify *Charadrius apricarius altifrons*, at any rate in Scotland. Except in the degree of development of the nuptial pattern, which I have been discussing, there are no other differences known between the supposed races, either in plumage or measurements, and in winter plumage all look exactly alike. Sub-species are geographical entities, and the trinomial must not be used to designate what are in fact varieties or polymorphs, everywhere found breeding together. The proportion of the more resplendent types undoubtedly increases northwards, but we cannot express this fact in trinomial form either. On Williamson's evidence, quoted above, the name *altifrons* Brehm (though strictly it designates only a single specimen, the type) refers to a mixed population, like our own in Scotland, and the name itself may therefore be held to have little or no validity. From the nomenclatorial standpoint there seems to be no option at present but to refer at least to all the western breeding stocks of golden plover simply as *Charadrius apricarius* L.

This must be regarded as a preliminary, but I hope not premature, statement. Perhaps others may be induced to share in extending observations on what already appears to be an interesting topic.

Summary

Breeding populations of *Charadrius apricarius* in Iceland, Faroe and the British Isles are shown to contain varying proportions of *altifrons* and *apricarius* types, with intermediates, as normal varieties or polymorphs. Trinomial designations are held to be inappropriate to describe this situation and it is recommended that only the binomial be used at present, at least in this part of the range.

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THE BIRDS OF ST. KILDA, MID-SUMMER 1956 *

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Four expeditions visited St. Kilda in the summer of 1956, and except for six days between 13th and 19th June, the islands were in continuous occupation from 11th June till 22nd July. This provided an almost unbroken record of the birds over five weeks in mid-summer.

Party 1 : James Fisher and E. M. Nicholson, were ashore on Hirta between 11th and 13th June, from H.M. Royal Air Force Vessel *Bridport*. J. F. and Air Commodore Levis were ashore on Dun.

Party 2 : A. D. Berrie, J. Morton Boyd, D. G. Cochrane, M. Colthart, J. B. Cowey, A. Fraser, J. D. Hamilton, J. Lindsay, and J. T. D. Wilson, arrived on 19th June and departed on 3rd July. This party, equipped with a powered small-boat, visited all the major islands and examined the cliffs from the sea. On the night of 20th-21st June, J. M. B. and J. B. C. were ashore in darkness on Dun, attended by D. G. C. and J. T. D. W. in the small boat, and six of the party were ashore there in daylight on 29th June. On 21st June, J. B. C. and J. T. D. W. navigated the coast from the jetty to the Mina Stac round Oiseval, and next day J. M. B. and J. T. D. W. circumnavigated Hirta, the latter being ashore on Soay for about eighty minutes. Boreray was visited twice. On 23rd June, A. D. B., J. M. B., and J. B. C. were ashore there for about eighty minutes, attended by J. T. D. W. in the boat. On this occasion the party approached Stac an Armin and Stac Lee, without landing, and navigated the cliff bottoms from Laimhail to Clesgor round Geargo. The second visit to Boreray took place on 27th June, when J. M. B., D. G. C., and J. T. D. W. were ashore for about $2\frac{1}{4}$ hours

* *Received 22nd January* 1957

(attended by M. C. and A. F. in the boat), and gained the summit of the island in clear weather. Levenish was visited by D. G. C., J. B. C., J. D. H., J. L., and J. T. D. W., on 28th June. The Carn Mor was visited on the night of 26th-27th June by A. D. B., J. M. B., J. L., and J. T. D. W.

Party 3 : D. G. Andrew, J. M. S. Arnott, A. D. Bateman, J. Cunningham, P. E. Naylor, R. W. J. Smith, D. I. M. Wallace, and D. R. Wilson, arrived by fishing-boat on 3rd July, and Party 2 departed. Party 3 did not have a small-boat and so was confined to Hirta, which was therefore well covered. The Carn Mor was closely watched during daylight on 6th and 7th July, and in darkness on the 8th, 9th, and 10th. On the night of 8th-9th July, D. G. A. and D. R. W. spent the hours of darkness on the Cambir and the north-west slopes of Gleann Mor.

Party 4 : A. Anderson, T. B. Bagenal, Miss W. U. Flower, J. MacGeoch (J. MG.), J. MacKay (J. MK.), A. Scott, D. Scott, Dr. H. Scott, A. Tewnion, Mrs. A. D. Tewnion, and T. Weir, arrived on 11th July, and Party 3 departed. This party was also restricted to the main island which was therefore well covered. The Carn Mor was visited in daylight and darkness several times between 16th and 22nd July. On the night of 18th-19th July, the talus slopes on the eastern side of the Ard Uachdarachd buttress of Conachair were visited in darkness by D. S. and T. W.

The weather conditions during the period were as follows: Between 11th and 13th June (Party 1) winds were W. to SW., light to moderate. Between 19th and 28th June the winds were mostly W. and N.W., light to moderate ; but on 29th June they shifted to S.E., strong to gale ; and then backed to the N.E. and moderated over three days (Party 2). From 4th to 11th July (Party 3) winds were moderate to light, mostly W. to S.W. on 4th, 6th, 8th-10th, and E. to S. on 5th 7th, and 11th. From 12th to 14th July, winds were very light W. to S.W.; from 15th to 20th very light, veering from S. through W. to N. ; but on 21st became strong from E., moderating on 22nd and veering to N. (Party 4).

A log covering the ornithological observations of all four parties was maintained. This paper sets forth the substance of the log.

Leach's Petrel *Oceanodroma leucorrhoa.* A colony much larger than that on the Carn Mor (Boyd, Munns, and Whitehouse, 1956) was found on Dun. Activity began there at 11.15 p.m. (all times in this paper are G.M.T.) on 21st June, and lasted till probably well after 1 a.m., when the party had to leave. The island was traversed from Caolas an Duin to the Castle, contouring on the northern slopes behind the peaks on the ridge. While the party was on the western end of the island it was still fairly light, so it was impossible to get a true assessment of the numbers to the west of the Altar. While the party approached the Altar on the northern slopes behind the buttress of An Fhaing, darkness fell, and the characteristic call of the species was heard from burrows (some of them puffin burrows). These burrows, and others discovered later, were excavated, and four birds obtained, each incubating a single egg. In a burrow where the calling was much louder than usual, two birds were taken out with beaks locked together and mouths filled with a reddish fluid. The night was dark, misty, and fairly calm. Activity on the ground was perceptibly more intensive on all the puffin slopes than among the boulders, though small petrels were often seen flying over the boulders, usually not calling. In a traverse from the Altar to the Castle and back to Seilg Geo, small petrels (probably mostly of this species) were seen and heard entering and leaving burrows, heard calling from burrows, and heard and seen in flight all the way. Calling from burrows was heard every few paces, giving an impression of fairly high density in places, and birds were seen in flight practically every time the party looked skywards (J. M. B., J. B. C.).

On 23rd June, two birds, each with one egg, were taken in daylight from burrows among the stones of the ruined " cleits " at Cleitean McPhaidein on Boreray. Birds were found at the first site that was dug out, but extensive investigation was not possible due to a change in the weather (J. M. B.).

A small colony was discovered on the western side of the Cambir isthmus on 9th July, among fallen rocks on the N.W. aspect of Geo na Stacan. Ten to twenty birds were calling in the air and a pair were caught in an otherwise empty burrow (D. R. W.). On the same night another small colony was found on the eastern side of the Cambir isthmus on the slopes

of Mol Carn na Liana, immediately west of the recent landslide (D. G. A.). None was caught here, but they were heard from burrows, and both heard and seen in the air. They seemed less conspicuous than above Geo na Stacan.

Another small colony was found on the eastern terrace of Ard Uachdarachd on 19th July. Activity began at 11.20 p.m. with cries of " quicker-ik-ik-ik ". Various birds were glimpsed, but none was caught. They were more numerous on the north edge of the screes by the rock face, but the colony was not thought to be as large as the Carn Mor one, though the night was unusually clear and warm (D. S., T. W.).

The Carn Mor colony was visited on 27th June, 8th to 10th July, and on occasions between 16th and 21st July, both by day and night. Activity began between 11.15 p.m. and 11.30 p.m., and ceased about 2.30 a.m. The greatest density seemed to be on the north edge of the Carn Mor and along the grass terrace under the vertical cliff (D. I. M. W.). The steep grass slopes to the north of the Carn Mor talus were thought suitable for a Leach's petrel colony, when viewed in daylight, and small petrels were seen flying over a small grass saddle between the two areas during darkness. There also seemed to be periodic activity over the nesting site, with possibly up to 15 minutes between spells of activity. This was particularly noticeable when making sound recordings at a burrow where the partner bird arrived during the recording and returned at fairly regular intervals. One mid-air collision was seen, with one bird falling to the ground and the other flying off.

Small petrels, on two occasions successfully identified as this species, were seen from two to fifteen miles from St. Kilda during night passages.

Seven birds were ringed.

Storm Petrel *Hydrobates pelagicus*. A small colony was found on 27th June on the Carn Mor. Three birds were taken from burrows ; two at the foot of the access gully and another among the Leach's colony about 30 yards to the west. Calling from burrows was heard on a few other occasions at the same places, but the species seemed far less numerous than the Leach's petrel (J. M. B., J. T. D. W.). Between 8th and 10th July, four pairs were found with burrows in the Carn Mor area ; two in a " cleit " half-way down the slope below the

" Lover's Stone " (map of Mathieson and Cockburn, 1928), one under a slab of rock above this " cleit ", and one among the Leach's petrels under Mullach Bi. One was caught on the Carn Mor on 17th July, and another on 21st. No further definite evidence of breeding was found, but a small proportion of the flying birds seen on Dun and at Ard Uachdarachd during the night were small in size, and probably of this species. On 22nd June one was found dead on the talus slope below Tigh Dugan, Soay (J. T. D. W.), and one was seen about six miles east of St. Kilda in daylight. Three were ringed.

Manx Shearwater *Procellaria puffinus*. In the night traverse of Dun (see Leach's petrel), this species was not heard or seen till about midnight. Birds were active in the air all the way back from the Castle to Seilg Geo, but none was heard from the ground. The cavities under the large boulders on the eastern end of the island held many shags and razorbills, but Manx shearwaters were neither seen nor heard there. The promontory beyond the tunnel was not explored by land, but was examined from the tunnel to Gob an Duin by small boat at about midnight; however no shearwaters were seen. Between 12 p.m. and 1 a.m., they were heard calling from the lower levels of the puffin slopes from the tunnel westward to Seilg Geo, and also from the tower and flanking ridges of Bioda Mor, from which they swooped over the puffin slopes northward to the sea. None was caught, and the party had no clear impression of the size of the colony (J. M. B., D. G. C., J. B. C., J. T. D. W.).

On the isthmus of the Cambir (see Leach's petrel) a colony of probably 50 to 100 pairs was found among fallen rocks on the N.W. slopes of Geo na Stacan, and another in fallen rocks on the western side of the recent landslide at Mol Carn na Liana, probably at least 200 pairs. On the same occasion another colony of probably 20 to 40 pairs was located among fallen rocks on the west side of Gleann Mor (D.G.A., D.R.W.). Yet another small colony was found on Ard Uachdarachd, where they were heard calling from the air and from the burrow after 11.20 p.m. (D. S., T. W.).

The Carn Mor colony was visited on the occasions noted under Leach's petrel. On 27th June the night was windless and cloudless with moonlight, and activity was very slight

J. Morton Boyd

FIG. 1.—The 1,000 ft. wall of Mullach an Tuamail, on the southern aspect of Sunadal, Boreray, St. Kilda, on 27th June, 1956.

compared with what Boyd, Munns, and Whitehouse (1956) witnessed in late May 1955. On later occasions the species was very numerous there at night, nineteen being caught by Party 3, and three by Party 4. They were heard calling at night from Leathaid a' Sgithoil Chaoil, and young were occasionally heard calling during the afternoon on the Carn Mor (D. I. M. W.).

Twenty-two were ringed.

Great Shearwater *Procellaria gravis*. One was seen about seven miles S.E. of St. Kilda on 12th July at a range of 50 to 200 yards (D. G. A., D. I. M. W.).

Fulmar *Fulmarus glacialis*. Alex Anderson, of Party 4, made a census of the great population of fulmars on Hirta ; details of this are published in this number of the journal (Anderson, 1957). Large colonies, but of a smaller order than that on Conachair, were seen on Boreray (J. M. B.). The fulmar was nesting there on the same cliffs as the gannet. The gannet was distributed along the major fissures and ledges on the east and west crags, with the fulmar generally restricted to the more featureless walls, usually well covered with vegetation. A large fulmar colony was observed on the buttress of Clagan na Ruskochan. The wall of Clesgor was dominated by gannets, and the fulmars extended along the N.W. walls of the arête at Clais na Runaich, upwards into the gully Na Roachan. This colony was spread over the three-pronged tower, and down the west and south walls. Another large colony was seen on Mullach an Eilein. This colony extended over the upper part of the short steep buttress running north from the west summit, but appeared sparse in the recess of the north gully between the two summits. Along the wall of Mullach an Eilein the colony extended the entire length below the gannet ledges, and appeared to be particularly dense on the wall above and immediately to the south of Geo na Tarnanach. Few were seen above the gannets, though suitable cliff was available. When viewed from the west top, about 50 were seen nesting on the same rib or cliff as the gannets. On the crags above Sunadal another large colony was interspaced with the gannets. Here the fulmar colony ran mainly along the upper rim of cliff above the gannets. They were in places also numerous below the gannets, and at one place on Mullach an Tuamail both species were occupying the same face of rock.

J. Morton Boyd

FIG. 2.—The arête and tower of Clagan na Ruskochan, Boreray, St. Kilda, viewed from near the summit of the island on 27th June 1956. The gannet colonies are clearly seen.

Fulmars were numerous on the cliffs from Creagan na Rubhaig Bana round the entire southern aspect of Boreray to Geo an Araich, but fewer than on the N.W. and N.E. sides. A few were nesting in the old bothy at Tigh Stallar (J. M. B.).

On 13th July a nest was found containing two chicks (one thought to have fallen into the nest from above), on Ruaival. On 19th they were still together and stained with oil, and again on 21st when they were very dark as a result of oil discoloration. About half-a-dozen fulmars were seen sitting on ledges on Mullach Bi overlooking Gleann Mor (D. G. A.).

412 fulmars were ringed by the various parties.

Gannet *Sula bassana*. Found nesting in thousands on Stac Lee, Stac an Armin, and on Boreray (Figs. 1 and 2) where all the major ledges on the N.W. and N.E. crags were occupied. The Boreray colony extended on all cliffs from a point just north of Creagan Fharspeig to Geo an Fheachdair by way of Geargo. A small group of probably 100 to 200 pairs was on the southern side of the promontory of Clagan na Ruskochan. At this site two ledges about 50 yards to the west of the main group have been colonised. This corner is easily visible from Hirta, and may serve in future as an indicator of expansion. Stac Lee is the only area where maximum colonisation appears to have taken place. There is plenty of room for expansion on Stac an Armin and Boreray, but this would probably be at the expense of the fulmar in many parts (see notes on the fulmar). Gannets were seen alighting on Boreray on the green southern slopes and on Sunadal away from the nesting ledges. They were also seen alighting on green ledges and in gullies where there were no nests. A flock of over 500 often alighted on the southern slopes on the very steep verdure above Geo Sgarbhstac. None was noticed flying over the island (J. M. B.). Photographs of the cliffs (now kept by J. M. B.) were taken for comparison with others, past and future. Gannets seemed to be most numerous in Village Bay after rough weather, when they were seen collecting sea-weed. Very few were normally present feeding in the bay.

Cormorant *Phalacrocorax carbo*. One seen in Village Bay on 17th July (H. S.).

Shag *Phalacrocorax aristotelis*. A large colony of probably several hundred pairs, with fledged young, was found at the

S.E. end of Dun on 21st June, among the tumbled rocks on the ridge beyond the Guimachsgor buttress (J. M. B., J. B. C.). Shags from this colony flight to a platform at Rudha an Uisge where over 200 were often seen together, and to Village Bay where 120 were once seen. One colony of about 100 pairs was found in a boulder beach at Mol Ghiasgar (J. M. B., J. T. D. W.), and another of over 100 adults and young in Mol Carn na Liana (D. R. W.). The cliff bottoms generally present poor perching and nesting sites for this species, and where the rock enters the sea vertically only a few birds were seen, usually in the water. But near stacks, eroded dykes, and sills, the number increased with groups of up to 20 together. This also applies to Boreray where fledged young were seen. Numbers, including fledged young, were seen at Stac Dona. Seen also at Stac an Armin, the small stacks between Am Biran and Geargo, and on the south side of the Sgarbhstac. Six were ringed.

Heron *Ardea cinerea.* One at Village Bay on 11th June (E. M. N.).

Eider *Somateria mollissima.* Nest with eggs found on Dun. Nests (some empty) were found at the following places and heights above sea level: five in the village below 100 feet, two on Oiseval at 500 and 750 feet, one on Na Mullichean Mor at 700 feet, another on Claigeann an Tigh Faire at 900 feet, and another between Mullach Geal and Mullach Mor at about 1,100 feet. A duck and ducklings were seen at the Gleann Mor tarn. Four ducks were seen flying over Am Blaid from Gleann Mor to the village watershed at 2.30 a.m. Ducks and ducklings were always present in Village Bay, varying from 4 with 3 young, to 20 with 11 young. A few ducks were found with young at the cliff-bottoms near Mol Ghiasgar, and ducks were seen at Boreray. Drakes were much scarcer : two at Caolas an Duin, four at Na Sgarain, and one or two immatures in Village Bay. A drake was found dead in the village area.

Red-breasted Merganser *Mergus serrator.* Seen in Village Bay, 11th-13th June. One seen off Levenish on 1st July, and thereafter one to three birds (one male and two females) were seen regularly in Village Bay till 11th July. Only a single bird was afterwards seen there, and not every day.

Peregrine *Falco peregrinus*. A single female was seen over Oiseval and the village on 6th and 7th July, two on the west cliffs of Dun (Cul Clete) on 13th July, and one being attacked by kestrels on 20th and 21st July at Mullach Mor, where a pair was also seen on the same days.

Kestrel *Falco tinnunculus*. First seen on 16th July, and then regularly till 22nd; on four occasions a single bird, and on two occasions two birds. Seen on Mullach Bi, Mullach Sgar, and Mullach Mor. Both single and paired birds were seen attacking a peregrine.

Oyster-catcher *Haematopus ostralegus*. There were probably between 100 and 120 adults and young on Hirta in groups of up to 30. The major groups of 20-30 were on the strand at Village Bay, the base of Gleann Mor, and on the Cambir; and minor groups on the summit of Oiseval, Ruaival, Na h-Eagan, Gob na h-Airde, and Mol Ghiasgar. At least four pairs were in the village area with birds at An Lag Bho'n Tuath, and Lag Aitimir. Several pairs were on Dun, and a pair at Cleitean McPhaidein on Boreray. Four birds were ringed.

Lapwing *Vanellus vanellus*. Two seen on Am Blaid on 1st July, and one on Mullach Sgar on 16th July.

Ringed Plover *Charadrius hiaticula*. Heard in Gleann Mor, and seen at Village Bay. The counts, all in July, were: two from 15th to 17th and 20th, three on 18th and 21st, and one on 22nd.

Golden Plover *Charadrius apricarius*. One heard on the upper slopes of Oiseval on 13th July (T. W.). None seen.

Turnstone *Arenaria interpres*. Three birds glimpsed and others heard at Caolas an Duin on 20th July were probably of this species (T. W., A. T.).

Snipe *Capella gallinago*. There were at least four breeding pairs in the village area. About four nests present on the west bank of An t-struthan, with three calling in the village, on 11th June. At least three were in the upper meadows with day-old young on 30th June, and another nest with three eggs was found there on 18th July, near where one of the nests with eggs and young was seen on 30th June. At least five were flushed from the lower meadows on 20th June, one adult with

young was found there on 3rd July, and at least four pairs were in the lower meadows on 5th July. Birds were seen at, and flying to and from, An Lag Bho'n Tuath and the village area. A nest with eggs was found on Oiseval, another on Mullach Sgar, and a pair with young on Mullach Mor. Snipe were seen on the Cambir (probably two pairs), and on the summit of Conachair. One was flushed on 20th and 29th June from the same locality on Dun. Five were ringed.

Woodcock *Scolopax rusticola*. One flushed at Amhuinn Mor on 22nd July (A. T., A. D. T.).

Curlew *Numenius arquata*. Seen at Ruaival, the Cambir, Gleann Mor, Conachair, over Dun, and in the village meadows. The counts, all in July, were : one on 1st, at least two on 5th, one on 6th, four on 7th, one on 9th and 10th, two on 14th and 15th.

Whimbrel *Numenius phaeopus*. Seen at Ruaival, the Cambir, Gleann Mor, Conachair, and the village meadows. Counts in June and July, were: one on 20th and 22nd, at least five on 27th, one on 4th, four on 5th and 6th, three from 8th to 11th, one on 15th, two from 16th to 19th, one on 20th. Paired birds were noticed on the Cambir, in Gleann Mor, and at Village Bay.

Redshank *Tringa totanus*. One heard at Village Bay strand on 18th July, and seen there on 21st and 22nd.

Knot *Calidris canutus*. One adult in summer plumage was seen on the rocks below the manse on 8th July (J. M. S. A., P. E. N., D. I. M. W.).

Dunlin *Calidris alpina*. Seen at Mullach Mor, Amhuinn Mor, and the village strand. The counts, all in July were: two on 10th, one on 11th, six on 21st, and three on 22nd.

Sanderling *Crocethia alba*. One with dunlin at the village beach on 21st and 22nd July.

Arctic Skua *Stercorarius parasiticus*. One dark-phase bird was seen chasing herring-gulls in Gleann Mor on 26th June, and another flying over the Gap on 18th July.

Great Skua *Catharacta skua*. Seen over Am Blaid, Mullach Sgar, Gleann Mor, Caolas an Duin, Conachair, and the village. One seen on 5th, 7th, 10th, 14th, 18th, and 19th July, and a pair at upper Gleann Mor on 10th (D. G. A.).

Greater Black-backed Gull *Larus marinus*. Probably about fifty pairs breed on the St. Kilda islands. About ten pairs were seen on Levenish (J. T. D. W.), and probably not more than ten pairs breeding on Dun. Between ten and twenty pairs were nesting in lower Gleann Mor and on the shore of Glen Bay. A few were seen over the Carn Mor (where persistent swooping on an observer (J. MG.) occurred), on the talus slopes below Tigh Dugan on Soay, and over the puffin colony on the S.W. slopes of Boreray. The largest number seen together was 47 on the village strand on 11th July; this probably included most of the adults from the S.E. aspect of the islands. About twelve, probably from Dun, roosted regularly with other gulls on the eastern slopes of Ruaival, and about six were regularly present during the day on the village shore. Eleven were ringed.

Lesser Black-backed Gull *Larus fuscus*. Estimates of from 45 to 95 birds, and from 30 to 40 nesting pairs, were made in Gleann Mor, where nests and eggs were found. Only occasional birds were seen at Village Bay, and at Boreray. Seven were ringed.

Herring-Gull *Larus argentatus*. From 50 to 100 in June, and 135 in July, were estimated in Gleann Mor, but no definite evidence of breeding was found there. Between ten and twenty frequented Village Bay where two nests were found on the storm beach on 11th June, and more were on Dun. About thirty roosted occasionally with other gulls on the eastern slopes of Ruaival. Breeding on Dun, at Village Bay, the Cambir, Carn Mor, Oiseval, and on Soay. Present on Boreray and at the great stacks. Twelve were ringed.

Common Gull *Larus canus*. One on 4th July, and two on 5th at Village Bay.

Black-headed Gull *Larus ridibundus*. Two were at Village Bay on 11th and 29th June.

Kittiwake *Rissa tridactyla*. Breeding in many of the N.E. " geos " of Hirta and Boreray, usually in tens but occasionally over 100. Large colonies were at Gob na h-Airde, Geo Sgeirchaise and Geo Chalum M'Mhurich. Fewer were seen on the S.W. coast, though there was a colony at Geo Lashulaich and at Geo na Stacan. There were colonies on the N.W. side of Soay Stac, and on the eastern lower ridge of Stac Lee under

the overhang. Seen occasionally in small noisy flocks in Village Bay off the beach and jetty.

Razorbill *Alca torda*. There was a breeding colony of probably over 100 pairs among the large boulders on the eastern end of Dun. Occasional small groups were present on the N.E. and W. coasts of Hirta, usually near guillemot colonies. Tens were seen with the shags on the platform at Rudha an Uisge, and in Village Bay. Three were ringed.

Guillemot *Uria aalge*. Breeding, usually in tens, between Rudh Ghill and Gob na h-Airde, and on the north of the Cambir. Colonies of over 100 pairs were seen at Stac a' Langa, Mina Stac, base of Conachair, Bradastac, and at Gob na h-Airde. A colony estimated at over 1,000 was on Stac Biorach. There were small numbers along the east coast of Boreray, and a colony of auks, probably of this species, was seen from Boreray, on the north face of Sgarbhstac. Nine guillemots were ringed.

Black Guillemot *Cepphus grylle*. From one to seven seen at Caolas an Duin, and probably a nest on the Dun side. Pairs were seen in Village Bay off the manse, at the Point of Coll, Geo Bhradastac, Gob na h-Airde, and Glen Bay. A few were seen at Geo na Ruideig on Dun, Geo na Eaige, Village Bay, and Levenish.

Puffin *Fratercula arctica*. Major colonies of probably over 100,000 pairs were seen on the N.E. slopes of Dun, the eastern slopes of Soay from Pursan a' Chaim to the Altar, on the S.W. slopes of Boreray, on Sunadal of Boreray, and others of probably a much smaller order (though very large by any normal standards) on Carn Mor, Ard Uachdarachd, and Gleann Mor between Amhuinn Alltan and the Cambir isthmus. Still smaller colonies, of probably less than 1,000 pairs, are present elsewhere. The S.W. colony of Boreray extended all the way from Clagan na Ruskochan to Gob Scapanish on the lower grass slopes, becoming sparse above the 600 to 700 feet contour, and puffins were nesting in the " cleits " at Cleitean McPhaidein. A few were breeding at Geo Mor S.E. of the manse. On 7th and 10th July, between 8.30 p.m. and 9.30 p.m., puffins were seen returning to Dun ; about 350 per minute were estimated landing on the island. Two fish dropped by puffins at the Gleann Mor colony were later identified (T. B. B.)

as Norway pout (*Gadus esmarkii*). No mention of this fish is made by Lockley (1953) in his monograph on the puffin. Sixteen were ringed.

Carrier-Pigeon. At least one present continually from 11th-13th June and from 29th June to 19th July. Seen in the Village Bay area usually around the manse; three and four together on 5th and 6th July.

Turtle-Dove *Streptopelia turtur*. One in the village meadows on 25th and 26th June (J. M. B., J. L.).

Swift *Apus apus*. Numbers were seen between 3rd and 13th July over the village, Ruaival, Gleann Mor, Conachair, and Mullach Mor. The counts were: two on 3rd, two on 4th, two on 5th, four on 6th, two on 7th, one on 10th, five on 11th, and 20 on 13th.

Swallow *Hirundo rustica*. Three seen over the village, 11th-13th June. Numbers were seen between 23rd June and 18th July mostly over the village, but also over Mullach Sgar, Ruaival, Mullach Mor, and Cleitean McPhaidein on Boreray. The counts were: one on 23rd June, one on 24th, three on 29th, three on 1st July, two on 4th, two on 5th, three on 6th, one on 7th, two on 8th, one on 10th, one on 13th, and one on 18th. On three consecutive occasions a probable bird of the year was seen.

House-Martin *Delichon urbica*. Seen over the village, Oiseval, and Ruaival, between 29th June and 13th July. The counts were : one on 29th, two on 1st July, one on 6th, one on 9th, and one on 13th.

Raven *Corvus corax*. Seen along the ridge of Dun, on Ruaival, Am Blaid, Conachair, Oiseval, and also over the village where three dead ravens were found. At least six were seen in a full count on Hirta on 10th July (D. I. M. W.), and groups of five and four over Conachair on different occasions. Pairs and single birds were seen elsewhere. There were probably two fledged families present, counting the dead birds.

Hooded Crow *Corvus corone cornix*. Eleven, probably all the crows on Hirta, were seen making an evening flight on 21st June to the S.E. point of Dun. Nine were seen together on the Cambir, six on Oiseval, and four over Conachair on different dates. Probably two fledged families present.

Wren *Troglodytes troglodytes*. At least twenty singing birds were estimated to be on Hirta. Dawn counts (J. M. B.), and a daytime estimate (E. M. N., J. F.), gave five and seven singing birds respectively in the village area. Others were: one, upper Amhuinn Mor; one Ruaival; four, Carn Mor; one, Gob na h-Airde; one, S.E. Conachair; two, Stac a' Langa—Mol Ghiasgar area; one, Point of Coll. Wrens were heard singing at the Castle, Dun; above Mol Shoay; above Coinneag, Boreray. Adult seen (A. T.) feeding young on green caterpillars as Atkinson (1949) saw.

Six birds were ringed.

Wheatear *Oenanthe oenanthe*. Fourteen pairs estimated between 3rd and 11th July: five, village—Conachair slopes; one, upper Amhuinn Mor; two, Mullach Sgar; two, Mullach Mor; one, Gleann Mor; two, Mullach Bi—Mullach Sgar; one, Mullach Bi—Cambir. Numbers in June seemed considerably lower than in July (E. M. N.).

Redwing *Turdus musicus*. Single bird heard on Carn Mor, Ard Uachdarachd, and the Cambir between 16th and 20th July. Seen once only, on 19th, on the slopes behind the village (T. B. B.).

Blackbird *Turdus merula*. One male in Gleann Mor on 14th July, and a female in the village on 18th.

Meadow-Pipit *Anthus pratensis*. A pair was in the village on at least five days between 20th and 27th June and on 1st July. A few birds were seen on Ruaival, Am Blaid, Oiseval, Mullach Bi, Gleann Mor, and the Cambir. One newly fledged young caught on Mullach Sgar on 20th July. Possibly about ten altogether on Hirta.

Rock-Pipit *Anthus spinoletta*. Widespread on Hirta up to about 800 feet, though one was seen on top of Conachair (E. M. N.). Present also on Dun, Soay, and Boreray.

Pied Wagtail *Motacilla alba*. One near the manse 11th June (E. M. N.).

Yellow Wagtail *Motacilla flava*. A single adult male was seen on the saddle south of the Cambir on 7th July. The bird was first heard calling and then recognised as a *flava* wagtail. In flight it was seen to have bright yellow underparts, with dark head and back. Being very restless it was not well seen on the ground, and the observer (D. R. W.) had only one

view of the bird standing facing him. The dark head, darker coverts, and the lack of the superciliary eye stripe were noticeable. The back appeared to be darker than in *flavissima*. There is no doubt that the bird was of the grey-headed subspecies *thunbergi*.

Starling *Sturnus vulgaris*. From 350 to 400 starlings were estimated to be on Hirta on 10th July, birds of the year heavily outnumbering adults. About 100 were regularly seen within the village watershed, with a smaller flock on Ruaival. Birds from the village flew over the Gap to feed on the puffin slopes in Mol Ghiasgar. About 250 were present in Gleann Mor, mainly in the area of the sheilings and Gob na h-Airde, and forty were seen on Carn Mor. Numbers were on Dun, and large numbers on Boreray. Eight were ringed.

Twite *Carduelis flavirostris*. Probably not more than ten or eleven pairs on Hirta: three or four, village; two, Conachair; one, Point of Coll; one, Gleann Mor; one (three adults), Cambir; one, upper Amhuinn Mor; one, An Lag Bho'n Tuath. Young were seen in the village.

Crossbill *Loxia curvirostra*. About twenty (only six distinguished as to sex: two males, two females, two immatures) were seen on Oiseval on 16th July (A. D. T.). Seven (three males, two females, two immatures) were in the village on 17th, and five (two males, two females, one immature) on 19th. The last flock was thought to be different from the second (W. U. F.).

Discussion

The most important contribution of the 1956 observations to the ornithology of St. Kilda is the description of three colonies of Leach's petrels, one colony of storm-petrels, and four colonies of Manx shearwaters, all on Hirta ; another colony of Leach's petrels on Boreray, and a possible colony of storm-petrels on Soay. All these colonies (except the Leach's petrel colony on Boreray, which was possibly the one seen by Kearton and Kearton (1902)) were hitherto undescribed. Including the observations of Boyd, Munns, and Whitehouse (1956), probably most of the major colonies of small petrels and shearwaters on Hirta and Dun have now been

reported. Other colonies of all three species no doubt exist on the S.E. slopes of Soay, and on Boreray, though the absence of talus on Boreray might severely restrict colonisation by shearwaters ; all the shearwaters colonies already described at St. Kilda are associated with talus.

There is no evidence of the re-establishment of peregrine and kestrel as breeding species. The first peregrine was seen after three weeks of almost continuous observation, and the first kestrel after a month. Both the golden plover reported in previous years (Ferguson-Lees and Fisher, unpublished; Bagenal, 1953; Boyd, Munns, and Whitehouse, 1956), and the corncrake (*Crex crex*) regularly recorded by expeditions in the period 1938-55, were absent. An incident worthy of note is the occurrence of a pair of great skuas over Gleann Mor.

The most noteworthy change in the status of land birds is the apparent increase of the wheatear ; in 1939 it was decreasing (Nicholson and Fisher, 1940), and in July 1952 no evidence of breeding was found (Bagenal, 1953). In May 1955 a heavy passage of birds obscured the breeding status of the wheatear, but in July 1956 14 pairs were estimated to be on Hirta. The breeding populations of snipe, wrens, and twites, particularly in the village area, appeared similar to those in 1955.

The amount of migration increased perceptibly during the period of observation. The number of migrant species recorded in the consecutive weeks 20th-26th, 27th June-3rd July, 4th-10th, 11th-17th were one, seven, ten, and thirteen (not including skuas). The turtle-dove has been reported from St. Kilda several times and, according to Dr. J. W. Campbell, who has kindly given the authors information about the migratory species, it also occurs irregularly on passage in the Outer Hebrides. The record of the grey-headed wagtail is the first for the Outer Hebrides. The crossbill, which has been recorded from St. Kilda as a single bird on three previous occasions, is an irregular late summer immigrant to the Outer Hebrides, where it has occurred frequently during the present century. The fact that the crossbills arrived at the same time as the redwings is worthy of note.

In his notes Mr. Nicholson remarks that the absence of winged predators and the low numbers of corvids and large

gulls are extraordinary and inexplicable, in view of the exceptional abundance of easy prey and carrion, particularly dead sheep. The stability in numbers and species of the land-bird population since the time of the evacuation in 1930 is also noteworthy.

Acknowledgements

Permission for the visits of all parties was kindly given by the late Marquis of Bute. A very substantial grant from the University Court of the University of Glasgow, and a small, but much appreciated grant from the British Trust for Ornithology financed Party 2, and made possible the hire of a small boat with out-board motors. The authors are indebted to Mr. E. M. Nicholson who made available the notes about his visit with Mr. James Fisher. All members of Party 3 are much indebted to Mr. W. J. Wallace, who though finally unable to go to St. Kilda, helped to organise the party. All members of Party 4 are similarly indebted to Miss E. A. Garden who organised that party, but who was unfortunately prevented from visiting the islands.

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A CENSUS OF FULMARS ON HIRTA, ST. KILDA, IN JULY 1956*

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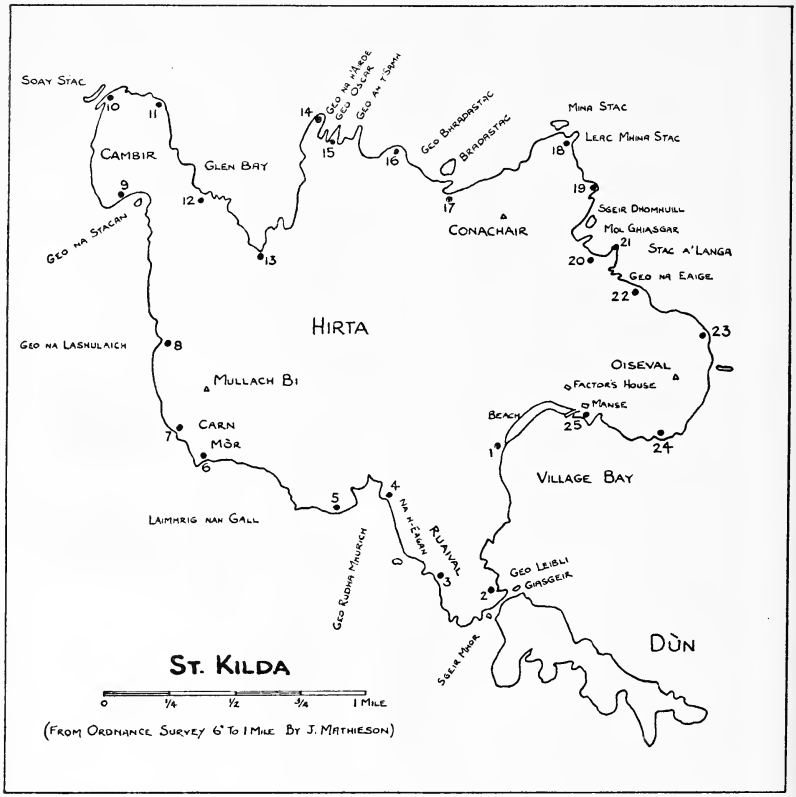
During the past 25 years, several attempts (Fisher, 1952, *The Fulmar*) have been made to estimate the number of fulmars (*Fulmarus glacialis*) on St. Kilda, the original breeding station of the species in Britain. I reached the main island of Hirta with ten companions on 12th July 1956, and stayed there till 23rd July. During this time, I counted the fulmar chicks and sitting adults on Hirta, and estimated their numbers on Dun (Table 1). For convenience I sub-divided the coastline into a number of sections marked by reference points (see map).

Each occupied nest-site, containing one or two adults or a chick, is taken to represent a breeding pair of fulmars. The counts were made from the cliff-top or cliff-side. Observation is fairly easy on most of the coast, as the cliffs are so indented, but in some places (e.g. at the north side of the Cambir and the east side of Oiseval) accurate counting is difficult, if not impossible, unless done from a boat.

To avoid omitting these areas, I made rough estimates of the numbers there by first counting the fulmars in flight ; and then comparing this with the proportion in flight over those other sections of cliff where the total number of both flying and sitting birds could easily be counted. The average number of flying birds at eighteen suitable cliff sections represented approximately 13 per cent. of the number of nest-sites on the same cliffs. A section of cliff was considered suitable for this purpose only if I was able to see all the flying birds and most of those sitting on the cliff. As the numbers flying between Stac a'Langa and Geo na Eaige (600) were larger than usual owing to disturbance, I have not included this figure. The counts on some cliff-sections, such as on Bradastac, Conachair cliff and Minastac, have been combined because flying fulmars

* *Received 13th February* 1957

on one section so often overlapped with those of the next section. Those from Laimhrig nan Gall, Carn Mor, Bay of Mol Ghiasgar and the west side of Stac a'Langa were also combined. The number of fulmars in flight may possibly also vary according to time of day, wind-speed and direction, and amount of disturbance. The first source of variation did not arise as all my



counts were done in the afternoon ; furthermore a careful approach prevented disturbance.

Every possible breeding-site was counted, but at least 20 per cent. may have been hidden from view in dead ground. The figures in Table 1 may be taken as almost minima but, as I was unable to differentiate non-breeders from failed breeders, these minimal estimates of the number of breeding-sites are no doubt slightly larger than would have been the case had there

been no non-breeders present. Non-breeders and failed breeders were abundant on and around St. Kilda : out of 2,620 flying fulmars examined for moult condition, 39 per cent.

Table 1. Number of Fulmars counted on Hirta and Dun, July 1956

Date	*Place*	*Reference Points*	*Number Flying*	*Number of Occupied Sites*
13th July	Village Bay beach—Geo Leibli	1-2	2	15
	Geo Leibli—West side of Ruaival	2-3	13	63
	Na H-Eagan	3-4	7	170
	Geo Rudha Mhurich	4-5	25	310
	Laimhrig nan Gall—Carn Mor	5-6	86	540
14th July	Carn Mor, continued.	6-7	41	75
	Western slopes of Mullach Bi	7-8	170	580
	Geo na Lashulaich—Geo na Stacan	8-9	170	570
17th July	Cambir, west side	9-10	162	775
	Cambir, north side	10-11	20*	160*
	Glen Bay, west side	11-12	220	1,100
	Glen Bay, west side	12-13	35	450
	Glen Bay, east side	13-14	4	95
19th July	Geo na h'Airde and Geo Oscar	14-15	19	82
	Geo an t'Samh	15-16	120	670
	Geo Bhradastac	16-17	260	3,030
	Bradastac			265
	Conachair Cliff	17-18	420	5,700
	Mina Stac			110
	Leac Mhina Stac	18-19	7	50
	Bay of Mol Ghiasgar and Sgeir Dhomhuill	19-20	250	860
	West side of Stac a'Langa	20-21		330
18th July	Stac a'Langa—Geo na Eaige	21-22	600	1,150
	Oiseval, north coast	22-23	145	665
	Oiseval, east coast	23-24	210	1,600*
	Oiseval, south coast	24-25	0	0
	Total for Hirta		2,986	19,415
13th July	Dun, Sgeir Mhor—Giasgeir		5	210
	Dun Total (Including Sgeir Mhor —Giasgeir)		117	1,680

* Estimated

showed evidence of moulting in the primaries, and an apparently small proportion of the remainder had completed the moult, with fine dark blue plumage on the back and upper sides of the wings.

The total arrived at for the number of occupied sites on Hirta (excluding Soay Stac and Dun) is 19,415, and if the

usual allowance (Fisher, 1952) of ± 20 per cent. is made for the errors in observation outlined above, my final estimate is 19,400 ± 3,900. This coincides closely with James Fisher's (1952, pp. 118, 120 and 121) estimate, from a boat in May 1949, that 19,943 pairs were present, with a minimum of 15,955 and a maximum of 23,931.

In such a comparison of numbers counted at different times, one must also consider the population changes which normally occur in a large colony at different times of the year (Fisher, 1952). Fisher made his St. Kilda counts in mid-May, when fulmar numbers at the breeding colonies are usually low ; whereas mine were in mid-July, when numbers tend to be slightly greater. The difference in counting technique and personal error should also be taken into account : e.g. Fisher estimated 4,000 + on Cambir from a boat in 1949, while my 1956 estimate there from the cliff-tops was only 2,035, which is probably too low as much of the cliff was not visible from above. But this is an extreme case, and on most parts of the cliff, counts done from the cliff-top or from the sea would probably be fairly similar.

So it seems that the breeding population in 1956 was about the same as seven years before. The population has not increased since 1949, or else numbers may have reached a peak and have since declined. In any case, a spectacular increase such as took place over the previous ten years between 1939 and 1949 is not evident.

In an attempt to estimate the numbers on Dun from Ruaival, I counted 1,680 pairs on Dun ; however, judging from the amount of dead ground, I consider the real total on Dun to be probably twice as great. This would agree with Fisher's 1949 estimate of 3,600 pairs there.

During our visit we found no fulmars breeding or sitting inland on Hirta, though many suitable nest-sites were available.

ZOOLOGICAL NOTES

Dragonflies recorded from the Isle of May.—In reference to my previous note on this subject (*Scot. Nat.*, 68 : 173), I am informed by Miss Cynthia Longfield that as soon as she heard of the supposed occurrence of *Aeshna caerulea* on the May she asked that the specimen be re-examined. She suspected from previous experience that it might turn out to be *A. juncea*, the common aeshna, which has been mistaken for *A. caerulea* before. In this she was quite right, for the specimen caught on 11th September 1953 proved indeed to be *A. juncea*.

Concerning this species Miss Longfield writes in her letter that it is " widespread all over Scotland, more especially in the Highlands as it particularly likes that type of country, but it has been seen and taken now and then in the Port of Leith, often flies into towns, but is not known to be a migrant. It would think little of flying out as far from the coast as the Isle of May, although there is no great attraction there for dragonflies. *A. juncea* has turned up on Fair Isle as well as Canna, so it moves quite a bit in certain seasons. It is a powerful flier."

Miss Longfield considers it probable that the dragonfly seen by Miss Baxter and Miss Rintoul on 30th September 1908 was another *juncea*.—W. J. Eggeling, Edinburgh.

Sooty Shearwater in the Shetlands.—On 9th September 1948, when travelling from Fair Isle to Shetland on the *Good Shepherd*, I saw a single sooty shearwater (*Procellaria grisea*). Its large size, dark underparts and typical shearwater flight left me in no doubt of its identity—I had seen the bird once before in Scottish waters.—R. S. R. Fitter, Oxford.

It seems worth repeating here an editorial comment from the Fair Isle Bird Observatory Bulletin (Vol. 2, page 233) :—

Although the sooty shearwater " appears to be considered rare in Shetland waters ". . . " it is in fact a regular if somewhat scarce bird on the journey between Fair Isle and Sumburgh Head in the late summer, and is not infrequently reported by visitors to the Bird Observatory. It is well known to James A. Stout, who sees single birds, and occasionally two or three, on most crossings in September."—Editors.

A Red-Breasted Goose in North-East Scotland.—I saw a red-breasted goose (*Branta ruficollis*) on 20th January 1957, feeding amongst about 100 grey-lag geese (*Anser anser*) in a field of winter wheat on the shores of the Beauly Firth, Inverness-shire. One cannot mistake the plumage of this bird, so there is no need to give a detailed description here. The bird was seen on this one occasion only.—D. Fraser, Beauly.

There are extremely few substantiated records of the red-breasted goose from the British Isles ; *The Handbook* refers to it as a " very rare vagrant " to England, and there appear to be no records of the species ever having occurred in Scotland. With very rare geese and ducks, there is always a suspicion that they may be " escapes " from aviaries, but the Wildfowl Trust at Slimbridge and Dr. John Berry of the Nature Conservancy in Edinburgh, have both informed us that they have heard of no " escapes " which could account for the appearance of this bird.

It seems very likely that this bird was present in or near the Beauly Firth at times during a period of several months from autumn 1956 till January 1957. Dr. Berry informs us that he heard a rumour of a red-breasted goose being seen there at the end of September. He writes : " There is little doubt in my mind that the bird was a genuine immigrant that had arrived about then." Just after this, in early October, a red-breasted goose was seen by Mr. E. Luxmoore, Whorlton Hall, Barnard Castle, Durham, who reported his observation in *The Field*, 1956, page 1124. Mr. Luxmoore saw his bird on the foreshore of a firth in north-east Scotland, along with a flock of wigeon (*Anas penelope*). It was observed as close as 80 yards through binoculars, both on the ground and in flight. He decided that it did not seem to be an " escape ", as it rose each time the wigeon took flight, and eventually flew away with them. There seems little doubt that this was the same bird as Mr. Fraser has reported seeing in January 1957. These are evidently the first substantiated records of a red-breasted goose in Scotland.—Editors.

Greenland Falcon in West Stirlingshire.—On 3rd April 1955, while sheltering from a heavy shower close by Buchanan Old House, near the mouth of the River Endrick, I saw flying down an opening between the trees a large white hawk. The bird was completely white over its whole body, apart from black-tipped wings and faint specklings of black or brown on the upper-parts. It was about the size of a large kestrel (*Falco tinnunculus*). The head was not rounded like the head of an owl. The wings were narrow

and sharply pointed, not rounded and broad like the wings of a buzzard or owl. The wing-beat was, I thought, slower than that of a peregrine (*Falco peregrinus*), and the bird also glided over the ground. I identified it as a Greenland falcon (*Falco rusticolus candicans*).—Matt Forrester, Glasgow.

According to the *Birds of Scotland* (1953), there is only one record for Stirling.—Editors.

Ecological Notes on Golden Plovers in the Cairngorms.—In the western Cairngorms, my wife and I have found nests of golden plover (*Charadrius apricarius*) as high as 3,200 feet in woolly-fringe moss, and in tufts of coarse grass in gravel—characteristic dotterel (*Charadrius morinellus*) nesting-sites—as well as in the mosses and peat-hags of An Moine Mhor where most of them nest. We have also found nests there on islands and hillocks of glacial drift. We have sometimes seen pairs of golden plovers—of both northern and intermediate appearance—scrape-making on the Cairngorm-Ben Mac Dhui flats ; but we have never actually found eggs or chicks there. This suggests that on the high ground they partly, or largely, depend on peat-mosses for food. There is not much peat-moss ground between Cairngorm and Ben Mac Dhui. We have found that this also applies further south in the Grampians—dotterel nesting on both kinds of hill, but golden plovers and dunlin (*Calidris alpina*) only where there are fairly large peat-mosses. Golden plovers' and dunlins' altitudinal range in the Spey Valley is also interesting. I know of only two dunlin breeding places in the glens below the Cairngorms (Inverness-shire side), but in some years they are very plentiful at 2,500-3,000 feet on An Moine Mhor, and on some of the Grampian tops. In Rothiemurchus Forest, golden plovers breed in small numbers in Glen Einich in association with peat-mosses ranging from 1,700 to 2,200 feet.

Golden plovers do not appear to be true forest-bog birds as are greenshanks (*Tringa nebularia*): but between 1933-37, inclusive, a solitary pair bred on the 1,100 feet contour in a forest-bog in Rothiemurchus. In 1935 they actually used the greenshank's scrape of the previous year. Again, golden plovers breed in Glenfeshie to approximately 1,350 feet, but not in the longish heather on the flanks of Carn Ban where there are no extensive peat-mosses. Here and elsewhere, these *Calluna* hill-flanks above the tree-line are among the poorest breeding-bird habitats of which I am aware—just red grouse and meadow-pipit, and the occasional curlew in the lower swamps, and a few wheatears where *Calluna* thins out and the ground becomes drier towards the 2,500 feet

contour. There may be another objection. Golden plovers do not appear to like stretches of longish heather; probably they do not find it easy to move over.

It is also of interest that the Cairngorm golden plovers generally lay their eggs two to three weeks later than those nesting in the valleys below. The late nests thus roughly coincide with those of early dotterel.—Desmond Nethersole-Thompson, Rothiemurchus.

"Northern" Golden Plovers in northern parts of Scotland.—As this issue devotes so much space to the problem of the "northern" golden plover (*Charadrius apricarius altifrons*) in Scotland, we thought it opportune to ask several ornithologists, who have considerable experience of golden plovers in the Highlands, if they had made any observations on this subject. Every one that we approached had a contribution to make, and this material is embodied in the following notes. These clearly show that breeding golden plovers which resemble typical "northern-race" birds are much more common in the Highlands than has been generally realised. Wynne-Edwards' observations in this issue of "northern"-looking birds in the Cairngorms are therefore amply confirmed by many independent observations going back quarter of a century or more.—Editors.

On 15th July 1925, on Monadh Mor, Cairngorms, I found a golden plover's nest with four unusually handsome eggs. A hide of stones and turf was put up, and on 19th July I spent several hours in the hide. My notes say that the plover's breast was almost completely black. The throat and cheeks were also black, and there was a well-marked band of white stretching backwards from the head—altogether a beautiful bird. It was because this bird had such conspicuous and handsome plumage that I had put up the hide, for closer observation, and also for photography which unfortunately was not successful.—Seton Gordon, Isle of Skye.

The following notes refer to variation in the summer plumage of golden plovers breeding on the Banffshire hills and the Cairngorms :—

1st June 1956. Ben Rinnes. A pair at 2,500 feet were of southern type. Another pair at 1,000 feet comprised one southern type and one northern type : the latter had "cheeks and throat brown-black, extending as a black band about half an inch wide to normal black belly, with some white marks at upper end of belly. Rest of throat and breast white."

7th June 1956. Jock's Hill, Dufftown, at 1,300-1,500 feet. One pair: one bird had a black belly marked with a few white flecks; the other was similar except for an irregular black patch (also white-marked) at the throat. On 10th June, this second bird was also seen to have a pale stripe along cheek and eye.

24th March 1957. Jock's Hill, at 1,400 feet. One pair: one bird southern type, the other northern (cheeks dark grey-black, pale eye-stripe and pale margin extending down sides of neck to belly).

20th April 1957. Between Carn Ban Mor and Mullach Clach a' Bhlair, West Cairngorms, at 3,000-3,400 feet. One pair: one bird of southern and one of northern type. A single bird was southern type, and another was northern type. Both the northern-type birds had clear black cheeks and unbroken black from there down to the belly, with a distinct pale margin all the way.

—Raymond Hewson, Dufftown.

For nearly twenty-five years, my wife and I have noticed that some of the golden plovers breeding on the high Cairngorms are similar to the northern race (*Charadrius apricarius altifrons*). These have jet-black faces and bellies, with distinct white bands running from forehead to flank.

Before Vol. 4 of *The Handbook* was prepared, and again when I was helping to correct it in proof, I pointed this out to the Editors; but the late Harry Witherby did not feel that sight-records of this kind were valid without the possession of skins for critical comparison with a series of *altifrons* from abroad. I then assured him that even on the low ground of Inverness-shire, where we had been making a behaviour study of golden plovers, I had never seen a breeding cock southern golden plover (*Charadrius a. apricarius*) remotely resembling that shown in *The Practical Handbook*, Vol. 2, page 532. As a result, when this text illustration was reproduced in *The Handbook*, Vol. 4, page 371, a note was added drawing attention to individual variations and stages of moult. It is, of course, quite possible that a series of clines exist which bridge the two races, but the bold contrasts of some of the Cairngorm golden plover, and the comparative rarity of " southern "-looking birds in this area, can hardly be attributed to individual variation. I must emphasise, however, that all the Cairngorm golden plovers do not resemble the northern race. Most of them are " intermediate " between the two extreme forms shown in *The Handbook* (page 371.) But, in 1941, when we were camping on the high ground of the Western Cairngorms, we located eleven nests. At least four of the cock birds belonging to these nests resembled the northern form.

I mention cock birds, in particular, as I believe that the white borders are more significant criteria than the ebony-black throats and breasts. These borders are, I think, more distinct in males than in females. But, by any comparison in the field, these four cock birds were similar to *altifrons*. We have also twice met with males similar to the northern form breeding between 1,100-1,300 feet contours on the Dorback Moor, Inverness-shire; and I see no reason why genuine northern-race birds should not occasionally breed here and in other parts of the Scottish Highlands.

DESMOND NETHERSOLE-THOMPSON, Rothiemurchus.

On a visit to An Moine Mhor, in the Cairngorms, during the summer of 1946, I paid no great attention to the golden plovers (*Charadrius apricarius*) there, although an impression was obtained that a number were somewhat darker in plumage than those I was accustomed to see breeding below about 2,000 feet. On 17th and 18th July 1949, when I was again on An Moine Mhor, the darkness of some plovers was so pronounced that I made a note about two of them (not a pair). Both were distinguished by their almost black faces and cheeks, and by very black bands running from chin to upper breast but not quite meeting the black breast-belly patch. In both an indistinct whitish border margined the black, including that on the face and cheeks.

Another of these dark plovers was seen by my wife and myself on 23rd May 1952, at about 2,800 feet on Tolmount, near Lochnagar, but this bird was so markedly black on face, throat, etc., that at the time I noted it as being of the northern (*altifrons*) form.

Near the south end of Loch of Cliff, Unst, Shetland, my wife and I watched, on 10th July 1953, another golden plover with extremely well-marked features of the northern form. This plover had very pronounced and unmistakably black face, cheeks and throat, the black of the throat being continuous with that of breast and belly, while the whole of the black area was bordered by a distinct white margin. It was keeping company with a normal southern-form bird, and though we suspected the presence of non-flying young in the vicinity, a twenty minutes' search proved unsuccessful.

The presence of this bird in the extreme north of Shetland is of interest, the more so as it is the only bird with distinct and clear-cut northern features that I have seen there. I camped on Hermaness from 10th to 12th July 1953, and again from 8th to 12th July 1955 ; and on Fetlar from 15th to 26th June 1956, but on none of these occasions did I see another plover with such well-marked features.

On 26th May 1957, I noticed another dark plover at about 2,200 feet on Meall an t-Slugain, in the eastern Cairngorms. This bird

was mated to a normal southern-form bird ; and it was less black on the face than the two noted on An Moine Mhor in 1949. Its chin was whitish, and no light border was noticeable round the dark face and cheeks ; but the black continued uninterrupted from throat to belly-patch, although very narrow at the junction.—A. Tewnion, Aberdeen.

During almost every year from 1944 to 1957, I have noticed golden plovers resembling the " northern-race " on the Aberdeenshire side of the Cairngorms, as well as on Glas Maol, Lochnagar, Morven, and other hills in Deeside. I have seen these variants in every month from April to July ; most in May, but some as early as the second week in April. Though some, especially in April, may have been genuine northern birds on migration, certainly most of them were local breeding birds.

The first time I noticed striking " northern " golden plovers was with my father in early July 1944, at 2,500 feet on Ben A'an, Cairngorms. Since then, with innumerable visits every year, I gradually came to expect those golden plovers breeding on the Aberdeenshire high tops to be on the whole more striking than any " southern " golden plovers depicted on plates in the standard bird handbooks. Admittedly these are only general impressions, but I do have notes of the most striking individuals seen in the earlier years and the more systematic notes that I have kept on the subject in the last few years amply confirm these impressions. I also know well what genuine northern birds look like, from four summer visits to Arctic Scandinavia. The individual notes are too extensive to set down in full, but may readily be condensed.

From these observations, many breeding birds in the Aberdeenshire hills appeared in the field to have the breast and belly almost if not completely black, and a strongly-marked white band between the dark underparts and the upperparts. The black often extended into the centre of the throat, but the cheeks were usually only partly marked with black, looking dark grey at a distance. Some had jet-black cheeks and throat, and a conspicuous white band stretching right to the forehead, but such types were not usual. In most of the variants, the white band along the sides was clear and unmarked, but usually it seemed not so broad as in typical northern birds, and usually the edges of the band were less clear-cut. Occasionally one had the band as broad and clear-cut as in real Lapland males, but again this was not usual.

To summarise, most of these variants had a breeding plumage resembling that of typical northern birds, except that the white band

was usually not so broad and clear-cut, and the cheeks not so completely black. Most were therefore intermediate between the two extreme types, comparatively few showing a close resemblance to the extreme northern type.

These observations were made on the mountains between about 2,000 and 3,800 feet. On the lower moors in Deeside, I have not studied the birds so closely, but the few scattered notes that I have kept about unusually striking " northern "-looking birds suggest that these types do occur there. On 1st May 1955, for example, I have a note of a male that looked about the same as a typical Lapland male in summer, at 1,300 feet on a moor near Morven Lodge, Ballater. Again, on 6th April 1957, several singing birds on the Corndavon moor, Crathie, at about 1,500 feet, had completely black breasts and flashing white bands alongside, and at least two had dark grey cheeks edged with white. I have no notes of northern types seen any lower than these moors, but this may be simply due to lack of sufficient observation. Whether these variants occur as commonly on the lower moors as on the high tops is a problem that could be elucidated only by a lot more field-watching.

Some of these northern types may possibly have been genuine northern-race birds from Scandinavia that had stayed on in Scotland, but alternatively there may simply be a cline of variation (within Britain as well as Europe), with darker, well-marked individuals tending to occur more frequently towards the north and possibly towards higher altitudes. However, this is no more than speculation ; to investigate any further the degree of variation over different parts of Britain would probably require examination of skins as well as more intensive field watching. But it would seem worth noting again here the early observation of Abel Chapman (*Bird Life of the Borders*, (1889), p. 18) that the breasts of the Northumbrian golden plovers were at the most only marbled, while Shetland birds approached much more closely to the plumage of golden plovers breeding in the Arctic.—Adam Watson, Aberdeen.

Nesting of the Dotterel in Ross-shire.—The note on the spring occurrence of dotterel (*Charadrius morinellus*) north of the Great Glen (*Scot. Nat.*, 67: 113) prompts me to give a definite nesting record for this region. On a range of Ross-shire hills west of the " well known breeding station in Easter Ross " (*ibid.*), I found two dotterel nests, each with three eggs, on 9th June 1956. Both were discovered by flushing the incubating bird at a few yards' distance. The two haunts were fairly typical, one nest being on the summit slope of the main peak at about 3,000 feet,

and the other three-quarters of a mile away on the level crest of a lower spur at 2,800 feet. The higher site was on a slope of about 10°—terraced irregularly and covered with a very open stone-littered and somewhat eroded *Rhacomitrium* heath. One of the terraces held the nest, a scrape in the moss carpet close to a stone, with a few fragments of *Carex bigelowii*, *Alchemilla alpina*, *Armeria maritima* and *Silene acaulis* at its edge. The lower nest was on almost level ground, stone-littered and carpeted with a thick layer of *Rhacomitrium lanuginosum*, densely studded with patches of *Silene acaulis* and *Armeria maritima*. The eggs lay in a deep scrape in the moss, lined with dried leaves of *Salix herbacea* and *Cladonia uncialis*, and sheltered by a sharply projecting block.

This windswept, stony *Rhacomitrium* heath was widespread on other spurs and summits of the range. Though these were not searched, probably the massif could hold at least one more nesting pair of dotterel. The total area of suitable nesting ground above 2,500 feet on the peak where we saw the two pairs of dotterel was about 450 acres.

Elsewhere in Ross-shire, the same kind of ground occurs extensively on certain of the higher hills, but I saw no other dotterel during visits to some of these suitable nesting haunts during May and June. The bird could well have been missed, but if present on these other ranges, probably occurs more sparingly or more locally than in the Central Highlands.—D. A. Ratcliffe, Edinburgh.

As dotterel in Scotland are still being harried by egg-collectors, the exact locality of Mr. Ratcliffe's observations in Ross-shire has not been stated here. It is necessary to record only that those dotterel earlier seen in spring 1954 (*Scot. Nat.*, 67: 113) were on an entirely different range of hills.—Editors.

Spotted Redshank in Hebrides.—At Loch Gruinard, Islay, on 6th December 1955, with the tide at the turn, Matt Forrester and I were watching the considerable flighting of birds on this long narrow loch, noting some eighteen bar-tailed godwit, lots of turnstone, sanderling, dunlin, oyster-catcher, shelduck, etc., when we flushed a bird which rose with the typical *chewit* cries of the spotted redshank (*Tringa erythropus*), and in the bright sunlight we had excellent views of the bird as it circled round us, keeping in sight for some ten minutes before flying out to sea. It is perhaps worthy of mention that I saw this species in South Uist near Loch a' Mhachair during a large migration of whimbrel in late August 1955.—Tom Weir, Glasgow.

There appears to be no previous record for Islay. The bird seen by Mr. Weir in South Uist in August 1955 was also observed by Miss Winifred Flower. Two spotted redshanks were also satisfactorily identified on Vallay Strand, North Uist, on 2nd October 1955, by Mr. L. G. Duke (*The Scotsman*, 26th October 1955 ; and *personal communication*). Two, reported from North Uist on 11th September 1909 and 25th December 1910, were considered by Mr. F. S. Beveridge to be not fully authenticated (*Scot. Nat.*, 1919 : 21). So the only satisfactory record for the Outer Hebrides, prior to these 1955 birds, was the one seen by Dr. Frank Darling at North Rona on 21st September 1938 (*Island Years* and *Brit. Birds*, 34 : 115).—Editors.

Nightjar in Orkney.—Opening my window on the evening of 18th June 1956, my curiosity was aroused by what I at first took to be a small pile of rubbish at the foot of the lawn. The light was just beginning to fade and so I took my telescope to examine the object better. I was astounded to see a wonderfully camouflaged bird, that could only be a nightjar.

It seemed slightly bigger than a blackbird, and smaller than a kestrel, very nearly the same size as a cock merlin. It was sitting extremely close to the ground, giving the impression of being pressed on to the ground, and this effect was heightened by the rather flattish head. The eyes were large and the tail and wings very long; the wings were slightly curved up at the tips.

It is difficult to give an adequate description of the colouring, so excellent was the camouflage. There appeared to be no definite pattern, but a general impression of rather blotchy markings in greyish-brown, with a noticeable patch, along the wing, of a light rufous-buff shade.

The bird sat very still while I examined it for close on five minutes. When I turned away, in that instant it was gone. To my regret I did not see it on the wing; had I done so, I might possibly have been more certain of its species. I have looked at Audubon's illustrations of the nighthawk and whip-poor-will, as well as the nightjars shown in *The Handbook*, and my definite impression is that my bird resembled the European nightjar (*Caprimulgus europaeus*) more closely than any other.—M. Traill-Clouston, Orphir, Orkney.

The nightjar is a rare migrant to Orkney.—Editors.

BOOK REVIEWS

Glen More : National Forest Park Guide. Edited by JOHN WALTON. H.M. Stationery Office, Edinburgh, 1956. Pp. 86, illustrated. 4s.

IT is good to see a new edition of this guide. The first edition was published in 1949 at a smaller price, but this new edition, more attractively produced and with more text and also more photographs, seems better value in view of the greatly increased costs of printing since then.

Of all the major areas or Forest Parks owned by the Forestry Commission, Glen More is by far the most important to Scottish naturalists. Now that a Nature Reserve has been established in the Cairngorms, it means that the public has a direct interest in almost the whole of the Strath Spey side of these mountains. The area is exceptional for its fine old pine forests no less than for the extensive arctic-alpine ground on the hills ; and of course both habitats hold many rare animals and plants.

It is now thirty-three years since the Commission bought Glen More, and their achievements are well illustrated by this guide. Various authorities write on the history and traditional life of the area, on the skiing, hill-walks and climbs, the geology, vegetation and wild-life, and the forests and plantations. These are very diverse fields, but they have been extremely well correlated, and Professor Walton is to be congratulated for editing such a successful introduction to the area. We consider it not only the most interesting but also the best-written guide to this side of the Cairngorms.

To return to the details of this new edition, Seton Gordon has contributed further sections describing notable changes in the wild-life, including the reindeer experiments. The account on forests by James Fraser is of great value, as it is only in this sphere that the Commission has materially altered the landscape of the Park. Much of the ground has been planted with exotic conifers, and the old Caledonian Forest is on the retreat. From the viewpoint of preserving the fauna of the old pine forest this seems a pity. It is therefore encouraging to learn that the Commission has repeatedly tried various ways to encourage natural regeneration of pine on some areas, but the conclusion is that natural regeneration is extremely slow, as also is the growth of the individual pines. Other foreign species grow faster and also seem to do better at high altitudes. Fortunately the outlook is more promising in lower parts of the strath with a less severe climate, as in lower Rothiemurchus. But the results of these experiments in Glen More woods, where rabbits and red deer are both uncommon, should jolt us into a full realization of the bleak outlook for regeneration on more exposed and higher areas, such as in the south of the Cairngorms and the upper parts of Glen More and Rothiemurchus, where more numerous red deer impose additional damage.

The Commission's main objective must always be to produce marketable timber. But it would seem essential that pine regeneration should be

extended rapidly wherever possible, especially in the southern part of the Cairngorms Nature Reserve. The slowness of regeneration and the lack of success so far seen are only additional reasons for pushing ahead with the programme faster than ever before it is too late. For many years, Seton Gordon has repeatedly urged—he does so again in this guide—the fencing-in of large areas on Mar and other parts of the Cairngorms before the old pines become completely extinct.

One or two small points need correction. On page 64-65, the Lairig Ghru is said to run between Castle Hill and Argiod Meall, whereas of course it really runs between Castle Hill and Carn Eilrig. The marking of a definite footpath from Miadan Creag an Leth Choin to the North Top of Ben MacDhui is likely to mislead the unwary hiker putting all trust in the map.

As this guide will no doubt be widely used by tourists, it would seem desirable to record that recent experience shows the rock-climbing on Creag an Leth Choin (Lurcher's Crag) to be by far the cleanest—and the best for beginners—to be found anywhere near Glen More.

A. W.

Junior Naturalist. Edited by G. G. Watson, assisted by M. T. Clegg. Scarborough, March-April 1957. Vol. 1, No. 1. Pp. 24, illustrated. 1s. 3d.

In these days of prohibitive printing costs, we are glad to welcome the first number of this new journal. To be published every two months, it is " . . . intended for young naturalists, and will provide information of a practical nature on all branches of Natural History ". It will also be open for the publication of original observations. This first number covers a very wide field, with articles on keeping pet animals and newts, animal tracks, pond life, bird notes, a biography of Darwin, and an account of the weather's relation to animal life. There is a strong emphasis on projects that young people will be able to do and see for themselves. The journal will certainly be invaluable wherever children are learning about biology, and to judge from this first number no school ought to be without it.

A. W.

NOTICE TO CONTRIBUTORS

THE SCOTTISH NATURALIST is devoted to the study of Scottish Natural History, and is therefore concerned with all the many aspects, zoological, botanical, geographical, topographical and climatic embraced by this title.

Contributions in the form of articles and short notes, and papers and books for review, should be addressed to the Editor, Adam Watson, Ph.D., c/o Department of Natural History, Marischal College, Aberdeen. Contributors should observe the following points and endeavour to conform with the arrangement and set-up of articles and notes adopted in the current number.

Manuscripts must be clearly written ; whenever possible they should be typed, double-spaced, on one side of the paper, and with adequate margins. Except in headings and titles, English names of animals and plants should appear without initial capitals, *e.g.* crested tit, red admiral, but Planer's lamprey, Scots pine. Scientific names should be given wherever they may be helpful to readers, especially to naturalists abroad. Trinomials should be avoided except where essential to the context. Authorities for scientific names should be given only where there is risk of ambiguity. The Editors will always assist in cases of difficulty over nomenclature.

Dates should be given in the following form : 4th July 1906, with the day of the month first. Titles of books and periodicals referred to by authors are printed in italics and should therefore be underlined. Listed references should be in the form of the examples in the current number. Maps, diagrams and graphs for reproduction should be drawn clearly in Indian ink on white, unlined paper, tracing linen or Bristol board. Lettering should be in pencil unless done by a skilled draughtsman. Photographs to illustrate articles and notes are accepted ; also pictures relating to subjects of special interest covered by the magazine. Photographic prints must be made on a glossy paper.

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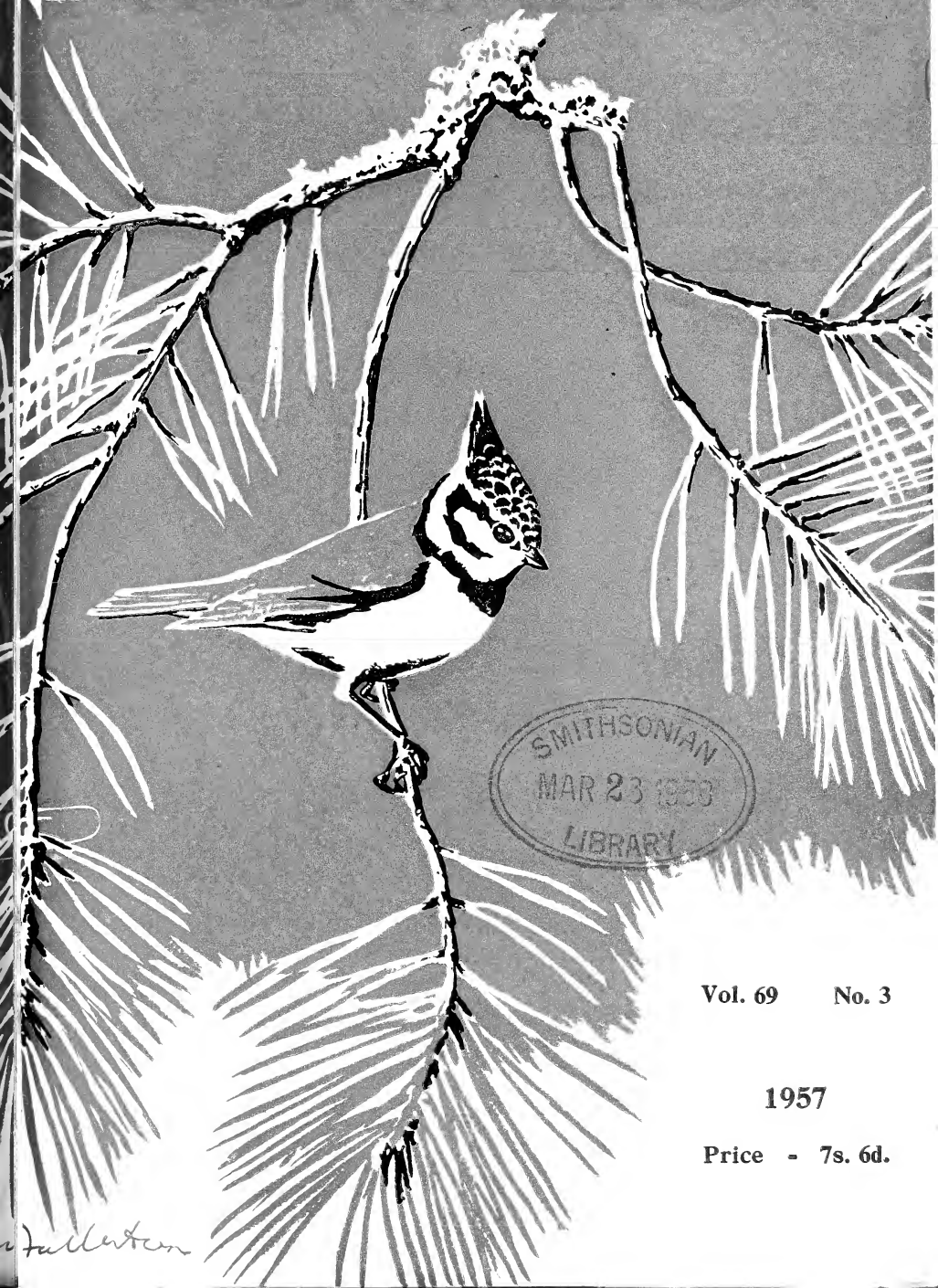

Vol. 69 No. 3

1957

Price - 7s. 6d.

The Scottish Naturalist

With which is incorporated

The Annals of Scottish Natural History

EDITED BY

ADAM WATSON,

WITH THE ASSISTANCE OF

V. C. WYNNE-EDWARDS, JAMES W. CAMPBELL, and WINIFRED U. FLOWER

All business communications should be addressed to Oliver & Boyd Ltd., Tweeddale Court, Edinburgh, 1.

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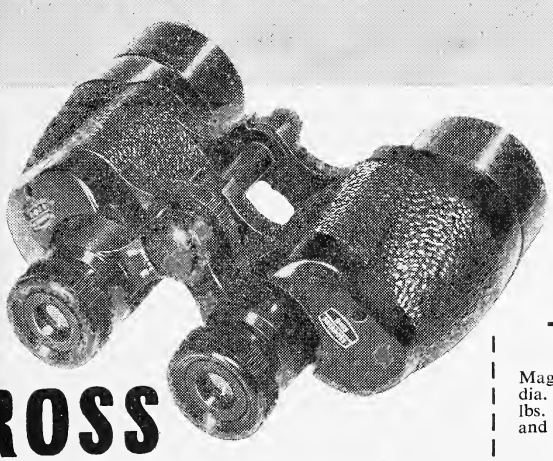

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Volume 69, No. 3 1957

ISLE OF MAY BIRD OBSERVATORY AND FIELD STATION REPORT FOR 1956 *

Prepared for the Observatory Committee
by
W. J. Eggeling
Hon. Secretary

The observer cover in 1956 was better than for several years ; there were 184 " watched days " compared with 162 in 1955, this figure including 4 days in January, 1 in February, 11 in November and a satisfactory spread of observers in summer. Special arrangements can always be made for anyone willing to spend a week or two on the island in winter (especially January-February), when the Observatory is normally closed, for little is known about the birds present on the island at that season.

In June the Isle of May became a National Nature Reserve by virtue of a Nature Reserve Agreement between the owners (the Commissioners of Northern Lighthouses) and the Nature Conservancy. The position of the Bird Observatory and Field Station is fully safeguarded and there has been no alteration in the procedure for making application to stay at the Low Light. The Observatory continues to be administered by a Committee on which all four Scottish Universities, the Midlothian Ornithological Club, the Commissioners for Northern Lighthouses and the Nature Conservancy are represented, but in addition to being responsible for the running of

* *Received 19th February 1957*

the Observatory the Committee now act also as agents for the Conservancy in the management of the Reserve.

Further improvements were made during the year to the Observatory's headquarters. The small room adjoining the main bedroom was gutted and redecorated ; it is now suitable as a bedroom for short, single persons, or as a nursery for very small families. The paraffin lobby and bathroom at the back of the house were pulled down and have been replaced by a brick building of unusual design. This is, as yet, far from complete, for it is still only a shell with a window yet to be fitted and basins to be installed.

The Crow Trap proved itself a useful adjunct in its first full year of operation, especially perhaps in catching rock-pipits (*Anthus spinoletta*). The Gully Trap, too, showed its worth. Its speciality has always been quality rather than quantity and it excelled itself in 1956 by catching not only bluethroats (*Cyanosylvia svecica*) and wrynecks (*Jynx torquilla*) but also a little bunting (*Emberiza pusilla*).

The year was notable for the addition of a Bewick's swan (*Cygnus columbianus bewickii*) to the list of birds recorded from the island. A pair of swallows (*Hirundo rustica*) nested for the first time. Perhaps the first young grey seal (*Halichoerus grypus*) to be born on the May was seen there by the Principal Lighthouse Keeper in December.

Migration

Spring. The spring of 1956 was a very poor one for migration and on only one day was there anything approaching a spring rush or a sustained flow of birds through the traps. This was on 5th May when, among other species, over 100 wheatears (*Oenanthe oenanthe*), about 50 willow-warblers (*Phylloscopus trochilus*), 10 whinchats (*Saxicola rubetra*), 6 redstarts (*Phoenicurus phoenicurus*) and 2 cuckoos (*Cuculus canorus*) were recorded, and also 30 dunlin (*Calidris alpina*)—the most dunlin ever seen on the island at a time. The ringing total for the day (47 birds) was, however, very poor compared with peak days in previous seasons.

Between 28th March and 1st April there was a mixed passage of corvids, in small numbers. " A few were seen to

arrive above the South Ness, a few to leave from the North, but most circled around, alighting at intervals, for some hours. One rook stayed 3 days." On 1st April at least 10 rooks (*Corvus frugilegus*), 9 jackdaws (*C. monedula*) and 5 carrion-crows (*C. corone corone*) were seen, and numbers were probably at least double this. Single hooded crows (*C. corone cornix*) were observed on two occasions.

From 6th to 8th May there was a small but well-defined movement of hirundines, involving up to 30 swallows, 13 house-martins (*Delichon urbica*) and 7 sand-martins (*Riparia riparia*) in a day. Then, on 10th-11th May, terns began to stream past in large numbers, mostly common terns (*Sterna hirundo*) and Arctic (*S. macrura*), but also a few Sandwich (*S. sandvicensis*). On the 11th, parties of between 10 and 100 terns were passing steadily, battling into the westerly or north-westerly gale. At lunch-time " terns could be seen strung out in an even line eastwards—terns, terns as far as the eye could see—and on and on they came in a never-ending stream ". Several thousands must have passed.

Autumn. If spring was poor for migration, the excitements of autumn more than made up for it, for they included one of the most unusual movements ever recorded from the island. Unfortunately none of the usual big influxes of Turdidae had materialised before the Observatory was closed down for the season on 11th November. (The largest numbers seen were over 200 redwings (*Turdus musicus*) on 15th October and rather fewer on 20th October. Never more than about 30 blackbirds (*T. merula*) and 8 song-thrushes (*T. ericetorum*) were seen in a day, and only a handful of fieldfares (*T. pilaris*), all told.)

There were three distinct autumn movements of special interest : a small one, with two peaks, in the second half of August ; a larger and very exceptional one, in so far as number of species was concerned, between 3rd and 10th September ; and a third, again small and again with two peaks, on 17th-25th September. They are best considered separately.

17th-26th August. The first noticeable movement of warblers began on 17th August when a sedge-warbler (*Acrocephalus schoenobaenus*) and 7 willow-warblers were recorded ; on the 18th there were 2 sedge-warblers, about the same number of willow-warblers as the day before, 4 garden-warblers

(*Sylvia borin*), a whitethroat (*S. communis*) and the first pied flycatcher (*Muscicapa hypoleuca*). These birds appeared to be part of a normal " north-east wind with rain " movement but on the evening of the 19th, when numbers had been much the same, an aquatic warbler (*Acrocephalus paludicola*) was most unexpectedly trapped—only the second record for the island and the first to be ringed. It was caught in the Bain Trap and, very fittingly, John Bain himself (the builder of the trap) was present to help identify it. This bird, like the reed-warbler (*A. scirpaceus*) trapped on the 21st—another rare bird for the May—may have been making south from a landfall further north. After this initial trickle of birds, the wind fell away and there was a lull till the afternoon of the 24th August when a small wave of birds came in which included 4 whinchats, a redstart, 5 garden-warblers, 3 whitethroats, 3 willow-warblers, 10 pied flycatchers, a wryneck and a barred warbler (*Sylvia nisoria*)—the latter, strangely, the only one of the year. This quite normal autumn movement continued to build up next day, when the numbers of whinchats doubled, redstarts rose from 1 to 5, garden-warblers from 5 to 20, willow-warblers from 3 to 10, pied flycatchers remained steady at 10, and a goldcrest (*Regulus regulus*) and another wryneck appeared. By the 26th the movement had passed its peak and numbers were decreasing, although a third wryneck was seen. Noteworthy in this second wave were the numbers of garden-warblers ; no less than 17 were ringed on the 25th alone, or more than half as many again as the largest number seen before in a day.

3rd-10th September. It was between these dates that the Isle of May had the same big landfall of birds experienced during approximately the same period at all other East Coast observatories from Fair Isle to the English Channel. The first of these migrants arrived during the morning of the 3rd, scarcely twelve hours after an observer had noted in the Log that " the wind has been in N.E. for the past 3 or 4 days with a ' high ' today centred on N. Scotland moving N.E., and a ' low ' over Brittany. The wind has freshened and although we are as birdless as usual, such a synoptic situation gives us hopes that the hoodoo will be broken very shortly ". This assessment of the position was abundantly justified next day, when in spite of appalling conditions—strong wind, driving

rain and very poor visibility—9 garden-warblers, 8 willow-warblers and a redstart were trapped, whinchats, whitethroats and a brambling (*Fringilla montifringilla*) seen, and tantalising glimpses obtained of several suspected rarities. The wind remained E.N.E. all day, force 6. By next morning, 4th September, the weather had improved greatly. The wind had gone into the S.E. and " the island was alive with birds ". The imposing tally of this eventful day included more than 20 whinchats, about the same number of redstarts, over 50 pied flycatchers (but only one spotted flycatcher (*Muscicapa striata*)), about 40 garden-warblers, about 70 wheatears and a great variety of " extra birds "—among them a grasshopper-warbler (*Locustella naevia*), an ortolan bunting (*Emberiza hortulana*), 2 more reed-warblers, 2 crossbills (*Loxia curvirostra*), 3 red-backed shrikes (*Lanius cristatus collurio*), at least 4 wrynecks and no fewer than 5 bluethroats. The ringing total for the day was 83 birds, including 20 pied flycatchers, 3 bluethroats, 3 wrynecks and 29 garden-warblers. Among the many other species seen were 6 lapwings (*Vanellus vanellus*), 7 whimbrel (*Numenius phaeopus*), a swift (*Apus apus*), a *flava* wagtail and 6 tree-pipits (*Anthus trivialis*). Surprisingly, only 1 sedge-warbler, 2 whitethroats and about 12 willow-warblers were noted. The number of species recorded was 50.

By the 5th September the majority of these birds had gone, but more began to arrive in the afternoon—in heavy rain and an easterly wind. Two more wrynecks and a bluethroat were trapped, and a party of about 35 crossbills passed over ; 19 birds were ringed. The foghorns were blowing by dark and the weather was just right for a fresh influx. Sure enough, on the 6th new birds had arrived, the bulk of them again being wheatears, whinchats, redstarts, garden-warblers and pied flycatchers. The trapping total included yet another bluethroat, a grasshopper-warbler, a reed-warbler and a crossbill. The east wind and a good deal of fog continued through the night of 6th-7th September, the wind staying in the east all day on the 7th and fog descending again at evening. Wheatears increased, and there were noticeably more whitethroats. New arrivals included a lesser whitethroat (*Sylvia curruca*) and another reed-warbler ; two more wrynecks were ringed and a fifth bluethroat. Each night was bringing in replacements for

birds which had moved on. During two hours at the lighthouse between 22.30 hours on the 7th and 00.30 hours on the 8th, watchers saw many birds in the beam. Although the majority were pied flycatchers, a few sedge-warblers, wheatears, and some song-thrushes were moving too, and there must have been goldcrests also, for they were distributed all over the island next morning, when about 14 robins (*Erithacus rubecula*)—of undetermined race—were other new arrivals. The wind was N.W. to begin with, moving into the S.E. in the afternoon and dying out at dusk. On the 9th fewer birds were about, although a bluethroat was ringed in the afternoon. On the 10th, when 48 birds were ringed, a south-east wind overnight brought in more goldcrests, whitethroats, willow-warblers, wheatears, redstarts and robins. By the 11th the wind was south-west, veering to west in the evening, and very few birds were left. So ended, with the easterly winds, an eventful eight days which had seen the trapping of 53 garden-warblers, 46 whitethroats, 36 willow-warblers, 36 redstarts, 35 pied flycatchers, 8 wrynecks and 7 bluethroats.

The dates of arrival of the various species are of interest. Whinchats, redstarts and garden-warblers were in the van ; they arrived on the 3rd (peak on 4th-6th). Pied flycatchers were a day later (peak 4th-7th), accompanied by the first bluethroats, wrynecks and tree-pipits. The first robins were recorded on the 7th (with a peak next day) ; goldcrests arrived on the 8th. Willow-warblers and wheatears were fairly steady throughout (peaks on 4th and 10th September, and 4th September, respectively).

17th-25th September. This period was notable as much for what might have been recorded had visibility permitted as for what was actually seen. It produced two interesting phases of passage, the first a small influx on the 18th, the second a minor rush on the 23rd-24th. The weather was unusual for September with a great deal of fog, although otherwise it was ideal for migration, with the winds predominantly easterly. The numbers of birds recorded, although very satisfactory by normal standards, were much lower than the conditions would have led one to expect. Presumably the birds which were passing simply did not see the island ; only those were recorded which hit upon it by chance as they arrived on a broad front.

During the influx on the 18th, when pied flycatchers were prominent (20 recorded), twelve birds of eight species were trapped—all active, robust and of good weight. They probably represented onward movement out of Scotland rather than birds arriving from across the North Sea. This one day excepted, there was little movement until the 23rd, when wheatears (*c.* 50), tree-pipits (*c.* 50), redstarts (*c.* 20), pied flycatchers (*c.* 15) and garden-warblers (*c.* 5) were recorded. There were also 2 ortolan buntings, a few reed-buntings (*Emberiza schoeniclus*), 2 Lapland buntings (*Calcarius lapponicus*) and several robins.

On the 24th still more wheatears (*c.* 60) and redstarts (*c.* 50) were recorded, and about 30 siskins (*Carduelis spinus*). The numbers of other species were much as before except that all but one of the pied flycatchers had moved on. A bluethroat and a red-backed shrike were new arrivals. By next day (25th) the numbers of all species except siskins (now about 60) had dropped considerably, and they declined progressively thereafter. The siskins behaved exactly as one would expect drift migrants from across the North Sea to do ; they fell to feeding as soon as they arrived.

The 23rd had been probably the most interesting day of the week. At dawn there was still the same S.E. wind as the day before, but also the same thick fog, and the island was practically devoid of birds. Then the wind freshened from the S.E. and it seemed impossible that there should be no response to such ideal conditions—but still nothing was caught. Finally, the worst of the fog lifted about noon (although the horns went on blowing until dark due to a persistent haze), and about half an hour later birds began to arrive. Tree-pipits were recorded first, then ortolan buntings and Lapland buntings ; reed-buntings were next and then a drive of the traps at about 13.00 hours B.S.T. yielded a redstart, a garden-warbler and 3 pied flycatchers. More redstarts and pied flycatchers were sitting about on Palpitation Brae. And so it went on, with birds coming in all afternoon.

On the 24th the weather was much the same : thick fog in the morning with the wind still easterly but very light. Again some of the birds had left despite the poor visibility (pied flycatchers were noticeably absent). In the afternoon

the fog lifted a little—later than on the 23rd and not so well. But the result was the same; birds were seen.

Unusual Birds and Numbers

The more unusual birds (and numbers) recorded from the island in 1956 were :

Red-throated Diver *Gavia stellatus*. 30th January. One.

Pochard *Aythya ferina*. 4th September. One.

Goldeneye *Bucephala clangula*. 9th March. One (some days dead).

Bewick's Swan *Cygnus columbianus bewickii*. 15th April. One (an immature bird, some days dead). First record for the island.

Water-Rail *Rallus aquaticus*. 23rd-24th September. One.

Northern Golden Plover *Charadrius apricarius altifrons*. 29th May-1st June. One.

Dunlin *Calidris alpina*. 7th May. Thirty (largest number ever recorded).

Sanderling *Crocethia alba*. 1st September. Fourth occurrence.

Ruff *Philomachus pugnax*. 25th August. One.

Little Auk *Plautus alle*. 28th, 30th and 31st January. Over sixteen, three, and one, respectively.

Black Guillemot *Cepphus grylle*. 7th November. Nine (largest number ever recorded).

Puffin *Fratercula arctica*. 14th-18th July. From fifty to a hundred daily (unusual numbers).

Turtle-Dove *Streptopelia turtur*. 21st August. One.

Wryneck *Jynx torquilla*. 24th-26th August, one each day (different birds) ; 4th-8th September, a movement involving at least eight birds.

Coal-Tit *Parus ater*. 15th October. One, race uncertain. Fourth occurrence.

Tree-Creeper *Certhia familiaris*. 21st and 28th September. One each day, race uncertain. Seventh and eighth occurrences.

Whinchat *Saxicola rubetra*. 4th-6th September. Over twenty daily.

Redstart *Phoenicurus phoenicurus*. 24th September. About fifty. A high number.

Bluethroat *Cyanosylvia svecica.* 21st-22nd May, one ; 4th-9th September, at least seven ; 24th September, one. A high total but not unprecedented (there were 13 on the island on 10th May 1936).

Grasshopper-Warbler *Locustella naevia.* 4th-6th September. At least two.

Reed-Warbler *Acrocephalus scirpaceus.* 21st August, one ; 4th-7th September, at least three. Only six previous occurrences.

Aquatic Warbler *Acrocephalus paludicola.* 26th August. One. Second occurrence.

Barred Warbler *Sylvia nisoria.* 24th August. One.

Garden-Warbler *Sylvia borin.* 25th August, twenty ; 3rd-8th September, ten, forty, twenty, twenty, ten, eight, respectively. Unprecedented numbers.

Chiffchaff *Phylloscopus collybita collybita.* 2nd-4th November. One. A late date.

Yellow-browed Warbler *Phylloscopus inornatus.* 10th October. One. (Trapped on a gloriously hot and sunny day when it was almost the only migrant in evidence.)

Pied Flycatcher *Muscicapa hypoleuca.* 4th September. Over fifty. A high figure.

Grey Wagtail *Motacilla cinerea.* 2nd April, one ; 26th August, one.

Yellow Wagtail *Motacilla flava flavissima.* 8th May, one male ; 10th September, three males. Only two previous autumn occurrences.

Crossbill *Loxia curvirostra.* 1st-9th June, a party of about twenty in dwindling numbers ; 4th September, two ; 5th-6th September, over thirty-five on 5th (passing over), two on 6th ; 17th December, one. Only eight previous occurrences.

Ortolan Bunting *Emberiza hortulana.* 4th September, one male ; 6th September, one female ; 7th-8th September, one ; 23rd September, two.

Little Bunting *Emberiza pusilla.* 15th October. One. Tenth occurrence. A very exhausted bird, trapped after a foggy night.

Lapland Bunting *Calcarius lapponicus.* 18th September, 20th-21st September, 23rd-25th September. Between one and three, daily.

House-Sparrow *Passer domesticus*. 4th November. One female.

Breeding Populations

Again about 26 pairs of fulmars (*Fulmarus glacialis*) are believed to have nested but although human interference was at a minimum only six young flew. Gulls were probably to blame. The shag (*Phalacrocorax aristotelis*) colony continued to grow and there were probably over 200 nests ; a pair nested on Rona, north-west of the Iron Bridge. No estimates were made of the gull population but certainly there were no fewer than in recent years, i.e., about 250 pairs of lesser black-backs (*Larus fuscus*) and some 3,000 pairs of herring-gulls (*L. argentatus*). The number of herring-gulls roosting in winter on the North Ness increased greatly, at its peak reaching nearly 10,000 birds, together with 300 or more greater black-backs (*L. marinus*). Two new kittiwake (*Rissa tridactyla*) colonies were founded, a couple of pairs nesting on the N.E. side of the Cleaver at the south end of the island and about a dozen pairs attempting to establish themselves on a crag to the south of East Tarbet. Because of interference by gulls, very few (if any) young were reared at the latter site.

The terns had a bad year. Few Sandwich terns arrived, very few eggs were laid and then the birds left. About 300 pairs of common and Arctic terns tried to breed, but with negligible success. The nests were mostly on both sides of the Low Road and in a new colony to the east of the Look-out. Only one pair of roseate terns (*Sterna dougallii*) laid; no chicks were reared. On the cliffs, the puffin (*Fratercula arctica*) colony is at very low ebb. One pair was seen carrying fish to a peeping young ; three other nests were suspected.

Four pairs of wheatears nested, seven or eight pairs of meadow-pipits (*Anthus pratensis*), about thirty pairs of rock-pipits, three pairs of pied wagtails (*Motacilla alba*)—one of the nests being in the " Mars " wreck—and five or six pairs of linnets (*Carduelis cannabina*) raising at least eight broods. One pair of linnets built in a grassy bank—the sort of site which was used before bushes were plentiful in the traps. A pair of swallows bred on the island for the first time, raising five young in

one of the old Naval Huts. They left the island as soon as the young were on the wing, without attempting to rear a second brood.

Ringing

1,561 birds of 60 species were ringed during the year—a very satisfactory total considering that because of the virtual absence of blackbird migration fewer birds (187) of this species were ringed than in any year since 1948, and that fewer nestling terns (7 only) were ringed than since 1937. Three species : little auk, mistle-thrush (*Turdus viscivorus*) and aquatic warbler, were ringed for the first time. Other notable catches were wryneck (10), redstart (84), bluethroat (8), reed-warbler (3), garden-warbler (94), pied flycatcher (59), red-backed shrike (4), and siskin (37) all higher totals than the previous best.

Several very successful torchlight-ringing forays took place. One of these, on 31st January, made up in variety what it lacked in quantity ; it comprised a purple sandpiper (*Calidris maritima*), a turnstone (*Arenaria interpres*), 2 greater black-backed gulls, an eider (*Somateria mollissima*) and a little auk! Another notable evening was 9th November, when the catch of 57 included a purple sandpiper, 6 turnstones, 2 adult lesser black-backed gulls and 46 greater black-backed gulls. The two lesser black-backs were probably of the typical race (*L. f. fuscus*), both because of their colour and of the date. Nevertheless, they are not definitely claimed as such because a comparison of mantle colour by torchlight is a profitless undertaking. In the course of the year 160 birds were ringed by torchlight and 13 caught in the beam of the lighthouse.

Recoveries

Among the recoveries reported during the year were the following :

Oyster-catcher *Haematopus ostralegus*

31806. Ringed June 1954, October 1954 or June 1955. Found dead at Réville (Manche), France, 22.8.1956. (Terminal figure of ring number indecipherable, hence doubt concerning exact date of ringing.)

Turnstone *Arenaria interpres*

X. 96273. Ringed full grown 27.10.1954. Caught and released (with ring) at Daneborg, Young Sound, Greenland, 1.6.1956.

Woodcock *Scolopax rusticola*

258884. Ringed full grown 27.3.1956. Caught by a dog at Neuville, near Montreuil-sur-Mer (Pas-de-Calais), France, 15.11.1956.

Greater Black-backed Gull *Larus marinus*

408985. Ringed adult 27.10.1954. Found dead at Nyksund, E. Lofoten Islands, Norway, mid-September, 1955.

408986. Ringed adult 27.10.1954. Found dead at Elie (Fife), 5.2.1956.

Razorbill *Alca torda*

AT. 14378. Ringed adult 25.6.1955. Recovered (presumed dead) at Plage de Sciotot, near Las Pieux (Manche), France, 7.2.1956.

Guillemot *Uria aalge*

AT. 26521. Ringed as young 26.6.1955. Shot near Arendal (Agder), Norway, 2.12.1955.

Song-Thrush *Turdus ericetorum*

P. 8981. Ringed adult 19.5.1953. Found dead on road near Ligure, Poitiers (Vienne), France, 19.2.1956.

X. 96431. Ringed full grown 10.10.1955. Trapped and killed near Guarda (Beira Baixa), Portugal, 24.12.1955.

S. 86007. Ringed full grown 19.10.1956. Killed at Taillis (Ille-et-Vilaine), France, 21.11.1956.

Redwing *Turdus musicus*

P. 8944. Ringed full grown 27.3.1953. Found dead at Omagh (Tyrone), N. Ireland, 29.1.1956.

P. 9155. Ringed full grown 13.10.1953. Shot near Verteuil (Charente), France, 23.3.1955.

Blackbird *Turdus merula*

16207. Ringed adult 22.10.1950. Found dead at Sauherad (Telemark), Norway, 6.10.1955.

PX. 136. Ringed first winter female 15.10.1951. Caught and killed near Kristiansand (Vest Agder), Norway, 15.11.1955.

X. 65773. Ringed adult 27.10.1954. Recovered (pre-

sumed dead) at Newton Stewart (Wigtownshire), 15.11.1955.

X. 65812. Ringed adult female 27.10.1954. Shot at Kittilsröd, Gjerpen, near Skien (Telemark), Norway, 1.9.1955.

X. 65824. Ringed adult 27.10.1954. Snared at Eia (Rogaland), Norway, 19.10.1955.

X. 65926. Ringed adult male 13.3.1955. Found dead at Löten (Hedemark), Norway, 24.4.1955.

X. 66021. Ringed full grown male 17.10.1955. Found dead at Duffus, near Elgin (Morayshire), 27.3.1956.

X. 66111. Ringed full grown male 29.10.1955. Shot at Heroysundet (Hordaland), Norway, 10.4.1956.

X. 66149. Ringed adult female 3.11.1955. Recovered (presumed dead) at Norra Tång, Kalmar, Sweden, 27.7.1956.

X. 66227. Ringed first winter male 30.3.1956. Found dead at Hareid (More og Romsdal), Norway, 24.10.1956.

X. 66256. Ringed full grown female 2.4.1956. Shot at Bordalen, near Voss (Hordaland), Norway, 14.10.1956.

X. 92482. Adult female ringed at Spurn Bird Observatory, Yorks, 8.10.1955. Trapped and released on Isle of May, 26.4.1956.

Whinchat *Saxicola rubetra*

A. 11066. Ringed full grown male 30.4.1955. Caught near Estella (Navarra), Spain, 15.9.1955.

Redstart *Phoenicurus phoenicurus*

A. 11112. Ringed full grown female 16.5.1955. Recovered at Cabara, near Branne (Gironde), France, ca. 20.9.1956.

Willow-Warbler *Phylloscopus trochilus*

B. 75847. Ringed adult 5.5.1956. Found dead near Grantown-on-Spey (Morayshire), 87 miles N.N.W., 6.5.1956.

Spotted Flycatcher *Muscicapa striata*

A. 11278. Ringed adult 23.8.1955. Killed by a cat at Fosse, near Strandebarm (Hordaland), Norway, 29.7.1956.

Meadow-Pipit *Anthus pratensis*

A. 11538. Ringed full grown 17.4.1956. Trapped near Silves (Algarve), Portugal, 28.10.1956.

Pied Wagtail *Motacilla alba*

LF. 514. Ringed nestling 26.7.1952. Trapped Ortuella, near Bilbao (Viscaya), Spain, 19.3.1956.

Retrappings

Ringed birds retrapped on the island, as distinct from birds recovered elsewhere, included three shags breeding on the same site as in 1955 ; fulmars " Joe " (known since 1949) and " Jessie " (known since 1952), nesting together again ; the kittiwake " Herbert " (actually a female) back on the same ledge for the ninth successive year ; a herring-gull ringed as an adult on 7th August 1951, recaught by torchlight on 9th April 1956 ; and another herring-gull, ringed as an adult on 7th May 1949, trapped seven years later on 18th August 1956 (a breeding bird with soliciting young). Retrapping showed also that at least one hedge-sparrow (*Prunella modularis*) overwintered on the island (from the end of September 1955 until February 1956).

A meadow-pipit ringed as a nestling on 21st July 1954 was retrapped thrice in 1956—on 30th March, 13th April and 29th May. A second meadow-pipit, ringed on 25th May 1952, also as a young bird, and trapped again on 16th April 1953, was retrapped on 17th May 1956, at four years old. Another bird at least four years old was a starling ringed as an adult on 30th May 1952, found freshly dead on 4th November 1956. Eleven linnets ringed in 1955 (six as breeding adults and five as young birds born on the island) returned to the May in the spring of 1956. At least eight of them, including three first-year birds, are known to have bred.

Botany

Dr. E. V. Watson spent a week on the island at the end of May, continuing his study of its bryophytes. A further paper on his work is due to appear shortly. He noted that he had

" never seen the island like it, so far as flowers are concerned ", thanks to the almost complete disappearance of the rabbits. He and a companion, C. E. Douglas, added several flowering plants to the island's list, as did a number of other persons, including Mr. and Mrs. W. Watt from the Lighthouse, later in the season. These new plants were : *Raphanus raphanistrum*, *Atriplex glabriuscula* (typical form), *A. hastata*, *Trigonella ornithopodoides*, *Vicia hirsuta*, *Lamium molucellifolium*, *Festuca rubra* subsp. *rubra* var. *glaucescens*, *Puccinellia distans* var. *prostrata* (previously misdetermined as *P. maritima*) and *Koeleria albescens* (if this can be regarded as distinct).

Myxomatosis

In our last report we were careful not to suggest that all the rabbits on the May had been killed by myxomatosis, although this at one time seemed a possibility. However, at the end of January, when a covering of snow made a check-up possible, a few tracks were seen. Because the island lies in a Rabbit Clearance Area, a determined effort was made to deal with those which were left, using gun, ferret and snares, but by autumn it was clear that the animals were holding their own. Although over forty had been killed, there were still quite a number about. Efforts will be continued to keep the population at a low level but the terrain is such that complete eradication is virtually impossible. Nevertheless it is hoped that in place of the teeming hordes of rabbits, which until recently swarmed everywhere, a fair-sized flock of sheep (such as used to graze on the May in the last century) can be kept there again, for it is felt that the island can be made usefully productive without damage to its wild-life interest. The few black-faced ewes introduced by the Principal Lighthouse Keeper in the autumn of 1955 have shown no serious obstacle to this plan, for they reared eight healthy lambs, but the number of animals involved was too small to have much effect on the vegetation and in few people's memory can so much grass and clover have been seen. These sheep are the only domestic stock presently on the island for the two goats died of old age during the year.

Acknowledgments

Once again the Committee record the great debt they owe to the Commissioners for Northern Lighthouses for their continued interest in the Observatory and its activities. The Committee wish also to thank Mr. and Mrs. Watt and the other lighthouse keepers on the island for the help they have given to observers on so many occasions. Their indebtedness to Mr. W. Hughes for everything that he has done to transport observers and their stores to and from the island scarcely requires stressing. He has been a true friend in every way.

SEMIPALMATED SANDPIPER AT FAIR ISLE: A BIRD NEW TO SCOTLAND*

KENNETH WILLIAMSON and H. G. ALEXANDER

Fair Isle Bird Observatory

A SMALL wader, which had been seen but not identified on the previous day, was located by H. G. A. on the morning of 29th May 1956 on Midgeo Beach at the south end of Fair Isle. Searching the seaweed through binoculars, he found it feeding among seven or eight dunlins (*Calidris alpina*), five turnstones (*Arenaria interpres*) and a purple sandpiper (*C. maritima*). It was a pale and greyish-looking bird smaller than the dunlins, at least an inch less in length, and the colour-pattern was not unlike a sanderling (*Crocethia alba*) beginning to change from winter into summer plumage. For ten minutes he watched the bird closely at a range of from fifteen to twenty yards, and then, believing it must be an American species, summoned K. W. by telephone. Other visitors to the Bird Observatory who joined in watching it then and on subsequent days were Mr. and Mrs. T. V. Smith, Mr. and Mrs. M. Hartley, Misses H. Critchley and N. and M. Goom, and Messrs. V. F. Hancock and G. Stansfield.

The bird had a markedly grey and white appearance, and dark or blackish centres on the mantle feathers gave the plumage of the upper-parts a " scaly " pattern which suggested the possibility of a Baird's sandpiper (*C. bairdii*)—an opinion with which we were not entirely satisfied, however, as the bird seemed much too small. The crown and nape were similar to the mantle but with the black markings much reduced in size. A russet patch on the ear-coverts and similar colouring at the sides of the crown were especially noticeable features. An indistinct narrow wing-bar was apparent when the bird flew, and the centre of the tail was then seen to be blackish, with the outer feathers pale but not white. The legs appeared to be blackish-brown even at a short distance, but close views through

* *Received 4th April* 1957

a telescope showed that they were really a dark olive-green. They were longer in proportion to body-size than those of the dunlin, so that when the two species stood side by side the smaller bird looked as tall. The black bill, slightly decurved at the tip, was slender and rather long for a stint, and just about as long as the head. H. G. A. once noted an unfamiliar, musical " chirr-rr-rr " as the bird flew up.

At one point, while K. W. was watching with a 40 × telescope, the bird gave a useful clue to its identity by walking over a large sea-smoothed boulder; for it was then seen that the toes were partially webbed, indicating either a Western sandpiper (*C. maurii*) or semipalmated sandpiper (*C. pusillus*). In view of the great difficulty in separating these two closely-allied species in the field, it was felt that the only chance of securing a satisfactory identification lay in capturing the bird. So in the afternoon a Japanese nylon " mist-net " was set up on the wrack by K. W. and G. S.: the group of waders soon returned and gradually approached, and when we judged the moment was ripe we " rushed " the net and missed everything except the American bird! Its identification as a semipalmated sandpiper, the first for Scotland and third for the British Isles, was then confirmed in the laboratory. There has been one other occurrence in Europe, in France in 1930.

The specimen was in moult from winter to summer plumage, and the wing was almost completely unchanged except for the tertiaries. The primaries and their coverts were dark brown, the outer webs of the inner primaries having a white mark. The primary and greater coverts were tipped with white and formed an indistinct white alar bar. Median and lesser coverts were greyish-brown. The longest tertiaries were dark brown with some sepia and worn whitish edges, the new feathers being black edged with orange-brown and tipped with white. There were similar new feathers in the scapulars and mantle, forming a scaly pattern on the back, and the old scapulars were grey-brown with black mesial streaks. The rump and upper tail-coverts were blackish with brownish and greyish tips, and most of these and the mantle feathers were apparently new. The lores were greyish-brown, the ear-coverts reddish-brown, and above these markings ran an indistinct white stripe. The crown-feathers were blackish-brown edged with grey, more

rufous on the sides of crown and nape. Chin and throat were white, and also the belly, flanks and vent, but the breast was mottled with greyish-brown, most noticeable on the sides. The rectrices were greyish-brown with the middle pair darker. There was a pronounced webbing linking the 2nd-3rd and 3rd-4th toes.

Measurements : wing (chord) 97 mm., tail 40 mm., bill (from feathers) 19½ mm., tarsus 23 mm. Weight, 26 gm. Wing formula : 2nd primary longest, the 3rd to 8th primaries being shorter by 1 mm., 4 mm., 12 mm., 19 mm., 27 mm., and 33 mm. respectively. Legs, dark olive-green. Some Mallophaga were collected; these have been identified by Miss Theresa Clay of the British Museum (Natural History) as *Carduiceps pusillus* Carricker 1956 (Family Philopteridae).

The bird stayed for a week, being last seen on 3rd June. The composition of the wader flock varied from day to day, and the bird showed a rather loose association only with the dunlins. It may, of course, have arrived before 28th May, the day on which it was first seen, but this seems unlikely as the southern beaches were well watched at that period. It is interesting to know that an American passerine, the olive-backed thrush (*Hylocichla ustulata*), was found dead at Blackrock Light, Co. Mayo, Eire, on 26th May (R. F. Ruttledge, *pers. comm.*), and perhaps both birds were the victims of an ocean-wide westerly air stream which had covered the Atlantic on the northern perimeter of the Azores anticyclone for several days previously.

We are grateful to R. P. Bagnall-Oakeley for sending to Fair Isle a splendid set of prints of the Norfolk bird (Cley, 19th July 1953—see *Brit. Birds*, 47 : 131-132, plates 27-28) and to R. A. Richardson for a detailed description of it. It was very interesting to study these documents in relation to our own notes.

THE BREEDING SUCCESS OF GOLDEN EAGLES IN THE SOUTHERN GRAMPIANS *

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LITTLE is known about the breeding success of a known population of golden eagles (*Aquila chrysaëtos*) in a defined area over a period of years. The area that I have studied is a part of the Southern Grampians in the Scottish Highlands, reasonably accessible and easily defined by rail, road, and loch boundaries. For convenience I subdivided the area into four sub-areas or groups (Table 1), each different in topography, vegetation, and land-use. The whole area is approximately 50 miles from north to south, and 55-60 miles from east to west, or about 2,750 square miles. Much of it is high ground, as well as grouse moor and forestry land, but perhaps 40 per cent. consists of low arable areas in the straths and glens.

The survey of this vast area needed much hill and rock scrambling, often in adverse weather conditions that made observation of the eagles very difficult. So the whole area cannot be thoroughly covered unless by an exhaustive search of all rock-faces. On many visits to check on the presence of a pair, I saw only one bird for a few fleeting moments; this was sometimes taken to represent the pair in the area, if there was no reason to believe that its mate had been killed. On other occasions, I have assumed that if I saw no eagles in a territory after several visits in any one year, and if the alternative eyries were all unoccupied, then the territory had become temporarily vacant.

After finding what is considered the total population of eagles and their alternative eyries, I returned every year for seven years (1950-56 inclusive) to determine the presence of pairs of eagles, and also their breeding success. I tried to check my records by returning as often as possible, and also by discussing the activities of the pairs with the resident stalkers, keepers, or shepherds.

* *Received 9th December* 1956

There were 14 pairs of golden eagles in the whole area, plus a certain number of immature birds. The immatures may be absorbed into this adult group to replace the continual wastage due to human interference, and some may disperse more widely to other areas. Table 1 shows the breeding success of eagles in the different sub-areas.

In 11 cases one eaglet was reared by a pair, in 8 cases two were reared; the average number leaving a successful eyrie was therefore 1·4 young. A breeding success of 27 fledged young from 14 pairs in seven years (roughly four young per year, or about 0·28 young per pair per year) seems very poor. But this is misleadingly low, as the territories were so often vacant. The number of cases where a territory was vacant of both members of the pair during a breeding season was 23, and there were 8 cases where one member of the pair was absent; this was out of a total of 98 cases where a territory might possibly have been occupied by a pair. For this reason, it would be more satisfactory to state that the 27 young were reared in seven years from 14 territories rather than by 14 pairs. Thus the average number of young reared per pair-occupied territory per year was 0·4. It would be interesting to compare this with results from other areas, if such figures are available. The reasons for this lack of success seem to be very largely due to human interference (Table 2).

Information about eagle casualties and egg-robbing is very difficult to obtain. Poisoning and shooting are acts that are nearly always concealed, and so I consider the damage done in this way may be slightly under-estimated in the table. Such information is often revealed only indirectly, during general conversation with keepers, shepherds and others, often long after the event has taken place (e.g. one keeper admitted during conversation in his house that he had trapped two golden eagles the previous winter and that the pair had been eliminated). Nest-robbing is apparent during the breeding season, but in some instances it is difficult to say whether it has been done by human beings or hooded crows (*Corvus corone cornix*).

Egg-collectors are active each year, and crows may sometimes take the eggs at eyries where the eagles are often disturbed by people using nearby hiking tracks.

The north group of five operating pairs bred twice as

successfully as eagles in the other sub-areas. The number of young reared per pair-occupied territory per year in the northern sub-area was about 0·6, compared with only about 0·3 in the other three sub-areas. This was evidently due to less human disturbance, and the fact that eagles are often welcome on deer-forest. Although sheep are grazed throughout the northern sub-area, it is deer-stalkers that look after the ground and on the whole they take reasonable care of breeding eagles. From Table 1, it can be seen that the northern sub-area is the only one where deer figure largely in the land-use; the other three areas are given over to red grouse and sheep, or to sheep alone. Human persecution is clearly much greater on the sheep-grouse areas.

With roughly four young being reared per year, and an estimated annual loss of six eagles due to human interference alone, it would seem that this population, in the absence of immigration, would decline. My own opinion is that, fortunately, there may well be considerable immigration from areas with better breeding success, such as further north in the area covered by Adam Watson's report in this number.

About half the stock was not interfered with in an average season, so the 27 young had been produced by the equivalent of only seven adult pairs breeding without interference. As it is possible for a pair of eagles to rear one or two young in one year, it may be wondered why some of the pairs often did not rear young during seasons when they were not interfered with. Possibly the main reasons were the immaturity of younger birds pairing with older birds whose mates had been killed (cases of this are marked Y in Table 1), and infertile eggs laid by older birds.

Summary

1. A population of golden eagles (*Aquila chrysaëtos*) was studied intensively from 1950-56 in part of the southern Grampians. The area was about 2,750 square miles, of which roughly 40 per cent. was arable land.

2. Fourteen pairs of eagles occupied this area. A territory was vacant of both members of the pair during a breeding season in 23 cases during this seven-year period.

3. 27 young were reared from these 14 territories in seven

years, or 0·4 young per pair-occupied territory per year. Eagles bred twice as successfully on deer-sheep ground as on ground used for grouse and sheep.

4. The lower breeding success on some areas was due largely to human interference. Probably about six eagles per year were destroyed by shooting, trapping, or other interference and four nests per year burned or robbed.

5. With about four young reared per year and about six eagles destroyed per year, it would seem that this population could not long maintain itself, but probably there is considerable immigration from outside the survey area.

6. Some pairs did not rear young during years when they were not disturbed. Possible reasons for this are discussed.

TABLE 1

Breeding Success of Golden Eagles in Southern Grampians

Sub-area	*Pair*	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*Total*
NORTH									
(mainly deer	1	*	*	*	*	1	XS	*	1
and sheep	2	*	1	2	2	1S	XR	X	6
ground)	3	*	*	1	2	X	*	*	3
	4	*	X	X	1	X	X	X	1
	5	X	X	X	2	1	X	XR	3
CENTRE	6	X	T†	XY	X	*	*	*	0
(mainly sheep	7	X	†	*	*	*	X	X	0
and red grouse)	8	*	XR	2	2	E†	X	X	4
SOUTH-EAST									
(mainly sheep	9	T†	XB	2	1E	X	*	*	3
and grouse, with	10	S†	*	XY	*	XY	2	*	2
increasing arable use)									
WEST	11	X	X	X	1	XB	†	†	1
(mainly sheep)	12	X	X	X	X	X	1	XR	1
	13	X	XS	1	X	X	X	X	1
	14	X	X	1S	†	XY	XR	X	1
Total	14	0	1	9	11	3	3	0	27

Notes: Figures indicate number of young reared.

* Territory vacant of both members of pair.
† Territory vacant of one member of pair.
R Eggs robbed from nest.
Y One member of pair is immature.
E One electrocuted.
S One adult female shot.
B Nest burned.
T One trapped.
X No breeding success known (a pair present, but either no known eyrie occupied or else eyrie occupied but no young known to be reared).

During the period 1950-54 inclusive, eggs were stolen from pair 12 at least twice.

TABLE 2

INTERFERENCE WITH GOLDEN EAGLES

Type of interference	*Damage known for certain in seven years*	*Probable annual damage (estimated from hearsay information)*
1. Egg-robbing	5 (+ 1 doubtful) nests	2 nests
2. Nests destroyed or caused to desert by keepers and shepherds	3 nests	At least 2 nests
3. Eagles shot	5 (+ 1 doubtful) birds	About 4, perhaps more.
4. Eagles trapped	3 birds	
5. Eagles electrocuted on wires	2 birds	At least one per two years
6. Full-grown young sent to Zoo	1 bird	
7. Eagles poisoned		At least one, probably more
Total eagles removed	11-12	About 6

THE BREEDING SUCCESS OF GOLDEN EAGLES IN THE NORTH-EAST HIGHLANDS *

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THIS paper originated partly from my reading Mr. Sandeman's report on the breeding success of golden eagles (*Aquila chrysaëtos*) in the southern Grampians, and I am grateful for his ready agreement that it would be useful to compare both regions in the same number of the journal.

As eagles are still greatly persecuted in the Highlands, I have not disclosed where the eyries are, or even what general areas the eagles occupy; the following description is purposely vague. The region that I have studied is in the north-east Highlands of Scotland and it occupies roughly 240 square miles. None of it lies below 1,000 feet, and arable land takes up an extremely small fraction. Most of it is mountainous deer-forest, a fairly large part is grouse-moor, and a much smaller amount is sheep-ground (with both deer and grouse also). Some of the valleys are well wooded. About 20 square miles of low arable valley or dense low woodland are very rarely or never visited by eagles; this leaves about 220 square miles of suitable eagle country.

This region was visited so often, at all times of year, that I was able to find the total adult population of breeding eagles and most of their alternative eyries. The whole area was very carefully covered, and every possible-looking nest-site was visited. I found it unwise to rely very much on keepers' evidence; though much help was given by keepers, their knowledge about local eagles was often surprisingly inadequate. On a different plane was the encouragement given by Mr. Seton Gordon and Dr. Robert Carrick ; to them I owe the enthusiasm for eagles that was the most essential need in such a laborious survey.

* *Received 18th May 1957*

Population Density

During the years from 1948-57, twelve adult pairs of eagles occupied the region. There were fourteen pairs in 1946, and not more than thirteen pairs in 1945. These extra two pairs occupied grouse-moor country at the lower end of the region, but by 1948 they had both disappeared, due to shooting and trapping. At the present time, three areas would seem to offer room for future eagle expansion, two of them vacated by the above two pairs. In the third area I have found no eagles breeding; though it is in deer-forest on an estate where eagles are protected, there appear to be no rock-faces or nesting trees. However, adult eagles were often seen, not only in winter, and it is possible that a pair might breed undetected simply on a hillside, especially as I visited this area far less often than other parts of the region.

This figure of fourteen adult pairs takes no account of single adult birds ; there were a few of these in the region every year, and probably such unattached birds may help to replace natural mortality among breeding eagles. The population was certainly larger in autumn and early winter than in spring, as most young eagles stayed for several months within a few miles of where they were bred, till the end of the autumn or early winter. Some young stayed on in their second and even later years (sometimes in the near vicinity of occupied eyries), but there were many fewer of these. Certainly the density of adult eagles in this region was about as high as on any area of comparable size in all Scotland.

With fourteen pairs in about 220 square miles, each pair would have on average about 16 square miles or 10,000 acres. But some parts did not hold eagles and were only rarely visited or hunted over, so this average figure is misleadingly high. In the lower reaches of the upper deer-forest country, the eagles were at a density greater than anywhere else in the north-east. Several times, I found adjacent pairs breeding in eyries only $1\frac{1}{2}$ miles apart. In 1949 and 1950, three pairs occupied eyries very close together ; the three eyries were situated roughly at the corners of a triangle with sides $2\frac{1}{2}$, $1\frac{1}{2}$, $1\frac{3}{4}$ miles long. In both these years, eaglets were reared by a fourth pair just under three miles beyond one eyrie of the triangle, and also

by a fifth pair two miles beyond a second eyrie of the triangle. Where the eagles are as dense as this, practically all the ground is being hunted over. So it becomes reasonable to find the average area per pair simply by dividing the total area by the number of pairs. In the case of the above five pairs, the average area per pair thus works out at about nine square miles or less than 6,000 acres.

However, when the eagles are distributed a good deal more thinly over the ground, as they are on some grouse-moors on the fringe of the region or outside it, figures for hunting area may be misleading. Since the extinction of two of the grouse-moor pairs after the war, the ground vacated by them was not hunted over regularly by neighbouring eagle pairs. On the above grouse-moors, there were three eagle pairs (five pairs in 1945-46) in about 150 square miles of suitable country, or from 30 to 50 square miles each. But no eagle pair hunted over such a large area, and in fact much of the ground was only rarely if ever visited by them. On such areas, where red grouse (*Lagopus lagopus scoticus*) and mountain hares (*Lepus timidus*) are abundant and possible nesting places are plentiful, there is room for more eagles but they are kept down by persecution.

Other figures for territory size in the Highlands are: 10,000 acres of West Highland deer-forest (Darling, 1947); 6,000 acres (Nethersole-Thompson, in Gordon (1955)); some not more than 5,000 acres (Gordon, 1955); and an "absolute minimum" of about 10,000 acres (Nicholson, 1957).

The ground hunted over by a pair of eagles may be termed a territory, but in the north-east it was certainly not occupied to the complete exclusion of other eagle pairs and individuals, as in some species of owls where the breeding pair usually hunts exclusively within well-defined territorial boundaries. Seton Gordon (1955) noted that golden eagles do not stick to their territory so rigidly in winter, and also that there seemed to be "communal" hunting grounds over the high tops of the Cairngorms. In the north-east Highlands I found that each pair tended to hunt within roughly the same area in different years, but it was not unusual for them to move out of it, especially at some distance from the immediate nesting place. In winter they often moved out of this area, and even flew about

then occasionally in groups of three and four adults. Even in summer I often saw a hunting eagle move into the area of another pair, though only rarely close to the occupied eyrie of another pair. Several times I saw groups of a pair and a single bird of another pair, and even two pairs, combining. On some of these occasions there were fights, but at other times the eagles flew about together without fighting, even in summer. In the case of the above five pairs that I studied on the deer-forest ground, the average area per pair was about nine square miles, but in fact each pair at times hunted over a much larger area. The smallest area over which a pair used to hunt regularly was roughly between 2,500 and 3,000 acres, but an almost equally large area outside was also visited occasionally. There seemed to be no definite territorial boundaries, and the hunting ranges overlapped considerably, sometimes with two or even three pairs of eagles hunting on the same hill at different times.

Clearly it becomes difficult, if not meaningless, to state a territory size for a particular pair of eagles in such cases. It should therefore be emphasised that the figures I have given above are too small as indicators of the limit of a pair's hunting range: what they do show is the average area of regularly hunted eagle country that was supporting an eagle pair. Certainly neighbouring eagles do occasionally fight and have mutual displays both in the air and on the ground, and possibly this may tend to space out the pairs and prevent them from living too near each other. However, in view of all the above observations, the golden eagle's hunting ground seems more akin to a " home-range " than to a real hunting or food territory. (Of eagle species in general, Leslie Brown (1955 *a*) wrote: " it is far from easy to say whether they have a territory at all in the normal sense of the word, or, if they do, how and when it is defined.") Within this home-range, the eyries are of course strictly territorial sites; it is well known (Gordon, 1955) that the eagles return over and over again to the same few sites, at times up to half a century or more.

Nest-sites

Though the same nest may be repeatedly used by a breeding pair in different years, " alternately used sites, when available,

are more frequent" (*The Handbook*, 3: 39). These twelve eagle pairs in the north-east owned a total of at least 64 eyries, or an average of about 5.3 eyries each (Table 1). In fact the

TABLE 1

EAGLE EYRIES IN NORTH-EAST HIGHLANDS

Pair	Number of Eyries owned		Total
	In rocks	*In pine trees*	
1	1	3	4
2	8	0	8
3	3	2	5
4	3	5	8
5	6	3	9
6	4	0	4
7	4	0	4
8	3	0	3
9	3	2	5
10	5	2	7
11	4	0	4
12	1	2	3
Total	45	19	64

real total was probably higher. I found 34 eyries owned by pairs 1-5, or an average of almost seven each; in the case of the remaining seven pairs, which I knew less well on the whole, I found only 30, or just over four each. Many of these eyries were obviously old and had not been used for some long time, and many have since been removed by gales or snow avalanches. During seven consecutive years, no pair bred in more than five different eyries. However, one pair did use five, and two pairs did use four, in that period; no pair used one eyrie only. Most eyries were in rocks, but 19 were in trees of Scots pine (*Pinus sylvestris*). No pair had all its eyries in pines. Pines seemed to be favoured sites where they were available; wherever a pair had all its nests in rocks, the home-range was in the more mountainous parts of the area where no trees existed. Omitting these five upland pairs (2, 6, 7, 8, 11), the remainder had about half their nests in pines. The lowest nest was at about 1,500 feet altitude, the highest at about 3,000-3,100 feet. The majority of the rock eyries had a northerly or easterly aspect

(Table 2), as Seton Gordon (1955) found usual among Scottish eagles in general. However this may not be all a matter of preference, as relatively few west-facing cliffs exist in the north-east Highlands; most cliffs face towards north or east. The aspect of the tree nests was more randomly distributed.

Breeding Success

I was not able to follow the activities of every one of these pairs every year. Observations were spread over fourteen years, but in some of these years they were not intensive all over the region. Consequently, though much useful information was collected during every year, I know now that not all the nests were found in the early years, and therefore many of the observations on breeding success do not continuously cover every year in a series of years.

However, I do have continuous yearly data about some pairs that I knew very well (Table 3). Three of these (pairs 1-3) showed how very successfully Scottish eagles may breed, given peace and good conditions. Pair 1 lived in deer-forest country that held no sheep and few red grouse ; pair 2 was in an area occupied by red deer (*Cervus elaphus*), sheep, and grouse; and pair 3 in an area with many sheep, deer, and grouse, and also many rabbits (*Oryctolagus cuniculus*). But though grouse and sheep figured rather prominently in the land-use, and though both were locally quite numerous, the estate as a whole was interested in deer and all the keepers were deer-stalkers foremost. Such an estate policy usually determines a different outlook—of neutrality or preservation—towards eagles, than one finds on an estate interested mainly in grouse, where the accent is usually on persecution. Two more pairs (4 and 5), both on the same estate as pairs 1-3 and both in deer-forest country with few grouse and no sheep, bred less successfully. Several of the sites owned by pair 4 were known to egg-collectors, and the eggs were taken here in several different years. Though pair 5 were undisturbed by egg-collectors, in three years the eggs were chilled due to unwitting human disturbance on cold spring days. So the poorer breeding success of certain pairs in this area was due considerably to human interference.

During twelve years from 1946 to 1957, pairs 1-5 reared a

TABLE 2

ASPECT OF GOLDEN EAGLE EYRIES

Aspect	*Number in rocks*	*Number in trees*	*Total*
N.W.	8	1	9
N.	3	1	4
N.E.	13	2	15
E.	8	4	12
S.E.	2	1	3
S.	7	4	11
S.W.	3	5	8
W.	1	1	2

TABLE 3

NUMBER OF YOUNG EAGLES FLEDGING, 1945-57

Year	*Pair 1*	*Pair 2*	*Pair 3*	*Pair 4*	*Pair 5*	*Total*
1945	?	2	1	1	1	at least 5
1946	1	2	2	2	*	7
1947	*	2	1	0 (†)	0	3
1948	1	1	1	0 (E)	1	4
1949	1	1	0 (†)	1	0 (D)	3
1950	1	1	1	0 (E)	*	3
1951	1	2	1	1	1	6
1952	1	2	1	0 (E)	1	5
1953	1	1	2	2	0 (D)	6
1954	1	1	0 (D)	2	0	4
1955	1	0 (†)	0 (D)	0 (E)	0 (D)	1
1956	0 (†)	2	0 (D)	0 (E)	1	3
1957	0 (E)	2	0	0 (†)	0 (†)	2
Total, 1946-57	9	17	9	8	4	
Years when definitely non-breeding	1	1	1	2	1	

? Successful fledgings were suspected.

* Alternative eyries not known at the time may have been used, but it is considered probable that the eagles were non-breeding, and most unlikely that young were successfully fledged.

Figures show number of young fledged. Where no young were reared, symbols in brackets indicate the reason for this (if it was definitely known), as follows :—

(E)—Eggs robbed ; (D)—Eggs chilled or nest deserted due to human disturbance ; (†)—Certain non-breeding.

total of 47 young, or an average of 0·8 young per pair per year; 73 per cent. of the known clutches resulted in fledged young. (Not one of these territories or home-ranges was vacant of an adult pair of eagles during any year.) By pairs 1-3 only, 35 young were reared in the same period, or one young per pair per year; 90 per cent. of known layings resulted in fledged young. With the less successful pairs 4 and 5, twelve young were reared, or 0·5 per pair per year; only 47 per cent. of known layings resulted in fledged young.

In the survey area as a whole, few pairs were subject to persecution by local keepers, stalkers or shepherds, though twenty or thirty years ago both adult and young eagles were very often shot on most of the ground. In the upper deer-forests, it is known for certain that there has been no trapping or shooting of eagles since the last war. In this remote country, where local men do not now persecute the eagle, the eagles' breeding is very successful. But the average breeding-success for the whole region is lower, as eagles are still subject to much more disturbance and persecution further down the valleys where the ground is given over mainly to sheep and grouse. Fortunately most of the eagles are in the upper deer-forest areas, otherwise the regional breeding success would probably be even lower. One eagle home-range on a grouse estate outside the survey area has produced no fledged young during the years of the survey, because of human interference.

Out of many nests from all parts of the region in various years (including those in Table 3), eggs were probably taken by collectors at fourteen nests, the whole clutch was probably infertile at two, eggs chilled and so addled due to human disturbance (in no case malicious) at five, nest deserted due to similar human disturbance at three, eaglets disappeared at two, non-breeding was known at eleven (and strongly suspected at many others), and young reared successfully at 51. From this it might be deduced that 66 per cent. of the known clutches had resulted in fledged young. But this might well be inaccurate and too high a success. It would not be safe to make such a calculation unless every nest in the region had been visited every year (as I did with pairs 1-5). If this is not done, it is clear that it would be easier to notice eaglets that stay in the nest or nearby for months, than eggs that may be removed

or deserted not long after they are laid. Where young were reared successfully, one young was reared in 36 cases, and two young reared in 15 cases; none reared three young (though in one nest three were hatched but only two reared). The average number of young leaving a successful nest in one year was therefore 1·3.

Non-breeding

It is very difficult to be certain that some eagle pairs were non-breeding. They may have laid earlier and then lost the eggs due to the raids of crows, and there is always a possibility that they may have nested in some new site unknown to the observer. But such destruction of the eggs is probably unusual, and in any case if there are many observations of the eagles' behaviour over a long enough period (especially before the eggs hatch), and if the area is covered really thoroughly, non-breeding may appear certain.

In this way I found eleven cases of non-breeding, besides other suspected cases where I had not watched the eagles long enough and often enough to be really sure. In two of the certain cases (both in the same pair), the female was considered to be non-breeding because of her immaturity. Eagles were noticed here about 1946, and in 1948 they put only a few small sticks on the nesting ledge and the female was seen to have a prominent white band on her tail. In 1949, the white band was far less distinct and more material was added to the nest; and in 1950 the female, now with very little trace of white on the tail, laid eggs and reared one young. Such non-breeding of immature birds is only to be expected, and it seemed to occur even more often in Sandeman's area where there was a more rapid removal of adult eagles by human destruction. But in the other nine cases of non-breeding that I found, there was no evidence of a change in mate or of immature birds pairing-up, and the observations suggested that the same adults were present but were simply not breeding every year.

This aspect of golden eagle breeding seems to have been largely overlooked, probably because the occurrence of non-breeding in this species is so difficult to prove. However, it may be more frequent than proof has so far provided. The low

breeding success found by Sandeman was probably mainly a result of human interference, but some non-breeding may well have contributed partly to the unsolved problem described in the final paragraph of his paper. Non-breeding of adult pairs of golden eagles has also been suspected by others for some time, notably by Leslie Brown (1955 *a*). Brown considered that in any group of golden eagles there will be non-breeding pairs in a particular year ; in every area that he surveyed, he found some pairs that did not breed in any place that he could locate. He concluded (p. 262) that it should be simple " for someone to establish whether this is true or not of the golden eagle, but again it will not be easy to demonstrate why ".

In the north-east there seemed to be no clear association of non-breeding with the food-supply; non-breeding was found in years when food was very plentiful as well as in years when there was a lot less food. Non-breeding may be more frequent when food is scarcer (see below), but its occurrence when food is in plenty raises a difficult problem. I did not find any relation of non-breeding with climatic factors such as severity of the weather in winter and spring. Even in such extremely severe springs as 1947, 1951, and 1955, after months of snow and frost, the eagles in the north-east were breeding no later than usual and in eyries no less high and exposed than usual. This suggests that the breeding of the eagles in spring is little, if at all, affected by an unusually severe preceding winter.

Non-breeding has also been found quite frequent in several species of African eagles (Brown, 1955 *a* and *b*), and possibly it may be a general feature of eagles. In Africa also, there appeared to be no clear association of non-breeding with smaller food supplies. However, eagles, including golden eagles, are relatively long-lived birds, and they breed slowly, laying usually one or two eggs, and only rarely any more. They rarely lay again after the first eggs have been removed (Gordon, 1955), and the same ancestral nest-sites tend to be used over many years. These adaptations may provide a means for self-limitation of the population (Wynne-Edwards, 1955); and it is clear that non-breeding of eagles could be another such self-limiting mechanism.

Breeding Success and the Food Supply

During the years of the study, there have been marked changes in the population of several species of animals that are important as eagle prey. As the breeding rate and breeding success of avian predators has often been shown to vary with their food supply, it is worth examining whether this occurred with these north-east golden eagles. The greatest change in prey numbers was of course the arrival in 1954-55 of myxomatosis, which almost exterminated the rabbit population of the north-east Highlands (even now, in the summer of 1957, the rabbits are still extremely scarce). Reduced breeding rate of buzzards (*Buteo buteo*) has been reported in various parts of Britain as a result of rabbit scarcity (Moore, 1957), and also a movement of buzzards to new areas; and it seems quite likely that where eagles were used to preying almost entirely on rabbits, the eagles' breeding activity might also be affected by rabbit decimation.

Before this can be studied, one must know what the eagles normally fed on. It was very difficult to find much quantitative information, and actual "kills" by eagles were only rarely seen. However, it was possible to find a rough order of frequency of prey by noting the contents of pellets and also what was taken to the eyries or larder-sites during the breeding season (Table 4). This table is based on many scattered notes

TABLE 4

ORDER OF FREQUENCY OF EAGLE PREY IN BREEDING SEASON

Order of frequency	*Pair* 1	*Pair* 2	*Pair* 3	*Pair* 4	*Pair* 5
1	red grouse or ptarmigan	red grouse	rabbit	red grouse	ptarmigan
2	mountain hare	rabbit	red grouse	rabbit	red grouse or mountain hare
3	others	ptarmigan and others	others	mountain hare and others	others

taken in every year of the study up till the arrival of myxomatosis.

It seems clear that most eagles in the deer-forest areas were used to feeding largely on food other than rabbits. Of pairs 1-5, only pair 3 fed very largely on rabbits, but also to a considerable extent on grouse and other prey ; the other pairs hunted over ground that held few or no rabbits in most years of the survey, and they fed largely on grouse and ptarmigan (*Lagopus mutus*), with rabbits on the whole ranking about third in importance. In the case of pairs 1 and 5, rabbits were taken only very seldom. These areas lie near the altitudinal limit of thriving rabbit communities in the north-east Highlands (about 1,500 feet). For years, rabbits have been nearly always scarce above this level. Though they did become abundant up to this height after some mild winters during and after the war, they were twice cut down almost to extinction by the severe winters of 1947 and 1951, and had not built up again to their former abundance by the time myxomatosis arrived. But though the rabbit was a dominant food for only pair 3, it was still of considerable importance for pairs 2 and 4 also; myxomatosis might, therefore, affect eagles in such cases.

Besides the rabbit decline, there has also been a great reduction since 1953 in the numbers of both red grouse and ptarmigan in this deer-forest area, dropping very low around 1956. On one mountain where I kept a census of ptarmigan since 1951, the population was reduced by more than 50 per cent. between spring 1952 and spring 1956 (mostly between 1954 and 1956). On some other hills, the reduction was even greater, and the fall in numbers of red grouse in this area was also much greater.

Unfortunately I was unable to compare eagle breeding success in this area with their breeding success in other lower parts of the north-east where these game-birds did not become so scarce. But the situation is not so simple as this, because rabbits used to be more abundant in nearly all these lower areas; thus the eagles there were used to feeding much more on rabbits than eagles in the upper deer-forests, and therefore would probably have been affected more by myxomatosis. Mountain hares are preyed upon by eagles in the north-east, but

in the deer-forests they have been fairly scarce since the war, and not nearly as common as on the grouse-moors further down the valleys. Probably the recent increase in hares in the last few years on these lower areas would make up for the lack of rabbits as eagle food, but I have not been able to study eagle breeding success intensively there during these later years.

However, it is known for certain that during the last few years in the upper deer-forests, there has been a great decline in the numbers of game-birds, no noticeable increase in hares which are still scarce, and a virtual extermination of rabbits. Many other foods are eaten by eagles in this area, but the only other important one is carrion. The amount of carrion has changed little from year to year, except in the springs of 1947, 1951 and 1955, when there were unusually many dead deer after the hard winters. Breeding was no more successful in these good carrion years than in most other years. Carrion was undoubtedly an important food for the eagles in winter, but it seemed to have little effect on their breeding activity.

Table 3 shows that since 1955 fewer eaglets have been reared by pairs 1-5, and it might be assumed that this was connected with myxomatosis and the decline in population of the game-birds. However, the lower breeding success was already apparent in the 1955 season, though in fact myxomatosis did not arrive in this eagle country till spring 1955, and did not seriously affect the rabbits there till well into the summer. Clearly some other factor was far more important. In the three years from 1954-56, only eight eaglets were reared by the five pairs, or just over 0·5 young per pair per year, compared with 0·8 per pair per year for the whole period 1946-56. However, such low breeding success was not confined to these later years. In any three years during the earlier period 1947-50, no more than 10 young were reared, or only two more than from 1954-56. Allowing for the greater number of failures due directly and entirely to human interference in 1954-56, the difference in breeding success from these earlier years becomes of no significance.

Perhaps this later period was marked by slightly more non-breeding than usual, but again this would be difficult to prove from these figures and it may well be not significant. There was never more than one of these pairs non-breeding in any

one year in this later period. Furthermore, non-breeding existed long before; during the six years from 1946-51, for instance, there was only one year when it could be stated that non-breeding certainly did not occur. I also have observations from other parts of the north-east which suggest more non-breeding than usual in 1955-57, but of course these data are less useful than those from Table 3 simply because there were so many gaps in year-to-year knowledge of some of these other pairs. In conclusion, it is still possible that a lower eagle breeding-success in the last few years may have been due to a decline of the prey population, but this is not clearly supported by the above observations.

There was also a considerable variation in eagle breeding success from year to year, quite apart from the last few years. For instance Table 3 shows the periods 1945-46 and 1951-53 to be more successful than usual for pairs 1-5 (average of six young per year); in other parts of the north-east, 1945-46 was also probably more successful than usual, but there are not enough data from 1951-53 to warrant comparison. In the period 1948-50, prey was abundant compared with 1954-56, yet eagle breeding success seemed not significantly greater. From 1945-47, grouse and ptarmigan were scarcer than from 1948-50, as they were then still building up from their great decline during the war and did not reach their peak till the years around 1951. However success was much better from 1945-46 (at least 12 eaglets reared and probably more) than in any two-year period from 1948-50 (only 6 or 7 eaglets reared). But though game-birds were scarcer in the earlier period, rabbits were very abundant in the glens then, and were not reduced till spring 1947; including the rabbits, the total prey available in the earlier period was probably considerably greater (especially in the ground of pairs 2-4) than in later years when game-birds were more common but rabbits much scarcer. Again, in the years 1951-53, when success also seemed better than usual, the rabbit population was recovering fast from the 1951 winter, and by 1953 they were again abundant in some places. Besides the rabbits, both grouse and ptarmigan reached their peak around 1951 and did not begin to decline notably till 1954.

It may be noted that after the very high breeding success

in 1945-46, there was a drop to a more usual level of success in 1947 and afterwards. Not only pairs 1-5, but also various other pairs both in and outside the survey area, reared fewer eaglets that year than in 1945 or 1946. In the north-east eagle country, rabbits were almost exterminated in the spring of 1947 because of the exceptionally severe winter. It is unlikely that the severity of the weather in itself could have caused poorer success ; in 1951, after an even more prolonged and severe winter, breeding was no less successful than usual.

To summarise, the two periods that seemed most successful for eagle breeding were both periods of maximum abundance of prey. However, this is very far from saying that any direct connection existed between the eagles' breeding success and the numbers of their prey. Any definite conclusions about this would be untenable, simply because the sample population of eagles was so small. It is also noteworthy that in the West of Scotland the eagles appear to breed successfully and reach a high density (Brown, 1955 *a*), even though the prey population there at its best is usually no greater than that of the north-east at its lowest. Eagles therefore seem to breed fairly well even where or when prey is not really abundant. With pairs 1-5, roughly three or four young were reared in most years, and so the breeding success really varied little from year to year (allowing for the extra disturbance from 1955-57) whether prey was much less abundant than usual or not. The only exception appeared to be that success may have been slightly better than usual during years of great abundance of prey. Also a decimation of prey may possibly have had some effect in depressing such a high eagle breeding success to a more usual level. But so far there has been no good evidence from the north-east that a success actually lower than usual resulted from a considerable decline of prey numbers.

Table 3 also shows that certain pairs were more successful in breeding than others. Though pairs 1 and 2 suffered no human interference during the survey until both were robbed of eggs in 1957, pair 2 reared twice as many young again as pair 1. Pair 1 reared two young not once, whereas pair 2 reared two young more often than one alone. Such a difference could be due to a difference in hunting ability of the two pairs, a difference in abundance of prey in the two areas, or to both

these factors. In this case, there was throughout the survey a notable difference in abundance of prey between the two areas. In every year, grouse and rabbits were much more abundant in pair 2's ground, hares slightly commoner, and ptarmigan and other prey about equally common in both areas.

Though these problems of food and breeding success are highly interesting, discussions on the subject can hardly avoid being speculative at this stage. These points are being offered here only as tentative suggestions, as it is too early to try to draw any conclusions. The study will have to go on longer, and there is also a great need for more evidence from other parts of Scotland. Such evidence of course tends to be circumstantial, but given a sufficient variety of different areas and conditions, it might be possible to draw some definite conclusions by comparison. Information about eagle food and breeding success is being collected by Dr. J. D. Lockie, The Nature Conservancy, 12 Hope Terrace, Edinburgh, and he would be pleased to hear of any such observations made by readers.

In spite of the lower breeding success of the deer-forest eagles in the last few years, the adult breeding population has not declined in the slightest and they may still be more than replacing normal losses. What happens to the young eagles that disappear about the end of the year is not yet known for certain. But it seems likely that many of them move to other areas where the adult population is less dense. Some young eagles are shot or trapped from time to time on the lower parts of the survey area, and also many others trapped or shot on north-east moors outside the area; the numbers involved are so large that they could not possibly have been reared locally. Probably these deer-forests in the north-east are acting as reservoirs from which surplus young wander away to replace to some extent those heavy losses of eagles on sheep-grouse country, such as Sandeman found in his more southerly area.

Summary

1. A survey of the population of golden eagles (*Aquila chrysaëtos*) in the north-east Highlands of Scotland was carried out from 1944 till 1957.

2. Twelve adult pairs (14 in 1946) occupied 220 square miles; maximum density was therefore one pair per 10,000 acres. However, much of the region was not visited by breeding eagles; on one regularly hunted deer-forest area, five pairs occupied an average of about 6,000 acres each. In the rest of the region, the density was lower, mainly because of human persecution.

3. The eagles' hunting areas overlapped considerably; it is therefore difficult to delimit the hunting area, which seems more akin to a " home-range " than to a " food-territory ".

4. Twelve pairs owned a total of at least 64 eyries, or about 5·3 each; one pair had as many as 9, and two pairs as few as 3 eyries each. 19 eyries were in pine trees and the rest in rocks.

5. During twelve years from 1946-57, five closely studied pairs reared an average of 0·8 young per pair per year. Three of these pairs were very successful, rearing an average of one young per pair per year. Other pairs were less successful, mainly due to human interference. The average number of young leaving a successful nest was 1·3. In the region as a whole, no young were reared from at least a third of the known clutches.

6. Some cases of non-breeding were found, among adult as well as immature birds, and during years when food was very plentiful as well as when it was much scarcer.

7. There was some variation in breeding success from year to year. This is discussed in relation to the food supply of the eagles.

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REVIEW OF ORNITHOLOGICAL CHANGES IN SCOTLAND IN 1956*

Evelyn V. Baxter

Upper Largo

The Scottish Bird Records Committee of the Scottish Ornithologists' Club have now reviewed the records published in 1956. The American element so conspicuous in 1955 was slight in 1956, and there were not as many records of birds new to areas and counties as in 1955.

No special immigration of any species was recorded, but there was a remarkable movement of passerines in early September 1956, mainly Whinchats, Redstarts, and Pied Flycatchers. Bluethroats were also unusually common.

BIRDS NEW TO SCOTLAND

Least Sandpiper or American Stint *Calidris minutilla*

One obtained Pool of Virkie, Shetland, 14th August 1955. Now in Royal Scottish Museum. Breeds Arctic America (*Fair Isle Bird Obs. Bull.*, 3: 76).

[Little Auk *Plautus alle polaris*

Several little auks sent from Shetland in the winter of 1955-56 to Bolton Museum were there identified by A. Hazelwood as belonging to this race (*F.I.B.O. Bull.*, 3: 77, and *Bull. B.O.C.*, 76: 107). Their measurements do not, however, confirm this identification.]

Thick-billed Warbler *Phragamaticola aedon*

A thick-billed warbler was trapped on Fair Isle, on 6th October 1955. In addition to being new to Scotland, it is also new to Europe. It breeds in south-east Siberia from the Yenesei eastward to Manchuria and North China (*F.I.B.O. Bull.*, 3: 3, and *Brit. Birds*, 49: 89).

* *Received 7th September* 1957

BIRDS NEW TO AREAS AND COUNTIES

Black-necked Grebe *Podiceps nigricollis*

A black-necked grebe reported from Portmore Loch, on 5th August 1956, is the first record for Peebles (*Edin. Bird Bull.*, 6: 67). Another seen at Loch Leven, on 18th October 1956, is the first for Kinross (*ibid.*, 7: 12).

Manx Shearwater *Procellaria puffinus*

Occasional autumn and winter off Rosneath; first for Dunbarton (*Glas. Bird Bull.*, 5: 15).

Sooty Shearwater *Procellaria grisea*

Sooty shearwaters seen off Dunnet Head on 22nd August 1955, and Buchan Ness on 8th September 1955, are the first recorded for Caithness and Aberdeen respectively (*Scot. Nat.*, 68: 177, and *F.I.B.O. Bull.*, 3: 62).

[Flamingo *Phoenicopterus* sp.

A flamingo said to be a Chilean bird was seen at Cramond on 7th September 1955 (*Edin. Bird Bull.*, 6: 33); and one reputed to be an African bird was seen at Loch ma Haik in early September 1955 (*Scottish Field*, February 1956). Both probably escapes.]

Long-tailed Duck *Clangula hyemalis*

This species was seen at Bothwell Bridge from 10th to 19th March 1955, at Hamilton from 21st April to 11th May 1955, and at Possil Marsh on 26th May 1955, possibly all the same bird. It is new to Lanark (*Scot. Nat.*, 68: 158).

[Harlequin-Duck *Histrionicus histrionicus*

A bird identified as a female of this species was reported from the Pool of Virkie, Shetland, on 16th October 1955 (*F.I.B.O. Bull.*, 3: 74, and *Brit. Birds*, 49: 36); but this appears to have been a misnomer, since the bird can be shown with certainty from the published descriptions and photograph to have been a juvenile long-tailed duck (*Clangula hyemalis*).

There is a generally unrecognised danger of confusion between the juveniles of these two species. They are very nearly the same size, and in each the most obvious field-characters are the essentially similar light or white markings on the sides of the head, in front of and behind the eye. There is some individual variation in their shapes and positions, but if the two species could be directly compared, the markings, especially the one behind the eye, would appear bolder and sharper in the harlequin than in the long-tailed duck. The most conspicuous difference, however, is in the underparts; in the long-tailed duck the lower breast and belly are white, whereas in the young harlequin the whole underparts are more or less dusky, the lower breast being ashy-grey barred with brown. In addition, the long-tailed duck has a fairly typical diving-duck bill, 15·5 mm. wide at the nostrils, whereas the harlequin's bill, although much the same in length and profile is remarkably compressed and narrow, and only 12 mm. wide at the nostrils.

The published descriptions and photograph referred to above unmistakably disclose the less clearly defined face markings, the white underparts and the broad bill of the juvenile long-tailed duck.

A letter from Professor Wynne-Edwards drawing attention to these details, and accompanied by a sketch, has been published in *British Birds* (50: 445).]

Smew *Mergus albellus*

A female on Loch Leven, on 18th December 1955, is the first record for Kinross (*Edin. Bird Bull.*, 6: 23).

[Bean-Goose *Anser arvensis arvensis*

A flock at East Kilbride, on 27th December 1954, is reported (*Glas. Bird Bull.*, 5: 3), but the Committee cannot accept this record on the evidence available.]

[Dark-breasted Brent *Branta bernicla bernicla*

A small flock seen near East Kilbride on 27th December 1954, is noted (*Glas. Bird Bull.*, 5: 3), but the Committee cannot accept this record on the evidence available.]

Whooper Swan *Cygnus cygnus*

One recorded from St. Kilda, on 28th May 1955, is the first definite record for the island (*Scot. Nat.*, 68: 16).

Bewick's Swan *Cygnus columbianus bewickii*

A Bewick's swan seen at Gartmorn Dam, on 2nd January 1956, is the first for Clackmannan (*Edin. Bird Bull.*, 6: 36), and one found dead on the Isle of May, on 15th April 1956, is new to that island (*ibid.*, 6: 51).

Iceland Falcon *Falco rusticolus islandus*

An Iceland falcon reported from Loch Leven, on 29th September and 7th October 1956, is new to Kinross (*ibid.*, 6: 68).

Grey Plover *Charadrius squatarola*

Three on Hule Moss, 17th September 1955, are claimed as new to Berwick (*ibid.*, 6: 35). There are, however, previous records (see A. H. Evans, *Fauna of the Tweed Area*, p. 197; and G. Bolam, *Birds of Northumberland and the Eastern Borders*, p. 521). Reports of two on Pabbay, Skye, between 18th February and 4th March 1956, were rejected on the grounds of insufficient evidence.

[Northern Golden Plover *Charadrius apricarius altifrons*

Birds of this form were recorded, on 10th and 13th May 1955, at Fair Isle (*F.I.B.O. Bull.*, 3: 12), but the Committee do not now consider this a valid race.]

Black-tailed Godwit *Limosa limosa*

One at St. Kilda, on 29th May 1955, is new to that island (*Scot. Nat.*, 68: 18), and one at the mouth of the river Endrick, on 11th August 1955, is new to west Stirling (*ibid.*, 68: 159).

[Spotted Redshank *Tringa erythropus*

The Committee consider the record of a spotted redshank seen at Clumley, on 16th September 1955 (*F.I.BO. Bull.*, 3: 76), to be unsatisfactory.]

[Broad-billed Sandpiper *Limicola falcinellus*

A bird of this species was recorded in the first half of August 25 miles south of Oban (*Country Life*, 18th October 1956) but the evidence is not completely satisfactory.]

Stone-Curlew *Burhinus oedicnemus*

One at Dunrossness, on 2nd June 1955, is the first record for Shetland except Fair Isle (*F.I.B.O. Bull.*, 3: 23).

[Arctic Skua *Stercorarius parasiticus*, and Great Skua *Catharacta skua*

Occasionally seen off Rosneath (*Glas. Bird Bull.*, 5: 44), but without date or details these records are unsatisfactory.]

Scandinavian Lesser Black-Backed Gull *Larus fuscus fuscus*

Three seen at Ayr, on 8th March 1955, are the first record for that county (*Scot. Nat.*, 68: 160).

Black Tern *Chlidonias niger*

One at Loch Leven, on 17th September 1955, is the first record for Kinross (*Edin. Bird Bull.*, 6: 23).

Wood-Pigeon *Columba palumbus*

A wood-pigeon seen on three occasions on St. Kilda, in May 1955, is an addition to the list for that island (*Scot. Nat.*, 68 :19).

Golden Oriole *Oriolus oriolus*

One seen on 14th May 1951, at Rosneath (*Glas. Bird Bull.*, 5: 32), was turned down owing to insufficient evidence, but we now have more details and consider it to be the first record for Dunbarton.

Marsh-Tit *Parus palustris*

Two in the Hermitage of Braid on 1st April 1956, are new to Midlothian (*Edin. Bird Bull.*, 7: 15). This has since been confirmed by a number of later records.

White's Thrush *Turdus dauma aureus*

On 3rd January 1956, a male was shot at Pitcarmick. It is new to Tay and north Perth (*Scot. Nat.*, 68: 120).

Red-spotted Bluethroat *Cyanosylvia svecica svecica*

One at Balcomie, on 23rd September 1956, is new to north Fife (*Edin. Bird Bull.*, 6: 72); and one at Ballantrae, on 15th and 16th June 1955, is the first record for Ayr (*Scot. Nat.*, 68: 160).

Sedge-Warbler *Acrocephalus schoenobaenus*

One on St. Kilda, 27th to 29th May 1955, is the first record for the island (*Scot. Nat.*, 68: 20).

Melodious Warbler *Hippolais polyglotta*

On 16th September 1955, a melodious warbler visited Fair Isle, the first for this island (*Brit. Birds*, 49: 94).

Greenish Warbler *Phylloscopus trochiloides*

A bird of this species was on the Isle of May from 27th August to 3rd September 1955, the first record for the island (*Scot. Nat.*, 68: 44; and *Brit. Birds*, 49: 43).

Red-breasted Flycatcher *Muscicapa parva*

One seen at Barnsness on 23rd September 1956, is the first record for East Lothian and second for the Scottish mainland (*Edin. Bird Bull.*, 6: 69).

Woodchat Shrike *Lanius senator*

A woodchat shrike on Foula on 28th May 1955, is new to Shetland ex Fair Isle (*F.I.B.O. Bull.*, 3: 10).

Red-backed Shrike *Lanius cristatus collurio*

A male found dead near Clynder, on 30th May 1952, is new to Dunbarton (*Glas. Bird Bull.*, 5: 38); while one seen on Pollok estate near Glasgow, on 25th September 1955, is the first record for Renfrew (*Scot. Nat.*, 68: 161).

Lapland Bunting *Calcarius lapponicus*

Two Lapland buntings seen at Scourie, on 15th September 1953; and one seen at Rogart, on 1st December 1953, are new to west Sutherland and south-east Sutherland respectively (*Brit. Birds*, 49: 7).

BREEDING RECORDS

[Manx Shearwater *Procellaria puffinus*

Recorded as breeding on Glunimore in 1955, when two young birds were dug out of their nest-burrows on 2nd September (*Glas. Bird Bull.*, 5: 1, and *Scot. Nat.*, 69: 53). No adults were taken from these nests, and there arises the possibility that the young of this species may be confused with young puffins (*Fratercula arctica*). Fuller details have not been supplied, and the Committee have therefore decided to place the record in square brackets.]

Shoveller *Spatula clypeata*

A nest and eggs found near Balmaha is the first breeding record for west Stirling (*Scot. Nat.*, 68: 158).

Red-breasted Merganser *Mergus serrator*

A pair nesting at Loch Arklet is the first breeding record for west Stirling (*Glas. Bird Bull.*, 5: 34). It is, however, common in the Loch Lomond district in summer.

Oyster-Catcher *Haematopus ostralegus*

Also found breeding on Loch Arklet and new to west Stirling (*Glas. Bird Bull.*, 5: 34), though common in the Loch Lomond district in summer.

British Lesser Black-backed Gull *Larus fuscus graellsii*

Nest and eggs found Loch Arklet (*Glas. Bird Bull.*, 5: 39): the first record for west Stirling.

Common Tern *Sterna hirundo*

A pair bred beside the Clyde above Hamilton: first breeding record for Lanark (*Scot. Nat.*, 68: 160).

Sandwich Tern *Sterna sandvicensis*

Eggs were found in 1955 on a fresh-water loch near Durness, and young hatched (*Scot. Nat.*, 68: 179). This is the first record for north Sutherland.

Great Spotted Woodpecker *Dendrocopos major*

Bred in Arran in 1955, and possibly earlier (*Birds of Island of Arran*, 1955 and 1956, p. 23).

Swallow *Hirundo rustica*

Bred on the Isle of May in 1956, the first breeding record for the island (*Edin. Bird Bull.*, 6: 51).

Crossbill *Loxia curvirostra*

Bred at Dawyk, Peebles, in 1956; the first-known nesting in Peebles (*Scot. Nat.*, 68: 182).

RARE MARINE INVERTEBRATES RECENTLY FOUND IN THE SCOTTISH AREA *

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This paper covers the period March 1953 to April 1957. A previous one, for November 1950 to February 1953, was published by Stephen (1953). Some specimens were received at the Royal Scottish Museum, Edinburgh and some at the Scottish Home Department's Marine Laboratory, Aberdeen. Thanks are due to all fishermen, fishery officers and others who contributed to the compilation of this note.

Palinurus vulgaris Latreille—Spiny Lobster

Records of this species in Scottish waters up to the end of 1955 have been published by Wilson (1952, 1954, 1956) and Campbell (1953). Since the beginning of 1956 the following additional records have been listed.

	Date	*Position*	*Gear*	*Sex*
1.	1956 14 Jan.	9′ N.N.W. Dunnet Head, N. Coast	Trawl	Female
2.	25 Feb.	Scourie Bank, N. Minch	Trawl	Female
3.	27 Feb.	6′ W. Hoy, Orkney	Seine	Female
4.	11 July	Off Ronas Voe, Shetland	Seine	Male
5.	26 Oct.	Off Arnish Pt., Lewis, N. Minch	Seine	Male
6.	28 Dec.	Off Whiten Head, N. Coast	Trawl	Male
7.	1957 18 March	50′ N.½W. Foula, Shetland	Trawl	Female
8.	1 April	4′ off Macduff, Moray Firth	Seine	Female
9.	6 April	Near Portree Harbour, Skye	Cod-net	—

None of the females was carrying eggs. The Ronas Voe specimen still survives in the Laboratory aquarium; casting took place in February 1957. The lobster which cast in the aquarium in June 1955 (Wilson, 1956) moulted for the second time in captivity in September 1956, and still survives.

* *Received 22nd May 1957*

Numbers 7 and 8 in the above list have also been kept alive. Number 8 is specially noteworthy; it is only the third known record from the Scottish east coast. Also, only once previously has a spiny lobster of equivalent size (carapace length 6·3 cm.) been recorded from the Scottish area. This was number 5 above, and the capture of these two adolescents provides useful evidence as to the possibility of the upgrowth in our northern waters of current-transported larvae (Wilson, 1952).

A single, very small larval stage, obviously only recently hatched out, was taken in a plankton net at 58°27′N., 8°00′W., on 28th July 1956.

Tritonia hombergi Cuvier

The stomach contents of a lesser-spotted dogfish (*Scyliorhinus caniculus*), caught by a research vessel ten miles north of the Butt of Lewis on 7th March 1956, included some material which was identified by Dr. W. J. Rees of the Natural History Museum, London, as the jaws of the nudibranch *Tritonia hombergi*. More than a dozen specimens of the nudibranch were evidently present.

Sepia officinalis L.

1. About twenty cuttlefish " bones " were observed on the beach between Brora and Berriedale, by Mr. John Sutherland of Helmsdale, in December 1953. Mr. Sutherland stated that " pens " were also plentiful there during the winter of 1951. This latter observation is in agreement with reports mentioned in the 1953 list.

2. Many " bones " were seen on Aberdeen beach from 14th to 18th February 1954. Samples which were collected and measured fell into three distinct size groups:

(i) 3·7 to 7·6 cm.; (ii) *c.* 11 to 12 cm.; (iii) 14·5 to 18·0 cm.

This provides evidence of a unique occurrence in the presence of small *Sepia* in Scottish waters.

3. One was taken by a seiner 8′ N.W. of Fraserburgh on 7th December 1956.

4. Two more were caught by another vessel, 50′ E.N.E. of Fraserburgh, on the same date.

5. The stranding of about twenty fully grown " pens " on the beach below Old Slains Castle, Aberdeenshire, in December 1956, was reported by Mr. J. F. Sutherland.

6. A similar stranding was observed on the shore near Girdleness Lighthouse, Aberdeen, in mid-January 1957. It is understood that in this case the numbers were considerably greater and that forty to fifty complete " pens ", from 9 to 10 inches in length, were collected for pet birds.

7. From eight to ten were caught by a trawler 90′ N.N.E. of Buchanness on 21st and 22nd February 1957.

8. One was seen in the catch of a Shetland seine-net boat on Aberdeen market on 15th March 1957. Fishing grounds were stated to have been about 20′ N.W. of Foula.

9. The record of another stranding—a single " bone " picked up at Greyhope Bay (north of Girdleness Lighthouse) on 13th April 1957—was received from Mr. A. Clark, Aberdeen, who also provided the information given at item 6 above.

Ommatostrephes sagittatus Lam.

1. One was taken alive from the water at Footdee, Aberdeen, on 28th April 1954.

The following records were obtained from research vessel trawl catches.

	Number	*Date*	*Position*
2.	One	20th May 1954	57°12½′N., 1°56½′W.
3.	One (small)	14th October 1954	56°47′N., 1°05′W.
4.	One	21st September 1955	57°00′N., 1°00′E.
5.	One	29th July 1956	59°30′N., 1°00′E.
6.	One	8th October 1956	55°12′N., 0°20′E.
7.	Three	24th October 1956	62°02′N., 6°00′W.

Although this last record is from eastern Faroese grounds it is convenient to include it with Scottish records.

Todaropsis eblanae Ball

One was caught by a research vessel in the Buchan Deeps on 15th June 1956 and is now preserved in the Royal Scottish Museum. It is one of our rarer squids, having been recorded on only three occasions from the west and north of Scotland.

Architeuthis sp.

A fine specimen of this giant squid was caught by the Aberdeen trawler *Viking Prestige*, Skipper James Slater, 6′ N. × E. of Rattray Head during the night of 1st February 1957. From the tip of the longest tentacle to the tip of the caudal fin the animal measured 23 feet 11 inches. This is the third Scottish record of *Architeuthis* since the end of the Second Great War (Rae, 1950; and Stephen, 1953). A fuller account of this animal will be published later.

It is obvious that the numbers of unusual cephalopods were greater in 1956 than in any other year covered by this summary. As most of the rare squid records have resulted from operations by research vessels, there may well have been many others present among the considerable quantities of common squid (mostly *Loligo forbesii*) now landed by fishing vessels in the latter half of the year.

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ZOOLOGICAL NOTES

Leathery Turtles in the Northern North Sea.—In *Nature*, 179 : 163-164 (19th January 1957), J. F. Willgohs, of the Zoological Museum at the University of Bergen, records the capture of four specimens of the leathery turtle (*Dermochelys coriacea*) in different parts of the northern North Sea in the late summer of 1956. One of these was harpooned during the basking-shark fishery 40 miles north-east of North Flugga, Shetland, on 5th September.

In Dr. A. C. Stephen's paper on Scottish turtle records (*Scot. Nat.*, 65: 108, 1953) it was pointed out that the leathery turtle is not known ever to have been stranded on the coasts of Scotland. (It has occured a few times in England and once in Wales, cf. Malcolm Smith, *The British Amphibians and Reptiles*, 1951, p. 264.) It seems of interest, therefore, to draw attention to this record of its occurrence offshore.—Editors.

Notes on Summer Birds in Islay.—With reference to the paper by Meiklejohn and Stanford on the birds of Islay in summer (*Scot. Nat.*, 66 : 129-145), I would like to add the following additional notes on birds that I saw on Islay between 31st May and 3rd June 1955 :—

Common Scoter *Melanitta fusca*. Three pairs seen at one locality.

Mute Swan *Cygnus olor*. One pair seen with eight young at Loch Allan near Port Askaig.

Whimbrel *Numenius phaeopus*. One seen and heard at Loch Gorm.

Greenshank *Tringa nebularia*. One seen and heard at Loch Skerrols.

Carrion Crow *Corvus corone corone*. Two near Port Ellen.

Chough *Coracia pyrrhocorax*. Choughs seemed to have declined in one district where I saw only four : at the same place, on 10th June 1943, six adults and six young were seen.

Chiffchaff *Phylloscopus collybita*. At least three were singing in the trees around Loch Skerrols.—Pat W. Sandeman, Edinburgh.

A Fulmar far inland in Angus.—On 22nd June 1956, a clear sunny day, I saw a fulmar (*Fulmarus glacialis*) at the head of Glen Clova, Angus, 30 miles from the sea. I was near the summit of Cairn Broadlands (2,796 feet), at the top of a steep scree slope with rocky outcrops, when the fulmar appeared a few hundred feet

below me, flying close to the cliffs. It was in view for about half a minute before it disappeared northwards up the glen, still contouring close to the hill-side. I was on this same hill for six further consecutive days without seeing it again. There was no question of it being storm-driven, as the weather had been calm for over a week.—G. B. Corbet, Dundee.

King-Eider on the Tay Estuary.—On 3rd November 1956, I observed a male king-eider (*Somateria spectabilis*) on the Tay estuary, while taking part in the monthly National Wildfowl Count. The bird was seen at Tentsmuir Point, in Fife, where the Tay enters the sea. I had an excellent view of it in bright sunlight, as it swam fairly near me, slightly inshore from the main stream of thousands of common eiders (*S. mollissima*) out in the channel. The clear-cut markings of the male king-eider were visible even with the naked eye. It was in full winter plumage, with the bill and front of the forehead red in colour, and a pinkish-white breast. The rest of the fore-parts and the shoulder were white, the back was black, and the rest of the body black with some white along the sides. It seemed smaller and more compact than male common eiders. Three female eiders were swimming in company with the bird.—James Blyth, Dundee.

The area around the mouth of the Tay is well known to be favoured by king-eiders. Most of the king-eiders recorded in mainland Scotland have been seen there (*The Birds of Scotland*, p. 435).—Editors.

Coition of Golden Eagles in Skye.—On the afternoon of 7th March 1957, I was watching the eyrie of the pair of golden eagles (*Aquila chrysaëtos*) whose record of nesting I have given in my recent book *The Golden Eagle*. The male of this pair is a most attentive husband, taking his spells at incubation several times daily, and working as hard at repairing the eyrie as his mate. On the afternoon of 7th March he was carrying heather branches to the eyrie. After the last of his visits he flew to a rocky spur, and after he had alighted I saw that his mate was standing on some heather just below the skyline. He flew over to her, a distance of seven or eight feet, mounted, and mating took place, his wings being moved to steady himself. She stood quite still and passive, her head lowered so that it almost touched the ground. After mating, she began to feed on the carcase of a rabbit which had been deposited nearby,

and he paid another visit to the eyrie almost at once, carrying a heather stem in his bill. A few minutes later, both set out on a flight down-wind, just below the cloud-ceiling. In previous years, this pair of eagles have usually had eggs between 8th and 12th March.—Seton Gordon, Isle of Skye.

Golden Eagle Display in late June.—On 26th June 1950, I watched a form of display by golden eagles (*Aquila chrysaëtos*) that I have not found recorded elsewhere. The display took place in an upland Aberdeenshire glen, in the main Grampian mountain range. I had just visited an eyrie from which one adult eagle and one fully-grown eaglet had flown. The eaglet flew a long way out of sight so it had obviously been flying for some days. The adult was soon joined by a second larger adult (which I took to be a female), and the two then flew over to a hillside about half a mile away. It was only when they were flying in the last few yards before alighting that I noticed a third adult eagle standing in the heather at that point. This third eagle was also large, and probably a female. The first eagle (which was now clearly seen to be smaller than the others and so probably a male) then began to display to the third one, jerking its head rapidly up and down and fanning its tail out and in. The third bird showed no reaction, though the display carried on for well over a minute. Just afterwards, all three took flight and flew out of sight. I presumed that here was an adult pair (which had an eaglet) joining a third adult (probably a female). Another eagle pair bred only two miles away that year, but I was unable to find if the third eagle belonged to this pair or if it was unmated.—Adam Watson, Aberdeen.

Uncommon Waders at Flood-Water in Moray.—After heavy rain at the end of July 1956, the River Lossie flooded a number of fields near Elgin. After partly drying out they were again flooded on 14th August and 4th September. Many birds, chiefly lapwings and black-headed gulls, fed at three main pools, and at one of these a green sandpiper (*Tringa ochropus*) was seen on 18th August. A spotted redshank (*Tringa erythropus*) was seen on 25th August and eight ruffs (*Philomachus pugnax*) on 27th August. There were ten ruffs the following day and varying numbers subsequently; 17 on 31st August, 19 on 1st and 4th September, none on 6th September, and three from 17th to 22nd September. The last, solitary, ruff was seen on 25th September. On 31st August and 1st September

there was also a wood-sandpiper (*Tringa glareola*) at one of the pools along with two common sandpipers (*Tringa hypoleucos*), lapwings, and ruffs.—R. Corbet and R. Hewson.

A white-winged Lapwing.—Dr. Arthur M. G. Kinnear of Dumfries reports seeing a lapwing (*Vanellus vanellus*) with completely white primaries, on the Merse at Blackshaw, Dumfriesshire, on 17th November 1956. Other cases of albinism in the lapwing are referred to by K. G. Spencer (*The Lapwing in Britain*, 139).—Editors.

Green Sandpiper in Inverness-shire in August.—On 12th August 1956, I saw a green sandpiper (*Tringa ochropus*) at a lochside in the neighbourhood of the Cairngorms in Inverness-shire.—Raymond Hewson, Dufftown.

Mr. Hewson's record is from a date when the green sandpiper could quite likely have been on passage. However it seems worth pointing out that his observation was made in an area where green sandpipers have often been seen displaying in summer. Nethersole-Thompson saw a single male green sandpiper displaying near another loch, not very far from where Mr. Hewson saw his bird, during several different summers from 1933 to 1948. In 1935, 1942, and 1948, there was a pair at the same place (*The Birds of Scotland*, p. 577), and Nethersole-Thompson suspected breeding, especially in 1935 (*The Handbook*, vol. 4, p. 312), though no eggs or young were found.—Editors.

Grey Phalarope in Orkney.—On 15th June 1956, when walking along the sands of the Bay of Skaill, Orkney, at low tide, we spotted an unusual looking wader feeding with some ringed plovers at the ebb. It was about the same size as these birds, but looked more elongated and had shorter legs. Its underparts and neck were reddish-buff, its crown dark. There was a black line at the eye with white above and below the eye and on the sides of the face. The bill was yellow with a black tip, and the legs were yellowish. Its identity as a grey phalarope (*Phalaropus fulicarius*) was quickly confirmed when it suddenly took flight, alighted on the sea, and behaved in typical phalarope manner. In flight the underwings looked white, and there was a thin wing bar. The bill looked stouter than that of the red-necked phalarope, which we know well.
—Irene Kinnear and George Waterston, Edinburgh.

Nesting of Great Black-backed Gull, Herring-Gull and Common Tern in Dumfriesshire.—On 3rd July 1956, recently formed colonies of the lesser black-backed gull (*Larus fuscus*), herring-gull (*L. argentatus*) and common tern (*Sterna hirundo*) and a single pair of great black-backed gulls (*L. marinus*) were found nesting on Caerlaverock Merse, a Dumfriesshire salt-marsh. According to the *Birds of Dumfriesshire* (Gladstone, 1910) and the *Birds of Scotland* (Baxter and Rintoul, 1953) the last three species were not known to nest in this county previously.

Roughly 50 pairs of lesser black-backs and several pairs of herring-gulls were nesting on the eastern half of the marsh. The birds had obviously lost their eggs repeatedly, for many were still incubating or even laying on this late date. Usually the occupied nest was within a few yards of a group of empty nests representing earlier failures. Fourteen lesser black-back nests, mostly with two or three eggs, and one of the herring-gull (three eggs), were found. The great black-back nest, containing two eggs, was towards the landward edge of the colony, but within a short distance of sitting lesser black-backs. The incubating great black-back was flushed to prove identity of ownership. The nest and its site did not differ from those of the lesser black-backs, all consisting of a hollowed pad of dried grass amongst the salt-marsh turf on perfectly level dry ground. The height of the sward varied, reaching nine inches over some of the nesting ground, but more closely-cropped in places. The grassy vegetation on this area was composed mainly of *Festuca rubra*, *Agrostis canina* and *Juncus gerardii*, with an abundance of *Glaux maritima*, *Plantago maritima* and *Triglochin maritimum*. This was a mature salt-marsh community, at a level submerged only by high spring tides.

The common tern colony consisted of at least three groups, scattered over about two miles of marsh and totalling about 50 pairs. Of 21 nests, three had single eggs, ten had two, and the remainder had three eggs each. All were at the seaward edge of the marsh, and most of the terns had chosen the same kind of nesting site as the gulls, in short turf. The other nests were situated on the more open, lower-lying sandy flats, colonised by a sparse pioneer growth of *Puccinellia maritima*—sites more vulnerable to high tides

Both gull and tern nesting places were identical with those of the older-established colonies of these birds on the Cumberland Solway marshes of Rockcliffe and Long Newton. Most of the birds which breed on the Solway salt marshes were seen on Caerlaverock. A straggling colony of black-headed gulls (*Larus ridibundus*) occupied the outer edge of the marsh, and nests with eggs were seen.—D. A. Ratcliffe, Edinburgh.

Not long after the above records were received, we were sent the following notes by Mr. Mayer-Gross, who had independently found all three species breeding at Caerlaverock Merse in earlier years.—Editors.

Though there appear to be no records of the herring-gull, great black-backed gull, and common tern breeding in Dumfriesshire, in the last few years I have found all three species breeding on Caerlaverock Merse. On 1st July 1953, I found one nest of great black-backed gull there, with three well-incubated eggs. One or two further pairs were seen there in 1953 and in subsequent years, and also to the east of the mouth of the river Lochar.

Also on 1st July 1953, I found a herring-gull's nest on Caerlaverock, in a colony of lesser black-backed gulls. One pair of herring-gulls was present, and one bird was watched moving on to the nest, which contained two eggs. A pair was seen at the same place in the summers of 1954 and 1956; on 18th July 1954 they defended the area around an empty nest by calling and diving, possibly because they had small young nearby.

The common terns were first found nesting on 16th June 1951 on the merse; six nests with eggs were seen, and on 18th July 1951 three more nests and eight small young. Only a small part of the colony was visited then; but on 1st July 1953 I estimated there were 125 pairs in two scattered colonies, and I saw 30 nests with eggs, and a few nestlings. In June 1956 there was still a large colony.—Henry Mayer-Gross, Glasgow.

Wood-Pigeon nesting in a barn.—A pair of wood-pigeons (*Columba palumbus*) nested in a barn at Cairn of Craigs farm, Dumfries, in the summer of 1956. The first nest was built at the end of April, but after a short period of incubation it was pulled out and thrown to the ground. Mr. Glencross, the farmer, said he thought the eggs were infertile. A second nest was later made in a more secluded corner of the barn; the material of the first nest was probably used in its construction, as this material disappeared when the second nest was built. Incubation started about 24th May, the two young were ringed on 19th June, and one was successfully reared, the other being killed by a cat shortly after leaving the nest.—William Austin and Ian F. Stewart, Dumfries.

The inside of a barn appears to be a most unusual site for wood-pigeon breeding. *The Handbook* records them breeding occasionally " . . . on ledges of rocks in parts of Wales, and on buildings in towns."—Editors.

Collared Doves nesting in Scotland.—About the beginning of June 1957, one of the writers (A. A.), on his farm at Covesea, Morayshire, heard the cooing of a strange dove. It reminded him strongly of the note of the African collared dove (*Streptopelia roseogrisea*) which he had frequently heard in Africa. The bird, when seen, also struck him as being extremely similar to the above species. The doves—there was a pair of them—were soon identified as collared doves (*S. decaocto*), a species which, after a spectacular spread across Europe, has recently obtained a foothold in Norfolk.

About the middle of June the birds were thought to be sitting, and on 30th June the nest was found on a *Cupressus macrocarpa* tree, one of a line bordering the garden wall. It was in a very dense part of the tree, about 15 feet above the ground. It was rather solidly built of sticks, and lined in the centre with thick brown roots. The tree was first climbed on 30th July. The nest then contained one young which flew strongly when approached, and one infertile egg now in the Royal Scottish Museum, Edinburgh.

No observations were made in August, but on 10th September it was clear that the birds were not nesting again. The juvenile from the first brood was still with its parents much of the time, but in the latter half of the month it became more independent. At the time of writing, 6th October, there is still no evidence of a second brood.

The identification of the birds was confirmed by Mr. William Crawford, Rothes, who has seen the species in Norfolk, and also by the other authors.

The birds were rarely seen away from the farm, usually feeding within its precincts or in the cottage gardens around, and not in the fields. They were quite tame and approachable to within a few yards. Two notes were heard, both from the male only. One was the cooing song, delivered usually from one of a few favoured posts, a telephone pole, or a tree. It sounds like " coo-cooo—cu " ; the last note is quite short and given after rather a long pause. The second call was heard when the male was returning to, following, or displaying to the female. It is a penetrating scream, rather like a very distant call of a peacock to one of the writer's (R. R.) ear. It is undoubtedly the note heard and described by Richardson, Seago and Church (*Brit. Birds*, 50: 243), and interpreted by them as a threat note. Yet we did not notice any provocation to a threat in the case of the Covesea birds.—Alistair Adam, William Crawford, Raymond Hewson, Alastair Raffan, Roland Richter.

The spread of the collared dove also continued in other parts of Britain in 1957. Breeding occurred in Norfolk, Lincolnshire

and in one other English county, and one or more single birds were recorded in several other English counties. All the 1957 records are to be published in *British Birds*, and we are indebted to the Executive Editor, Mr. I. J. Ferguson-Lees, for the information in this editorial note.—Editors.

Red-backed Shrike in Inverness-shire.—With reference to the record of the red-backed shrike (*Lanius cristatus collurio*) seen near Coylumbridge on 1st June 1954 (*Scot. Nat.*, 66 : 127), and included in the " Review of ornithological changes in Scotland in 1954 " (*Scot. Nat.*, 68 : 7), as new to Inverness, Miss Cynthia Longfield has reminded me of a previous occurrence, also at Coylumbridge, which has not hitherto been recorded. On 9th June 1947, a male red-backed shrike, still showing features of juvenile plumage, was seen near Coylumbridge by Miss Longfield and Mr. P. W. E. Currie, and subsequently on the same afternoon by four more ornithologists, all members of the London Natural History Society. All were agreed as to the bird's identity, age and sex. Their attention was first drawn by the outcry made by four or five willow-warblers that were mobbing the shrike as it perched on a juniper bush.

Later, in July 1947, at the same place, Miss Enid McEwan saw a red-backed shrike, probably the same bird, but now in full male summer plumage. It is interesting that this species, so seldom observed in the Highlands and never previously recorded from East Inverness, should now have been reported three times in seven years near Coylumbridge.

Miss Longfield tells me that she mentioned these interesting observations to me and two other Scottish ornithologists at the Ornithological Congress in Edinburgh later that summer, and I must apologise that we omitted to note these observations when the record of the 1954 occurrence was published.—James W. Campbell, Strathtay, Perthshire.

Crossbills in Lewis.—The 13th January 1957 was a warm sunny day after a succession of northerly gales and, under such conditions in this outlying island, one may see a great variety of migrants. I was particularly surprised this forenoon, however, to come across a group of five or six crossbills (*Loxia curvirostra*) feeding greedily on the cones at the tops of spruce trees close by Stornoway harbour. In the bright sunlight their identity was unmistakable even if their feeding habits had not given them away. The only adult cock amongst them was a particularly handsome bird with

his russet crown and rump and dark ear-coverts. The birds appeared to be so hungry as to be oblivious of passers-by, and occasionally one of them, losing grip of a cone, would chase it down through the branches, recover it, and then resume its perch on the tree-top.

This is the first time during my eight years' stay here, that I have noticed crossbills which seems surprising in view of the abundance of feeding in the Castle Grounds. According to Harvie-Brown's *Vertebrate Fauna of the Outer Hebrides* (1888) " the only mention of this species is a doubtful one, thus ; ' Crossbill seldom seen '. This note is, however, by Mr. D. Mackenzie at Stornoway, a good observer. Mr. D. Mackenzie left Stornoway in 1885 or 1886 for North America."

It is interesting to note that the Gaelic name " Camghob " or " crooked mouth " is quoted in the above context and that I myself have come across this name, the implication being that the crossbill has been known for some time in this outlying Gaelic-speaking area.

In *The Birds of Scotland,* the relevant entry is that " Small numbers arrive in late summer or early autumn and are chiefly recorded from our island stations even as far west as St. Kilda ". Two large irruptions to the Hebrides have occurred, during the summers of 1909 and 1927. But in no case can I find evidence of irruptions in winter and it would be interesting to know if there has been a similar influx elsewhere.—W. A. J. Cunningham, Stornoway.

The first record of the crossbill in Lewis was in 1895, when seven appeared on 8th July in a Stornoway garden. They were also reported from Stornoway Castle woods in August 1927, and again there in the summer of 1929 when they also visited the garden of the Parish Church manse, Stornoway. Other localities on the Lewis mainland where they have been noticed are at the Butt and Eishken Lodge, Park. All these records were from the period 11th June to 22nd September inclusive, so Mr. Cunningham's record is the first for January. There is now much suitable crossbill habitat at Stornoway, even for sporadic breeding. It seems likely that the crossbills seen by Mr. Cunningham were the remnants of an earlier irruption in 1956, and had either stayed on in Lewis—crossbills were reported to us at Shader, near Barvas, on 5th-6th July 1956—or had crossed later from the Scottish mainland.—Editors.

Post-breeding Moult of Crossbills.—During the course of the 1953 " irruption ", over a hundred crossbills (*Loxia c. curvirostra*)

were trapped at Fair Isle: of the birds sexed, 46 were males and 49 females, and the records show 46 immatures (both sexes) as against 16 adult males and 37 adult females. Information about the annual moult of the remiges and rectrices was obtained from some of these birds.

No moulting examples were seen until mid-August. A male and female on the 13th had their 9th and 10th primaries new, and a female on the 16th was at a similar stage but had cast the 8th feather in each wing and had the 7th to 10th primary coverts new. Two adult males on the 17th were a little more advanced: one had the 9th and 10th primaries new, also the outermost secondary in the left wing, and the greater coverts were moulting; and the other had the 7th to 10th primaries new, also the innermost tertiary, 2 middle tail-feathers and the greater and lesser coverts. I saw no more as far forward as this until near the end of the month.

Two first-year males on the 17th, and an adult male and five juveniles and first-year females on the 18th, had not yet begun moult and on this date only one of two adult males showed early primary moult, the other having a few new greater coverts. An adult male on the 19th which was renewing the greater coverts had the 9th and 10th primaries three-quarters grown. Next day, the 20th, I had the first immature male to show moult, the 7th to 10th primaries being new, and an adult female was just starting with the innermost primary half-grown. The other females had not begun.

A curious case of irregular moult was seen in an adult male on 21st August, the 7th and 8th primaries and their coverts being new, but the 1st to 6th and 9th and 10th being old; the second tertiary and greater coverts were new and the outer secondary in the left wing only. On the 25th an adult male had the 7th to 10th primaries complete and the 6th three-quarters grown, the greater and lesser coverts new but the medians old, and the two middle pairs of tail-feathers new. An adult male and adult female on the 7th and 8th September, and two adult females on the 13th and 14th, had not proceeded beyond completion of the 8th primary, but the last two birds had begun to replace their tertiaries. An adult male on 14th September had finished the 7th to 10th primaries and their coverts ; and an adult female had proceeded as far as renewal of the 5th primary and its covert and had new tertiaries and outer greater coverts.

The data are scanty, but show that the sequence is much the same as in the starling (*Sturnus vulgaris*), twite (*Carduelis f. avirostris*) and house-sparrow (*Passer domesticus*), which also have been studied at Fair Isle. It appears that sometimes the 9th and 10th, and next the 7th and 8th, primaries may moult as pairs. Moult of the

tertiaries appears to take place between the completion of the 7th and 5th primaries : it is usual for these three feathers and the mid-wing coverts to be complete before the secondaries commence in the other passerines mentioned, but in some crossbills the secondaries appear to begin rather earlier. The succession of wing-coverts—greater, then lesser, and finally median—is normal, and it would appear that the tail begins to moult very soon after the wing, from the centre outwards.

The onset of moult is surprisingly late, considering the early breeding-season, and some individuals have not started by the third week of August. In migratory species such as the wheatear (*Oenanthe oenanthe*) and meadow-pipit (*Anthus pratensis*) the majority of adults have finished by that time (Williamson, 1957, " The annual post-nuptial moult in the wheatear (*Oenanthe oenanthe*)," *Bird Banding*, in press), and the resident passerine species begin in early or mid-July.—Kenneth Williamson, Fair Isle Bird Observatory.

Snow-Buntings feeding on Heather Seeds.—While walking over the snow-covered watershed between Glen Buckie and Glen Finglas, Perthshire, on 2nd February 1957, at about 1,500 feet, I came across a flock of about 150 snow-buntings (*Plectrophenax nivalis*) on long heather shoots, feeding on the heather seeds. In the *Handbook* there is no record of snow-buntings feeding on any species of heather in Britain.—Pat W. Sandeman, Edinburgh.

Risso's Dolphin in Orkney.—On 11th December 1956, while beachcombing along the shore at Birsay, a little to the north of the old Palace, I came upon a small dolphin, about 7 feet long, which had been cast up by a storm tide: though dead, it was in good condition. I was unfamiliar with the species.

The posterior part of the body tapered somewhat gracefully towards the tail, and there was a pronounced hump on the top of the head. It seemed to have no teeth (certainly none in the upper jaw, which I prised open). There was a peculiar, rather irregularly disposed, iron-grey colour along the sides; the back was dark, almost black, and the underside whitish. On returning to Kirkwall (Birsay is on the north-west corner of the mainland of Orkney), I immediately looked through the illustrations and text of the Cetacea in Bell's *History of British Quadrupeds*. At once I was struck with the marked resemblance, in appearance and outline, of Risso's Grampus (*Grampus griseus*) with the one I had seen. I carefully compared the

description in the book with what I had noted on the spot. The high dorsal fin was an additional confirmation, and though the flippers of the Birsay specimen were damaged and partly missing, their position could be determined; they were " placed low down ", conforming to the position in Bell's illustration. As the animal did not look even approximately like any of the other species figured in Bell, there seemed no doubt whatever that my identification was correct.

However, at the invitation of Professor Wynne-Edwards, to whom I had reported the find, I sent away the skull and lower jaw for examination. As the animal had now lain on the beach for some five weeks and had become decomposed, the skull and jaws were unfortunately damaged during extraction, but they retained enough to show the general features of the species. Professor Wynne-Edwards writes :

> I have examined the skull of the dolphin which you very kindly sent. The front tip of the upper jaw is missing, but there are neither teeth nor sockets in the remainder ; in the mandibles the alveolar groove is narrowed or closed except in front, where it is open and probably contained a few teeth. I have looked at the plate of *Grampus* in Van Beneden and Gervais' *Ostéographie des Cétacés* (1869-80), and this agrees closely with the specimen. I think there remains no doubt about the identification.

In 1874, when Bell's monograph appeared, *Grampus griseus* had only " fallen into the hands of naturalists on eleven occasions, eight times on the French and thrice on the English coasts: the three taken on the English coast were all taken in the Channel ". The Birsay record therefore extends the known distribution, and illustrates yet again the present northward trend of certain marine animals hitherto recorded only from further south.—Robert Rendall, Kirkwall.

Previous records of this rare dolphin in Scotland appear to be as follows: Hillswick, Shetland, 1889 (*Proc. Roy. Phys. Soc. Edin.*, 11: 192); Stirling, 1919; near Wick, 1927; and near Portsoy, 1935 (the last three records appear in *Scot. Nat.*, 1927; 60, and 1935: 175).—Editors.

The use of corrugated-iron sheets by Orkney Voles.—While staying on the Mainland of Orkney in the summer of 1955, we were able to make some interesting observations (which do not appear to have been noted before) on the use of corrugated-iron sheets by the Orkney vole (*Microtus orcadensis*). Many of these sheets, the remains of war installations, lay scattered over the countryside

and we were surprised to see how many vole runs were continuous with them. The diameter of a corrugation is almost identical with that of an Orkney vole run, a fact which these voles had been able to utilise to their advantage. Several times, by looking under a sheet, we found adults sheltering there, and on 3rd June, near Loch Harray, we found a nest, built of dried grass and containing six well-grown young, but still with their eyes shut. Tracks from the nest led along the corrugations and out into the heather.

These corrugated-iron sheets obviously make excellent artificial runs for Orkney voles, and they have the advantage of providing good shelter from the weather and of being proof against owls and harriers.—Jeffery Harrison and David Jones.

Unusual Plumage of Jackdaw in Berwickshire.—On 25th May 1957, a friend and I watched a jackdaw (*Corvus monedula*) with unusual plumage, feeding in a grass field near Polwarth, Berwickshire. Details of plumage were as follows: ash-grey forehead, crown and nape; black mantle and back; greyish-white rump; black tail; white secondaries and lesser wing-coverts; and all the underparts pale grey, shading to white on the under tail-coverts. It was accompanied by another jackdaw with ordinary plumage. According to my friend, the unusual jackdaw had been in the area for several days.—W. M. Logan Home, Edrom.

Ruffs in Winter in Dumfriesshire.—On 4th November 1956, and again on 2nd December 1956, three ruffs (*Philomachus pugnax*) were seen in fields at Eastpark farm in the parish of Caerlaverock by David Cunningham of Dumfries and myself. They were on both occasions in company with lapwings.

While under observation the three kept together most of the time. They flew together in close formation with characteristic abrupt changes of direction in perfect time, when the diagnostic white patches at the base of the tail and the narrow white wing-bar were clearly visible.

Nearly all the Dumfriesshire records of this species refer to this same parish. Sir Hugh S. Gladstone in *The Birds of Dumfriesshire* recorded two separate occurrences in 1885, one in 1905, and one in 1908 at Caerlaverock in the autumn, and one small party remaining for the summer of 1908 at Glencaple.

Mr. R. Smith of Lochmaben reports a ruff feeding with lapwings and golden plover at Browhouses, near Eastriggs, on 23rd September 1956.—Ian F. Stewart, Dumfries.

A Gannet in Dumfriesshire.—An adult gannet (*Sula bassana*) killed by oil, was found by us on the green merse bordering the Priestside Bank, Ruthwell, on 27th January 1957. It appeared to have been dead for about a week.

Previous records for the county, given by Sir Hugh S. Gladstone in *The Birds of Dumfriesshire*, are of storm-driven birds found far inland, except for one at Annan. There are six such records between 1828 and 1902.

This is the first time we have known of an oiled gannet in Dumfriesshire.—David Cunningham and Ian F. Stewart, Dumfries.

Long-tailed Skua at Fair Isle.—When checking up on the activities of a non-breeding pair of Arctic skuas (*Stercorarius parasiticus*) on 23rd June 1956, at a new territory on heathland east of the Fair Isle village, I found standing alongside the pair an immature long-tailed skua (*S. longicaudus*). Its smaller, slimmer appearance was at once noticeable, as also were the entirely greyish-blue legs. First and second summer Arctic skuas are frequent visitors to the Fair Isle colony, and although a few have irregular blue patches on the legs, both legs and feet are mainly black. In pale-morph Arctic skuas of these ages, the breast and belly are always barred with brown, but in this long-tailed skua the middle of the breast and belly were white, the barring being confined to the sides and flanks. There was a distinct " cap ", but this, being streaked brown and white, was less well-defined than in immature pale-morph Arctic skuas, which have the top of the head a solid brown. When the three birds took flight, I saw that the smaller skua had pointed middle tail-feathers projecting to much the same length as in the adult Arctic skuas.

In respect of the mainly white underparts, the bird was quite unlike the first-summer long-tailed skua depicted on Plate 139, vol. 5, of *The Handbook of British Birds*, where the head and breast are an almost uniform grey-brown, the head streaked darker. But Dr. Finn Salomonsen, who has access to a large series of specimens at the University Zoological Museum in Copenhagen, informs me that a number of sub-adults, presumably in their second and third years, acquire the white underparts of the adult plumage. Judging by the length of the tail-streamers and the amount of barring on the sides and flanks, the Fair Isle bird was probably in its second year.

This is the first recorded instance of a long-tailed skua visiting Fair Isle; and according to the Venables (*Birds and Mammals of*

Shetland, 1955, p. 332) the only Shetland occurrences in the present century are of adults in May 1900 and May 1906. When returning from the Faeroe Islands on 6th June 1953, I saw an adult at latitude 60° 10′ N., longitude 4° 15′ W., almost equidistant from Faeroe, Shetland and Orkney. It would appear to be a surprisingly scarce bird in these waters, considering that it has breeding-grounds in Lapland to the north-east and Greenland to the north-west.

—Kenneth Williamson, Fair Isle Bird Observatory.

Baldpate (American Wigeon) in Aberdeenshire.—On 4th and 5th May 1957, an adult male baldpate (*Anas americana*) was seen at the Meikle Loch of Slains, near Newburgh, in company with about ten European wigeon. On 4th May it was seen by E.A.G., G.F.R., and V.M.T. and on the 5th by A.T. and V.M.T. The bird was observed on grass (when the white crown was particularly obvious) and on the water at distances from 100 yards to $\frac{1}{4}$ mile. On 4th May the sky was overcast and the light poor, and on the 5th heavy snow-showers alternated with brilliant sunshine.

Our observations on this bird agree closely with the comments made on the baldpate present at Hamilton in March 1954 (*Scot. Nat.*, 66 : 123). It appeared to be slightly more heavily built than the accompanying wigeon. The white crown was very conspicuous even at a considerable distance and in poor light, the rest of the head looking dark by comparison. Under slightly better light conditions the eye-stripe was visible, but it was only in full sunshine that the green colour could be distinguished. The red-brown sides contrasted markedly with the white flank-patch and black under tail-coverts. The horizontal white wing-patch was generally obscured and was seen only once when the bird was alert before taking wing. In flight the wing pattern was similar to that of the drake European wigeon.—Elizabeth A. Garden, George F. Raeburn, Alex. Tewnion, Valerie M. Thom.

INDEX

Note.—Species of birds and mammals are listed under their English names; there is a collective entry under MAMMALS and another for each other vertebrate class (except birds). Invertebrates are collected under their respective classes (e.g. SPIDERS, CRUSTACEA), and in addition there is an entry for each order of insects. References to plants are grouped under BOTANY.

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