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The Annals of Scottish Natural History

EDITED BY

V. C. WYNNE-EDWARDS
Regius Professor of Natural History
Aberdeen University

AND

JAMES W. CAMPBELL

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FIELD NOTES ON THE BIRDS OF THE HRÚTAFJÖRDHUR DISTRICT, NORTH ICELAND

G. K. Yeates, B.A., F.R.P.S., and Captain T. B. W. Jeans
Harrogate Salisbury

The following notes were made during a three-week stay in the Hrútafjördhur district, North Iceland, in June-July 1948. We camped near the farm and post office of Stadhur, close to the main Reykjavik-Akureyri road, and between 12th June and 2nd July worked the high ground to the east of Stadhur with some intensity.

Stadhur overlooks the estuary of the Hrutafljot—a typical " Arctic " delta in miniature, with many channels and streams winding into the fjord, creating in their meanderings many small islets. Farther south the river flows through a long flat, until, two miles to the south, where it is joined by two tributaries flowing through rocky gorges, the Ormsa and the Sika, it too becomes a typical mountain river closely confined by rocks.

Northward stretches away the Hrútafjördhur itself, which many miles on becomes the Hunafloi, the largest inlet into the northern coast of Iceland. The shores of the fjord are stony and very scantily grown with vegetation.

A very beautiful hill, Trollakirkja, snow-capped at all seasons, dominates the scenery to the south-west, while to the west across the river the moorland runs gradually up to the long flat plateaux of Geldingafell, 820 metres.

OCT 6 - 1949

Behind Stadhur and to the east the ground rises in a gradual slope up to about 250 metres. The slopes and ridges nearest the fjord have, especially on their tops, many extensive patches of small, loose stones with a very scanty vegetation, *Dryas*, *Silene*, *Salix*, etc. Where these areas of loose stones are not dominant, the ground is tummocky with a heavy growth of rough moorgrass. Once over the seaward ridges a vast area of undulating ground is disclosed, not unlike the " flow grounds " of Sutherland. This is a land of many lakes, both big and small, and, between each, bogs dominate the ground. From here the eye travels south-east over 60 miles of flow ground to the ice-cap of Eriksjokull, and north-west, 40 miles away, to the hills of Vidhalsfjall.

The fjord and the adjacent low ground proved very disappointing for breeding birds. Most common were eiders on the small islets, and there was one small colony of great black-backed gulls. The shingle banks were occupied by ringed plovers and a few pairs of oystercatchers. The flat levels of rough grass were the habitat of innumerable Iceland redshank, a few pairs of dunlin and whimbrel, and many meadow-pipits, while the bog pools therein swarmed with red-necked phalaropes. The estuary was the regular feeding ground of great northern and red-throated divers, red-breasted mergansers, arctic terns, purple sandpipers, whooper swans, and grey-lag geese. A few mallard were always on view, and once a flock of wigeon. A glance at the map of Iceland and its position in relation to Greenland and Spitzbergen will reveal that the Hunafloi, and eventually the Hrútafjördhur, are ideally situated to attract wild geese on their southward migration, and the flats of the estuary are equally designed by nature to accommodate them temporarily to their liking. We learnt from the farmer at Stadhur that in the last weeks of September and early October this was indeed the case, the whole estuary then becoming carpeted with geese. We were unable to learn from him to which species this vast congregation belonged.

The hill and lake country behind our camp—the Hrútafjardharhals—occupied most of our attention, and except on days when the mist kept us in the valley, we daily explored this flow ground to the east. The first slopes were the nesting haunt of many Faeroe snipe and whimbrel, a few Iceland

redshank, innumerable meadow pipits, and a great company of northern golden plovers. Where the areas of loose stones held sway were a few pairs of ptarmigan and of purple sandpiper, the last named being found only on the highest ground. Snow buntings were common wherever sufficient rock was available, and here and there a very occasional pair of wheatears.

Most of the waders were repeated in the bogs of the flow ground on top, but while whimbrel tended to be up here less common and the redshank scarce, both snipe and dunlin abounded. Here and there were scattered pairs of arctic skuas.

The lakes, the number of which was legion, were the haunt of scattered pairs of great northern divers, chiefly on the larger waters. Whooper swans were also present, not only on the large lakes, but also on the smaller tarns. Red-throated divers abounded; great black-backed gulls had scattered colonies of small size; arctic terns were common, though only one colony was found; long-tailed ducks and scaups were the commonest ducks, while red-necked phalaropes abounded on every little pool. In addition we also saw on these upland lakes occasional specimens of mallard, teal, and merganser.

In all, after three weeks' intensive work in this district, we saw only thirty different species, and of these we proved eighteen to be breeding, though several of the others, *e.g.*, ptarmigan, scaup, merganser, etc., were undoubtedly nesting, but not actually found by us. In short, the district appeared to be very representative of the low-hill and water birds of North Iceland. It is entirely without the typical sea-birds and, possessing no crags or rocks of any size, is devoid of localities for such species as gyrfalcon or sea eagle. The absence of birch scrub precludes the redwing.

Systematic List

Iceland Raven, *Corvus corax islandicus* Hantzsch

The absence of suitable breeding localities made this species merely a casual passer-by in the district. We saw odd birds from time to time in the fjord valley. The passage of a raven always gives an excellent idea of the number of nesting pairs of whimbrel, which mob it remorselessly on sight.

SNOW BUNTING, *Plectrophenax nivalis nivalis* (L.)

Common on the tops, *i.e.*, at about 200 metres, but we found it nesting by a mountain stream as low as 80 metres. Males of this species, vol-planing onto their singing perches, were characteristic of all the rocky ground. At times pairs were so close together as to give the impression of a small colony. They do not demand a scree or an area of extensive rocks for nesting. We found nests by mountain streams and on open bog on the top with a few scattered rocks. On 15th to 17th June all nests found had chicks of about 3 or 4 days old. At this stage the males were assisting the females equally in feeding the young, but so quickly do they get down to second broods that when the chicks are about a week old, the males feed only desultorily, spending their time more and more in singing and " territorial fighting." On 24th June we saw a female taking nesting material into a rock-crevice. She was repeatedly accompanied by the cock, but we never saw him with material. When we examined this nest-crevice, we flushed a chick of the first brood, scarcely able to fly. Its parents took not the least notice of it and displayed no anxiety on its account. The male, however, does appear to look after these fledglings of the first brood, for on 28th June, at another nest, we saw the male bird feeding chicks which were well out of the nest. In this case there was no sign of the female, which was probably incubating the second clutch.

MEADOW PIPIT, *Anthus pratensis* (L.)

Abundant at all levels, a bird of the valley as well as of the tops. We found eggs (c/5) on 15th June: the first flying fledglings were about on 27th June; and on that date we found the first of the second clutches (c/5).

WHITE WAGTAIL, *Motacilla alba alba* L.

There seemed to be a pair to each streamlet, usually in the low ground. Nest with 5 small young found under a road-bridge, 21st June.

WHEATEAR, *Oenanthe oenanthe* (L.)

Not common. We saw only 3 separate male birds in our area. All had food and clearly had nests with young. The

G. K. Yeates

PLATE I.—*Above*—Base Camp, North Iceland; Trollakirkja (1001 m.) in background. *Below*—Long-tailed Duck at nest.

only specimen we looked at carefully was very bright and appeared large, and might well have been of the Greenland form, *leucorhoa*.

ICELAND FALCON, *Falco rusticolus islandus* Brünnich

On 26th June by the river valley we observed an arctic skua mobbing an object on the ground. This it eventually put up, when it proved to be a gyrfalcon in the reddish plumage. The arctic skua then pounced to the ground while the falcon watched the proceedings from a pinnacle of rock! It later flew off, leaving the skua in undisputed possession of its kill, which we afterwards found to be a mallard. The lack of crags made the district quite unsuitable for gyrs.

WHOOPER SWAN, *Cygnus cygnus* (L.)

Whoopers, single birds or pairs, and up to as many as 11 at a time, were frequently seen feeding in the marshes of the estuary. They were nesting in the lake country behind, where we found 3 nests, 2 on islands in large lakes and 1 on the mainland shore of a small bog-tarn. The two of these nests which we examined contained c/4. At one nest we heard the young inside the uncracked eggs on 19th June; on 20th June, 1 cygnet was out and dry, and 2 other eggs were cracked; on 21st June, 3 cygnets were out and the fourth just emerging; on 22nd June, the family was afloat and away from the island. Both parents of this nest, which we photographed, had their necks very stained with russet red.

GREY-LAG GOOSE, *Anser anser anser* (L.)

Odd birds were seen feeding in the estuary, and occasional pairs flying over the tops. One nest, on a small island in a lake by the roadside near our camp, was found on 14th June.

MALLARD, *Anas platyrhynchos platyrhynchos* L.

Hardly abundant. A few birds were usually to be seen by the estuary, and we saw odd birds on the hill lakes.

TEAL, *Anas crecca crecca* L.

Seen only twice—on a hill lake and by the fjord.

WIGEON, *Anas penelope* L.

Apparently not breeding in this locality. A flock of 12, chiefly drakes, seen by the fjord on 26th June.

SCAUP, *Arthya marila marila* (L.)

With the next species the characteristic duck of the hill lakes. They were to be seen on nearly every sheet of water. They would appear to be very late nesters, for it was only in the last week of our stay that we began to see the drakes unattended by ducks.

LONG-TAILED DUCK, *Clangula hyemalis* (L.)

Abundant. Any sheet of water, large or small, seemed to suit. The one nest found, on 18th June, contained c/6. The down was very dark indeed. It was situated on top of a tummock of rough grass in a bog about 80 yards from water.

COMMON EIDER, *Somateria mollissima mollissima* (L.)

By the estuary abundant. It was nesting here on the stony islets. We also saw a nest, from which the young had hatched, amongst the rocks on the hill at about 200 metres and perhaps a mile from the fjord.

RED-BREASTED MERGANSER, *Mergus serrator* L.

Scattered pairs on the hill lakes and frequently seen fishing at the estuary.

GREAT NORTHERN DIVER, *Colymbus immer* Brünnich

Our main object was to see something of this fine species. We found scattered pairs on the larger lakes of the hill ground behind our camp, and their ridiculously high-pitched calls were daily music to us, especially early and late, as we sat in our tent. Amid that vast area of innumerable lakes in the hinterland there were clearly many nesting pairs. In the group of lakes within reach of our base we found three breeding pairs (Grjotovatn, Tangavatn, Holmavatn). All were island sites. One pair had hatched by 18th June. At the nest we found both sexes incubating. They are extremely restless sitters, being constantly off and on their eggs, and " displaying " to one

another on the water in those extraordinary races over the water which are so characteristic of all divers. The sitting bird also repeatedly called, with that same high-pitched, rapidly repeated note with which pairs flew down to the fjord to fish.

RED-THROATED DIVER, *Colymbus stellatus* Pontoppidan

Abundant. All times of day the guttural, cacophonous calls of this diver were to be heard. We found many nests on the lakes of the hinterland. One pair had hatching eggs on 18th June—a date which would be decidedly early even for Scotland. There is no doubt at all that the red-throated divers of Iceland are very much tamer than Scottish birds. The great majority allowed close approach before taking to the water, often croaking from the nest at the intruder in indignation.

WHIMBREL, *Numenius phaeopus phaeopus* (L.)

Extremely abundant, especially on the hill slopes. We found a number of nests, all c/4, 14th to 27th June. They were frequently very tight sitters, flushing at the feet, even on open country in which they must have been able to see the approach of danger.

FAEROE SNIPE, *Capella gallinago faeroeensis* (Brehm)

Abundant at all levels. We found a number of nests, all c/4.

RED-NECKED PHALAROPE, *Phalaropus lobatus* (L.)

Every loch, every little bog pool appeared to have a pair or pairs.

DUNLIN, *Calidris alpina* (L.)

A characteristic bird of every suitable piece of ground at all levels, but especially on the bogs of the top. One nest, c/4, 18th June.

PURPLE SANDPIPER, *Calidris maritima maritima* (Brünnich)

A few widely scattered pairs on the stony tops of the ridges facing the fjord. We first saw these birds feeding in the mountain streams in mid-June. On the breeding ground this sandpiper is extremely tame, but we found the nest very difficult

indeed to discover. One bird which we watched for long stretches over a period of 10 days always flew to meet us whenever we appeared and ran about at our feet. It would sit for hours on a tussock, occasionally display-flighting over the hill and was presumably a cock bird. On 28th June we located 2 chicks at least 8 to 10 days old, though previously, despite our long watches, we had never had a clue to their presence. We had, in fact, regarded the bird as a male on guard and had expected a sitting partner. On 24th June we had found newly hatched chicks of another pair. The first bird kept its chicks within a radius of 200 yards for a fortnight, but the second pair moved their young away within 24 hours, for we never again saw adults or young in that vicinity. With chicks discovered, the parents of both broods went into paroxysms of anguish, fluffing their feathers out, depressing tails and heads, and running at great speed around our feet. They had a trick of approaching very close behind us. We lay down flat on the ground and held a chick in our hands. The parent approached within 6 inches of the outstretched hand and, when the chick was released, brooded it within a yard of us. We saw this species also feeding along the stony banks of the river at the estuary.

ICELAND REDSHANK, *Tringa totanus robusta* (Schiöler)

This dark sub-species was very common in the lowland bogs and round the estuary. It was breeding also in the bogs on the tops, but here much more sparingly. From their behaviour most had hatched by mid-June. They are great perchers, using all and any form of post, and even attempting a little tight-rope walking on the telephone wires. We found one nest, c/4, on 16th June. The eggs were noticeably lighter in ground colour and less heavily marked than most British clutches.

RINGED PLOVER, *Charadrius hiaticula hiaticula* (L.)

Common on the shingle-banks of the estuary.

NORTHERN GOLDEN PLOVER, *Pluvialis apricaria altifrons* (Brehm)

Even more than the whimbrel this is the characteristic bird of the Iceland moorland. It could be said that one was never

G. K. Yeates

Bernard Jeans

PLATE 2.—*Above*—Male Snow Bunting. *Below*—Purple Sandpiper.

out of the territory of a pair. They frequented the stony ground and the wet bog alike. 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. We found two nests, c/4, just chipping on 22nd June, although on 19th June we had found a nest of c/2 which was just laying up. The Iceland birds differ very much from ours in their habit of tight sitting. Both the above pairs habitually flushed at our feet, running off with wild wing-waving and a great show of " injury-feigning."

OYSTERCATCHER, *Haematopus ostralegus* (L.)

A few pairs breeding by the river estuary and along the shores of the fjord.

ARCTIC TERN, *Sterna macrura* Naumann

Common. Strangely this species was not breeding on the islets at the river-mouth, and the only colony we found was on an island in one of the hill lakes (Geitholsvatn). We constantly saw them at all levels, hunting the mountain streams and hawking insects round our camp-site.

GREAT BLACK-BACKED GULL, *Larus marinus* L.

Scattered pairs found nesting (already hatched by 16th June) on the islands in the lochs. A small colony was also seen on the estuary.

ARCTIC SKUA, *Stercorarius parasiticus* (L.)

Frequently seen in the river valley and near the estuary. As a breeding bird it was uncommon, and we had only 2 known nests on our beat. We saw 12 of the dark phase and 2 of the light.

ICELAND PTARMIGAN, *Lagopus mutus islandorum* Faber

The ptarmigan was unexpectedly scarce, and we saw a few pairs only. This race is conspicuously whiter in summer plumage than Scottish birds.

COURTSHIP DISPLAY OF SOME DUCKS ON SALT WATER

Henry Boase
Invergowrie, by Dundee

Common Scoter, *Melanitta nigra* (L.)

The display of the sea ducks is seen comparatively seldom within a working range of observation from the shore. The following notes refer to three sets of observations made at long intervals from the Angus coast.

The earliest set of notes refer to a group of two drakes and one duck, drifting on the spring tide in rain and poor visibility off the Craig Pier, Dundee—that is, about eight miles up from the river bar—on 31st March 1918. One of the drakes rose on the water, with head and neck in line, bill pointing upwards at a steep angle, wings slightly drooping, for a moment and resumed a normal swimming attitude. At some stage of the action it called a soft "woo." Once a male made a short rush at the other, and one rose in flight for a few yards, alighted, and called. The whole action occupied only a minute or two, after which the three birds departed down river.

A group of three common scoter—in line drake, duck, drake—was seen flying about at Lunan Bay on 28th August 1948.

The second report refers to the behaviour of a party of about twenty common scoter, keeping station on the ebb tide, off St Cyrus, on 28th September 1931. At intervals the whole group dived, but between dives there was some display. There appeared to be at least two females, but the motion of the birds and the breaks in watching as the flock disappeared into the trough of the swell made detailed observation of these difficult. Only some of the males appeared to be directly interested in display, the others seemed spectators.

The ardent males seemed to mob the female or females, pressing towards them in rapid swimming or in short "skates" along the surface, either directed towards the females, or at rivals in the way. The main attitudes were:

Intent attitude—neck held stiffly erect, stretched, with bill level.

Skating—head and neck in line almost on the water, rapid movement along the surface with vigorous action of the feet.

Salute—the male rose almost upright on the water, neck retracted, bill level, with a follow-through of moderately extended neck, bill raised in line, held for a moment, and then a resumption of the " intent " or the normal swimming attitude. Once a male flew a short distance beyond the female, turned, and gave the salute towards her.

A more detailed watching of the display of common scoter was done at Lunan Bay on 28th August 1948, during the forenoon. The light was good, and the high point of observation available rendered possible continuous observation without interference from the swell. There was a large gathering of duck in mid-bay, most of which were this species. There were some six or seven active groups scattered in the gathering. In the main all were behaving similarly—a rapid swimming group, twisting and turning this way and that, with short scurries and splashing, now and then ending in the active centre of the group taking flight, but in no instance was flock-diving of the active group seen. One group of about twelve birds in vigorous display rose, circled around, settled, and resumed active milling about, rose again and circled, to settle again and continue the sparring. Finally, a group of six males and one female rose and came in towards the shore, settling near enough to allow of more detailed watching.

The males were all ›g the intent attitude already described, but at times swimming so vigorously as to rise partially so that the breast was clear of the water.

The " skating " appeared to take two forms. The one, apparently an attack on a rival, was done with head and neck stretched out in line along the surface, back flat, and progress swift, with little wake. The other form seemed a display—the head with retracted neck held low, the back arched giving a coot-like appearance, and progress slower, with a marked splashing of the feet and a heavy wake. In this style, a male might pass right through the group and out beyond for a few yards—might even take to flight for a few yards and retire

from the contest for a few minutes. Whether the female " skates " was not established with certainty—the movements in the group were so rapid it was not possible to be sure which was the female.

The female also used the intent attitude and also rose on the water when the speed of action became violent.

The males used the salute already described but without any noticeable check, the up-tilting of the bill being part of a continuous movement to the erect attitude.

Several times a bow display was seen. At first sight it appeared to be a mere stretching with open wings common to all duck. Later it was seen that the wings were held partly open and back for a moment as the bird stood erect on the water, with neck curved and the bill pointing downwards, followed by the throw up of the head, the wings closing to a drooped position, and the bird subsiding on the water, all in one continuous action. This action was given by males on the fringe of the active group; the displaying bird would turn towards the female as it gave the bow. On 9th January 1949 a less complete version of the bow was seen. The male rose only slightly, without opening the wings, with arched neck, and bill pointing downwards, remaining so for scarcely a second.

Owing to the distance—at least half a mile—and the off-shore wind, no calls were heard during the watch.

Once only, a male tossed the bill (that is, a sharp upward jerk of the bill) while in the intent attitude.

VELVET SCOTER, *Melanitta fusca* (L.)

On 16th October 1948, at Lunan Bay, on the Angus coast, velvet scoter were active, quarrelling and apparently displaying. There were some two hundred birds scattered in groups on the mid-portion of the bay, ranging from half to one mile from the shore, and among them, four or five groups were active. The splashing of the display " skating " was visible a long way.

In a group of about twelve birds, at least nine were males and one at least a female. The more active birds were in a tight bunch, darting here and there, turning and twisting, breaking momentarily, and forming again as the pursuit of

the female continued in a new direction. The less active birds kept an eager watch on the central mêlée, turning about as the group broke this way and that. Now and then, a male would skate violently right through the bunch, scattering the onlookers and churning up the water in its passage, on occasions taking wing or diving at the finish of its rush. Once a male skated through the mob, took wing for a few yards, and on alighting swam straight away from the contest. Now and then, when the excitement was high, the central active group would dive, followed within a second or so by the onlookers. The dive seemed long, say 30-35 seconds (it was not timed); all returned together to the surface to resume the chase, giving the impression that the pursuit continued under water with the same zest as on the surface.

The attitudes used were to all appearances identical with those of common scoter—the intent attitude, with stiff upright neck, the two forms of skating—attack and display—with the very marked splashing wake of the latter form.

On the other hand, in no instance was any form of salute or bow or bill-toss seen from any of the males watched. The males did at times rise on the water and flap the wings as all duck do, and this gave an opportunity of identifying positively the members of the active groups. This was necessary, as some common scoter were present also, but none of these were seen in any display action.

* * * * * * *

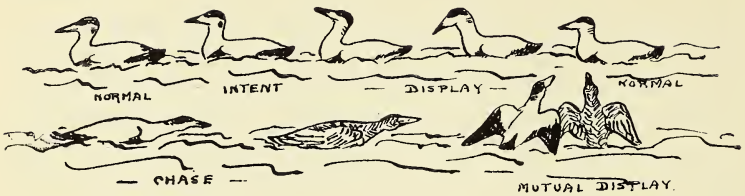
The writer has already described the courtship display of certain ducks dealt with in the following notes. Some additional features of their behaviour have been noticed, and the following notes deal with these observations.

As it is difficult for the reader to visualise the attitudes described, the writer has attempted to illustrate these in a semi-diagrammatic form. These representations are crude, but they do contain the essential features of the displays.

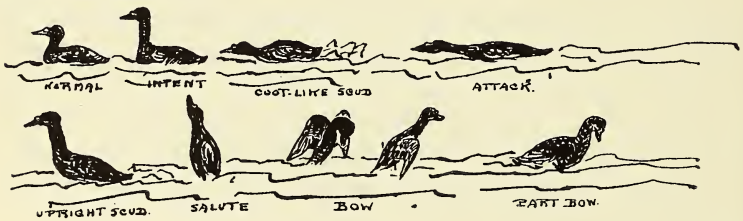
COMMON EIDER, *Somateria mollissima* (L.)

At Monifieth Bay on the outer Tay Estuary, a group of eider were displaying on 15th January 1949. The active birds consisted of three drakes and two ducks. The latter were active, swimming to and fro between the drakes, often with head held

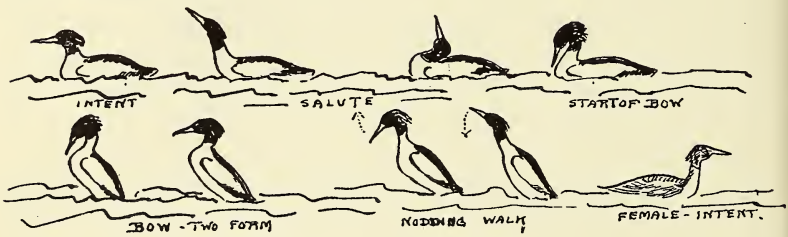
EIDER



COMMON SCOTER



GOOSANDER.



RED-BREASTED MERGANSER.

Henry Boase
© 1949.

low, almost touching the water, the neck little extended, and also bobbing the head up and down by repeated extension and contraction of the neck while in a more normal attitude, the bill sometimes slightly inclined upwards at its highest point. The drakes were interested, at times giving the full display—a part rise on the water as the head is thrown up and back, the bill raised to about 40 degrees, drop on to the water, with an up-jerk of the tail.

Twice during the ten minutes' watch a drake chased a duck with a rush, both " skating " on the surface for two or three yards, followed almost at once by the birds facing each other and rising on the water a foot or so apart with spread wings, head and neck in line at a steep angle, and remained so for a second or two.

A further opportunity of watching eider display occurred on 5th February 1949, a quiet, rather misty day.[1] The ebb was almost spent, and over two thousand eider were scattered on the outer Tay Estuary. The courting calls were almost continuous, a soft cooing, as of distant pigeons. Only now and then did a drake rise on the water as it tossed back the head; most merely tossed back the head, the neck swinging back about its base, but repeatedly the recovery included a definite pause with neck arched and the bill pointing down at about 45 degrees, before resuming a normal or intent swimming attitude. No instance of the skate and mutual display of drake and duck was seen, not even one instance of a chase of duck by drake, although this was watched for in all the nearer groups.

GOOSANDER, *Mergus merganser* L.

Goosander have been watched in display on a number of occasions but always at considerable range. In contrast to red-breasted merganser, which will display inshore in shallow water, goosander have kept well out on the Tay Estuary or in mid-loch on fresh water, making it difficult to see the finer details. The displaying birds are very active, swimming fast in close groups, turning abruptly, scudding and splashing, all of which makes the following of the action of an individual bird of doubtful certainty.

[1] See " Notes on the Courting Display and Nesting of the Eider in the Tay Estuary," *British Birds*, 19: 45-48, 1925

Two main forms of display have been noted: (1) a sudden stretching of head and neck in line upwards at about 80 degrees without noticeable depression of plumage, held so for a moment, with an equally sudden retraction, without the marked up-throw of the stern usual with merganser; in one instance, the head rested on the back with bill almost vertical for an instant before the normal or intent attitude is resumed; (2) a "mallard bow" display, in its simpler form just a rising off the water with level bill, exposing the breast; in its more elaborate form, a dipping of the bill as the bird rises, the final position with the bill touching or almost touching the upper breast. There is no marked up-throw of the stern on resuming the normal swimming position. Sometimes, when the drake is swimming with the neck rather extended when intent, the plumage of the head is noticeably raised, giving a high-crowned appearance.

Sometimes the female uses an intent attitude similar to that of the male; more usually the duck is antagonistic, making vigorous lunges at the drakes as they jostle and thrust around her.

The neck-stretch display is perhaps the more formal—it is generally given during a pause in the mêlée: on one occasion the drake gave this salute, turned about, and swam away some distance from the active group and did not return. On another occasion a solitary drake, feeding on the Tay near Kinclaven, gave this salute between two dives, although no duck was in sight.

Other less definite actions may be associated with display. Once, a male in an active group continued a vigorous scud on the surface by rising almost clear of the water, walking as it were on the surface, with neck and head in line at about 45 degrees, as it pattered along for a few feet—Clunie Loch, 22nd February 1943. On another occasion a male, which had swum in company with a second male behind a bank, came scudding on the surface into view and rose right up, walking as it were on the surface (with no sign of vigorous action of the feet) with neck and body inclined at a steep angle (70-80 degrees) and tossing the bill through about 90 degrees from about a 60-degree drop. The bird continued for some five or six yards in this position, moving rather slowly, for the second drake

then overtook it while swimming normally, and swam alongside the performer for most of its " walk "—Forfar Loch, 1st January 1949.

Another line of behaviour was seen on 19th January 1935, the performer apparently a young male moulting to adult plumage. It was swimming normally and at intervals opened the bill wide, with head and extended neck held low and swinging from side to side like the challenging action of great crested grebe. The feathering of the head seemed expanded. Several times it shook its head violently. No certain call was heard, although the distance was only fifty yards or so.

The display actions described seem little different from the ordinary stretching behaviour of a flock of moulting goosander seen on the Tay Estuary on 21st August 1943. At this time they are commonly incapable of flight, but feed on the tide races quite unconcerned, and flap their unfeathered stumpy wings out on the open water, in contrast to their non-diving relatives such as mallard, which keep either in cover or close to it when flightless.

Red-breasted Merganser, *Mergus serrator* L.

In *British Birds*, vol. 18, pp. 313-316, 1925, was published an article on the display of this bird, by H. R. Colman and the writer. Since then, various additional notes have been made of certain differences in the ritual.

On 9th January 1926 a party of two males and two females was watched for a time. Presently, the males swam aside and assumed the " rest intent " attitude, and, turning abruptly, displayed in unison. This was repeated several times, and once at least the one male displayed to the other.

In this display an attitude with arched neck and down-pointing bill occurred between the preliminary " intent " attitude and the " neck and head in line upwards " which had not been seen in the earlier displays. The stages of the display were : (1) rest intent, with neck retracted, head plumage bristling, bill inclined upwards at about 30 degrees ; (2) neck moderately extended, arched, bill pointing downwards ; (3) neck extended with head in line upwards at about 80 degrees, plumage depressed ; (4) retraction of neck, bill still pointing upwards, with a simultaneous upthrust of the tail—the bill

may be opened wide, either at the lowest position, or after a moderate recovery with the head more or less level; there is much variation at this final stage.

The joint display of two males was again watched on 4th May 1945. In this instance the females were some twenty yards apart, and the males displayed together to each female at least three times, and at least once, stopped between them and displayed to each other. As the range was considerable, no detailed note of the ritual was made.

During the action watched in January 1926, the females at times bobbed the head up and down with the bill somewhat raised, sometimes opened at the lower position, probably when the bird called "urk."

A somewhat similar display was given by one of two females on 14th March 1937. These birds were fishing at high water in the mouth of a small stream which runs into the upper Tay Estuary. One secured a small fish and the other scudded towards her perhaps to steal it. In the ensuing rushes and dives it was not clear what happened, but immediately after the scuffle ceased, one of the birds displayed, bobbing the head by extension and retraction of the neck, sometimes pointing the bill straight up as the neck retracted, and once at least opening the level bill wide, with the neck extended.

FAIR ISLE BIRD OBSERVATORY

First Report, 1948

Part I—Detailed Notes on Species

Compiled by

Kenneth Williamson, Director

The ornithological work of the Fair Isle Bird Observatory will be published annually in two parts, Part I dealing with general field observations abstracted from the station's "Notes on Species" record-book, and Part II a report on the migration abstracted from the "Migration Schedule." Additional reports on special field studies will be issued as and when occasion arises.

Unless otherwise indicated by initials, a key to which is given on page 20, the observations are those of the Director.

None of the many notes on bonxie, *Stercorarius s. skua*, and arctic skua, *Stercorarius parasiticus*, is included, as these species are to be the subjects of special field work in 1949 and subsequent seasons.

The following analysis of the notes is given for convenient reference:—

Callnotes: See Raven, Little and Snow Buntings, Yellow-browed Warbler, Wren, Sanderling, Ruff, Oyster-catcher.

Behaviour: Wheatear, Swallow, Merlin, Eider Duck, Fulmar, Sanderling, Ringed Plover, Western Oyster-catcher.

Duration of Stay of Passage Migrants: Greenland Redpoll, White Wagtail.

Field Characters: Greenland Redpoll, Scarlet Grosbeak, Great Grey Shrike, Yellow-browed Warbler.

Food and Feeding Habits: Rosy Pastor, Snow Bunting, Great Grey Shrike, Red-backed Shrike, Wheatear, Water-rail.

Parasites: Rosy Pastor, House Sparrow, Great Grey Shrike, Continental Song Thrush, Merlin, Western Razorbill.

Roosting: Shetland Starling, Common Redstart, House Martin, Long-eared Owl.

Taxonomic: Shetland Starling, Northern Guillemot.

Weights: Greenland Redpoll, Continental Goldcrest, Great Grey Shrike.

References to *The Handbook of British Birds* (H. F. Witherby, *et al.*, 1938-41) are given as *The Handbook*, with the appropriate volume and page number in parentheses.

Observers

The following are the names of the observers: RC., Dr Robert Carrick, Aberdeen; RSRF., Mr R. S. R. Fitter, Oxford; GTK., Mr G. Theo Kay, Lerwick; IRP., Mr Ian R. Pitman, Edinburgh; RAR., Mr R. A. Richardson, Norwich; PR., Mr Pat Robertson, F.I.B.O.; GS., Mr George Stout, jun., Fair Isle; JS., Mr James Stout, F.I.B.O.; LSVV., Mr L. S. V. Venables, Scousborough; GW., Mr George Waterston, Edinburgh; JW., Mr James Wilson, Fair Isle.

Identification of parasites was undertaken or arranged by Mr Eugene O'Mahony, National Museum of Ireland. Our thanks are due to him and to other specialists named in the text for their services.

Common Raven, *Corvus c. corax* L.

Call Notes.—A party of 5 birds indulging in air-play over the Observatory buildings on 15th August used a variety of notes in addition to the normal, far-carrying guttural croak. Two much-used calls which are not noted in *The Handbook* (vol. 1, p. 8) were a regularly repeated "ek, ek, ek" very like the greeting call of the bonxie, and a deep, sonorous " mee-oo " with a rising inflection.

Shetland Starling, *Sturnus vulgaris zetlandicus* Hartert

Taxonomic.—All birds trapped and examined (over 80) showed affinity in shape and structure of the bill with *Sturnus v. zetlandicus*. Wing-measurement, 27 males 126-134 (mostly

130-133), 18 females 123-131 (one 117). There may be a small error in the sexing, as the characters used were presence or absence of a light eye-ring and the shape of the throat feathers.

Roosting.—Large numbers roosted from mid-July onwards in a sea-cave in Swartz Gio on the south-east coast, the great majority gathering beforehand on the ruined croft of Kennaby or the nearby fields. A much smaller roost existed in the bomb-shattered ruin of the Skaddan Lighthouse dwellings.

ROSY PASTOR, *Pastor roseus* (L.)

Food.—The stomach contents of an example brought in by GS. on 6th August were examined by Mr R. Willis, North of Scotland College of Agriculture, and contained remains of weevils (Otiorhynchids), earwigs (Forficula), ground-beetles (Carabids)—the last two in some quantity—and a chelate claw (Crustacea).

Ectoparasite.—A single specimen of the tick *Hyalomma marginatum* var. *balcanicum* Schulze and Schloltke, a nymph, was taken from the bird. According to Dr F. A. Turk, who made the determination, this tick is new to the British list of Ixodoidea; its distribution appears to be mid and west Asiatic, and the adult is unknown.

GREENLAND REDPOLL, *Carduelis flammea rostrata* (Coues)

Field Characters.—One arrived at North Haven on 18th September, and was watched at close quarters by KW. and RAR., who made a detailed plumage description. The bird was sketched by RAR. The diagnostic characters were the warm buffish-brown mantle and greyish-brown rump striated with dark brown, and the heavy blackish-brown streaks on the flanks. The bill appeared large and thick, brownish horn, and the tarsi and toes black. It was a most confiding bird, permitting very close approach. It fed alone (on one occasion only it was seen with a small party of twites) or in company with a second Greenland redpoll which arrived some days later. Feeding was mainly on the ground, with a hopping gait, but on occasion it perched on top of thistle clumps to take the seeds. It was seen to bathe in the overflow from a water-pipe, and on one occasion, when disturbed, alighted for a few moments on

the back of a sheep. A characteristic upright stance with outstretched neck was adopted when the bird was suspicious.

Duration of Stay.—This bird, " A," stayed at North Haven for the 9 days 18th to 26th September. A second bird, " B," which appeared on 23rd, had the crimson of the crown darker and less extensive, and the edgings of the mantle feathers much greyer. " B " was caught whilst roosting on a projection below the eaves of a hut on 25th, and was ringed ; " A," which had gone to roost on an identical projection a yard away, had later changed position and was not found. " B " remained in the neighbourhood for 8 days, 23rd to 30th September. Two redpolls were reported seen about the Shirva croft, 2 miles south of the Observatory, between 4th to 7th October, and one of these, " B," was killed by a cat early on 7th and was brought to KW. The second was examined by KW. at close quarters on 8th and the plumage details were identical with those of " A " : assuming it was the same, then " A " had been on the island 22 days, and " B " 16 days. A brief but good view of a Greenland redpoll, possibly " A," was had at a croft 250 yards from Shirva on 14th October.

Fat Storage.—" B " weighed 18 g. (dead) and was very fat, a good deal of fat having been laid down between the folds of the large intestine. RC. determined the fat weight as 1·5 g. (For comparison, the average fat weight of a Shetland starling—weighing 80 g.—is generally below 1·5 g.) Wing 80 mm., bill (along culmen from feathers) 7·5 mm., tarsus 17 mm. It was an immature male (skull incompletely ossified).

SCARLET GROSBEAK, *Carpodacus e. erythrinus* (Pallas)

Field Characters.—The following notes were made on a female or immature bird seen on 30th September. Upper parts yellowish brown, with not very obvious dark mesial streaks ; rump paler, unstreaked, but providing no marked contrast with the back. Sides of head inclined to rufous, contrasting well with the crown, which was a little darker than the mantle ; this rufous extended to the throat, providing a contrast with the greyish-white breast and belly. There were dark striations on the throat, breast, belly, and flanks, most marked on the breast, but not nearly so pronounced as in

The Handbook plate. The under tail coverts were yellowish brown. The primaries and secondaries were dark brown, the latter with broad white edgings. There was a double buffish wing-bar; and the median coverts were a darker brown than the rest of the wing. Tail dark brown. Bill large and conical, brown. Tarsi and toes pale brown. The observation of LSVV. (vide *The Handbook*, vol. 1, p. 88) of a bird perching "with characteristic dumpy stance," head retracted, was seen, especially when the bird perched for a few minutes on an oat stook and fed there. It was at first in company with sparrows, later alone.

LITTLE BUNTING, *Emberiza pusilla* Pallas

Call Notes.—A quiet "tip, tip" heard from a bird at Shirva on 20th October appeared to be a mild anxiety note: it is probably the same as the " high, quiet ' pwick ' " noted by LSVV. and the low " tick, tick " of E. R. Alston and J. A. Harvie-Brown (vide *The Handbook*, vol. 1, p. 138). The same bird, and an earlier one watched at Kennaby by RAR., LSVV., and KW., also had a strong, musical " see-oo."

SNOW BUNTING, *Plectrophenax nivalis* (L.)

Call Notes.—Birds in flock had a much-used call " chirrrc," used in flight, on the ground, and when perching together on buildings. The more familiar call, described in *The Handbook* (vol. 1, p. 149) as " a musical, rather rippling twitter," was also used frequently. This " chirrrc " is probably the same as the " rippling, yet rather harsh, ' stirrrp ' " which *The Handbook* says is used on the breeding-ground. Odd birds which flew over often used a high pitched and rather musical note, " chay-ip."

Castings.—Four birds were taken in the Ward Hill trap on 2nd October and were colour-ringed red on the right legs. They were the first of this species to be trapped and ringed in Britain. They were brought down from the trap in linen bags for examination and ringing, and when these bags were examined afterwards a number of small, hard castings, about the size of a pea, were found in them.

HOUSE SPARROW, *Passer d. domesticus* (L.)

Parasite.—Specimens of the flat-fly, *Ornithomyia fringillina* Curt., were found on trapped house sparrows, the species proving to be a new host for the fly.

WHITE WAGTAIL, *Motacilla a. alba* L.

Duration of Stay.—An adult female remained for some days from 23rd September at the Observatory, was trapped and colour-ringed there on the 27th, and was reported at Shirva 2 miles to the south on 1st October. The minimum period of its stay on Fair Isle was 9 days, and for 7 of these it was the only white wagtail recorded.

GREAT GREY SHRIKE, *Lanius e. excubitor* L.

Field Characters.—An immature male was trapped and ringed on 11th October. In the field the head and tail looked disproportionately large for the size of the body; a restless upwards flicking of the tail was noted whenever the bird alighted, and the wings when at rest were carried with their points drooping below the tail. The whitish eye-stripe was continued as a narrow line across the forehead, and the white speculum was clearly visible in the middle of the trapezoid area of black formed by the loosely held primaries and secondaries. Iris dark brown, tarsi and toes black, soles of the latter yellowish-brown. Wing 111 mm., weight 48 g.

Parasite.—A flea, *Ceratophyllus borealis* Rothschild, female, was taken from this bird, which is a new host for the species.

Food.—One seen by PR. at the Observatory on 6th November was carrying a wren in its bill.

RED-BACKED SHRIKE, *Lanius c. collurio* L.

Feeding Habits.—A young bird was trapped and ringed at the Haa by RAR., RSRF., and KW. on 1st September, and it was seen there the following day. On the 1st, RAR. found four specimens of the bee, *Bombus smithianus*, impaled on the points of a barbed-wire fence 50 yards from the trap mouth. The bird presumably returned to its larder and ate the bees, as these had gone by the following day. J. H. Owen (*Brit. Birds*, vol. 1, pp. 200-203, 1948) records the setting-up of larders

by birds of passage, adding that the captured insects, etc., "are wasted and dry up or rot." W. Eagle Clark (*Studies in Bird Migration*, vol. 2, pp. 124-125) records adult migrants in spring capturing this species of bee and forming larders, but has no mention of juveniles making and using such larders on autumn passage. The use of barbed wire by a juvenile in the absence of thorns is an interesting commentary on the deeply inherited nature of this behaviour pattern.

CONTINENTAL GOLDCREST, *Regulus r. regulus* (L.)

Weight.—Four females weighed from 5 to 5½ g. each. (*Cf.* weight of 2 wrens, probably resident, 12 and 12½ g.) A tired migrant goldcrest entered the house at Busta and slept for several hours on the window-sill.

YELLOW-BROWED WARBLER, *Phylloscopus inornatus* (Blyth)

Field Characters.—Good views were had by KW., RAR., and LSVV. of a single bird in roots at Lower Leogh on 26th and 27th September. It was a neat, compact little bird, slimmer and slightly larger than a goldcrest, and giving a general impression of a tiny and very active chiffchaff. Olive-green upper parts, conspicuous white superciliary stripe and double wing-bars (the one formed by the tips of the greater coverts being the wider and more obvious) were the main features. The under parts were whitish, washed yellowish green. The bird varied its mouse-like running among the drills by leaping up from the ground to two or three feet, fly-catching: once, as it took a fly, there was an audible snap of the bill. It was a great skulker, never perching in the open for more than a second or two.

Call Note.—C. B. Ticehurst (*A Systematic Review of the Genus* "Phylloscopus," pp. 103, 105) says the call note of the nominate race was well rendered by Brooks as "weest." Our bird had a distinctly disyllabic note, a sweet, high pitched, and rather loud "tu-ee."

CONTINENTAL SONG THRUSH, *Turdus ericetorum philomelus* Brehm

Parasite.—A bird which struck the lighthouse on 9th October and was skinned had a specimen of the tapeworm,

Porrocaecum ensicaudatum (Zeder), female, in the large intestine. It was determined by Dr S. Prudhoe at the British Museum (Natural History).

WHEATEAR, *Oenanthe oenanthe* (L.)

Feeding Habits.—In deep twilight on 9th August a large number of migrants were active among the tidal wrack o South Haven, catching the flies (*Fucomyia* sp. ?) which were flying thickly even at that late hour.

Behaviour. — A juvenile was observed chasing an expostulating redshank over South Haven on 28th July. On occasion small parties of migrants, apparently for the most part *Oenanthe oe. leucorhoa* (Gm.), gathered together in the vicinity of piles of stones on the moorland, chasing each other in and out of the holes—an example, perhaps, of that resurgence of breeding-season activities which sometimes accompanies autumn migration.

Hovering Flight.—KW. watched male wheatears persistently indulging in a beautiful hovering flight on Bu Ness on 7th and 15th June. The hovering was sustained for 5 to 10 seconds at a height of 10 feet or less, and was followed by a downwards swoop, a short flight low over the grass, and a steep climb to a hovering position once more. The body was held at an angle of about 45 degrees from the horizontal, and the tail was depressed. In neither case was any reason for the hovering (other than sheer exuberance) apparent. Subsequently similar behaviour was seen in other birds, of both sexes (but most frequently in males), and in many cases it was obvious that the hovering was practised as an aid to hunting, the birds swooping quickly to the ground to pick up food. An alternative " look-out " system adopted by many wheatears whose feeding-grounds were suitably placed was to perch for several seconds on the 20-foot high telephone wires.

There appear to be two previous records of male wheatears using this picturesque hovering flight as a means of procuring food, one from the Isle of Skye (Seton Gordon, *Brit. Birds*, vol. 36, pp. 73-74, 1942) and the other from Central Wales (Hubert E. Pounds, *Brit. Birds.*, vol. 36, p. 94, 1942). W. Griffiths, however, has recorded a male performing this flight

in mid-May near Coniston under circumstances which suggest that it was a form of courtship display: the bird repeatedly rose from and returned to a certain rock, and a female was present nearby (*North-west. Nat.*, vol. 18, pp. 317-318, 1943). It seems likely that although this habit may have originated—and chiefly survives—as a means of locating food, it has become a behaviour pattern used in the general expression of exuberance and perhaps also in courtship display.

Common Redstart, *Phoenicurus ph. phoenicurus* (L.)

Roosting.—There were two cases of adult female migrants roosting in buildings, a hut at the Observatory (4th September, RAR. and RSRF.) and a byre at one of the crofts (third week of October, GS.).

Wren, *Troglodytes troglodytes* (L.)

Breeding.—An adult was watched feeding a fledged youngster on 3rd September. The food-call of the young, a single husky " cheep " with considerable carrying power, was heard each day till 7th September (RAR.).

Swallow, *Hirundo r. rustica* L.

Behaviour.—A pair spent the greater part of 8th June flying in and out of a shed at the Observatory, and singing on overhead wires nearby. The weather was fine and warm and probably stimulated this nest-prospecting behaviour, but the birds were migrants only and had passed on by the 10th.

House Martin, *Delichon u. urbica* (L.)

Roosting.—At dusk one evening during the autumn migration some years before the war JW. saw some house martins entering a crevice in the rocks. On investigating he found the crevice packed with birds—about three dozen in all—roosting one layer on top of another.

Long-eared Owl, *Asio o. otus* (L.)

Roosting.—A migrant was captured at roost in an outhouse on 31st October (JS. and PR.) and was ringed.

MERLIN, *Falco columbarius* L.

Behaviour.—IRP. and KW. watched a male and female indulging in air-play with 2 and sometimes 3 hooded crows on 29th August, the performance continuing for about 20 minutes. Between aerial " bouts " the birds rested on telephone poles and wires spanning the moorland, and after a brief rest either hoodies or merlins would stoop at their opponents and drive them from their perch, and the game would continue. The merlins kept up an intermittent " keening " and the hoodies croaked protestingly at intervals, but it was quite obvious from their movements and the way in which sometimes one species, sometimes the other, initiated the " attacks " that the enjoyment was mutual. GW. and RSRF. had watched a similar display on the previous day.

Parasites.—Specimens of the flat-fly, *Ornithomyia fringillina* Curt., were taken from an adult female which was found in the catching-box of the Haa trap on 30th September, having entered presumably in pursuit of a small bird. The merlin is a new host for this fly.

COMMON EIDER DUCK, *Somateria m. mollissima* (L.)

Breeding.—Four ducklings were seen walking across the moor with an adult on 27th June. The first was seen on the water on 30th June.

Behaviour (*Distraction Display*).—A bird flushed from a nest among heather on the moor on 2nd July, and in the skuas' nesting area, stumbled away with the wings partly open and flapping feebly in an incipient lure display, similar in its essentials to the more emphatic display I recorded (*Ibis*, vol. 90, pp. 142-143, 1948) for the Faeroe eider, *Somateria m. faeroeensis* Brehm. A duck flushed from a c/4 on Bu Ness on 7th June covered her eggs with a stream of green, slimy, and evil-smelling excreta on leaving and flying away low; and another bird behaved similarly when disturbed from a c/4 on the shore of Mavers Gio on 20th June. This behaviour, which is not uncommon among eiders in Britain, and (according to Prof. V. C. Wynne-Edwards) is very frequent in colonies of *Somateria m. dresseri* (Sharpe) in the Gulf of St Lawrence, must be

regarded as a form of distraction display, and provides a rare example of a behaviour pattern which has evolved from a purely reflex action, defæcation.

FULMAR, *Fulmarus g. glacialis* (L.)

Behaviour.—Birds were going through courtship behaviour, in some places 5 or 6 together on one ledge, right up to the time of desertion of the cliffs, which took place during a severe south-west gale on 17th September (KW., RAR.). On 10th September RAR. observed a party of fulmars on the sea clustered round the floating carcase of a sheep that had fallen from the cliffs.

SANDERLING, *Crocethia alba* (Pallas).

Behaviour.—Seven adults, much advanced into winter dress, were feeding along the tide's edge at North Haven on the morning of 20th August. There was a good deal of chasing among the birds, and they kept up a continual sweet twittering, very passerine in character. This twittering comprised a rapid series of notes, " swee-swee-swee-swee," etc., with sometimes a more modulated " twee-oo, twee-oo " ending. They were also engaged in this lively behaviour, on the same part of the shore, in mid-afternoon 6 hours later. Their behaviour must probably be regarded as an example of the exuberance, recalling sexual activities, which is not infrequent among migrant flocks in autumn. A. L. V. Manniche (" The Terrestrial Animals and Birds of N.E. Greenland," *Meddelelser om Grønland*, Bd. 45, p. 147, 1910) records a " sanderling song " which he compares with that of *Sylvia curruca* (L.), from females gathering together their chicks following disturbance.

RUFF, *Philomachus pugnax* (L.)

Call Note.—A juvenile disturbed on the shore on 11th August flew off with a loud, clear call, " pee-up."

RINGED PLOVER, *Charadrius hiaticula* L.

Behaviour.—Among a few birds present on North Haven shore on 11th August some sexual chasing, particularly chasing

of birds of the year by adults, was going on. In chasing a youngster, one of the adults used the peculiar run which occurs in courtship, and is also a component of the lure display; the head is carried low, the back arched, and the feathers of mantle and scapulars raised, and the beautiful cinnamon-coloured tail is spread and depressed. One of the young birds also adopted this posture later, with fanned and depressed tail and lowered head, but there was no raising of the feathers and the display (which did not appear to have an object) was brief.

WESTERN OYSTERCATCHER, *Haematopus ostralegus occidentalis* Neumann

Behaviour.—G. F. Makkink ("Contribution to the Knowledge of the Behaviour of the Oystercatcher," *Ardea*, vol. 31, 1942) says: "The attitude in which the parent birds with food walk to their young ones was strongly reminiscent of that of the male prior to copulation ('stealthy walk'). It is quite possible that this is one of the many cases in which an attitude belonging elsewhere in the ethological repertory is being used as an introduction to copulation" (p. 50).

In amplification of this may be given the following observation, made whilst watching an adult and juvenile on the North Haven shore on 18th June. The young one persistently moved about its parent at very close quarters, sometimes almost touching as it passed in front or behind, with the same "stealthy walk" as described and figured by Makkink. The adult remained still most of the time, or moved only a few steps. The young one's movements were interrupted by probing with the bill in the wet sand, or by picking up food, but the attitude did not change. Once the parent picked at the sand with the bill, and the young one immediately came up and did the same at exactly the same spot, appearing to procure some food (*see* Makkink, p. 50, for a similar observation). Identical behaviour in the same two birds was watched on the shore on 20th June, when the adult again invited the attention of the juvenile to some item of food (which the latter took) by a deliberate picking action at the water's edge.

From these observations it would appear likely that the "stealthy attitude" of the male prior to copulation is one of

the many examples in birds of adult posturing which has its origin in the actions of the young bird. The young one had a short, quiet trill which might in the same way be the origin of the characteristic " twee-twee-twee " mentioned by Makkink (p. 25) as accompanying copulation.

WESTERN RAZORBILL, *Alca torda islandica* Brehm

Ectoparasite.—Several specimens of the tick *Ixodes uriae* White (*I. putus* P.-Cam. *et al.*) were taken from an adult razorbill on 17th June.

WATER-RAIL, *Rallus a. aquaticus* L.

Feeding Habits.—In the catching-box of the Gulley trap on the morning of 2nd October KW. found a water-rail and 3 twites. One of the twites had been partially eaten; another had been quite recently killed, having a hole in the breast obviously made by a spear-thrust of the water-rail's bill; and the third was alive and quite uninjured. There does not appear to be a record of the water-rail killing and eating small birds, but such predation is known in other members of the Rallidae, and it is possible that, being mainly a nocturnal feeder, the species may be in the habit of taking small ground-roosting birds. GTK. confirms the existence of the habit: a bird which he introduced to his large outdoor aviary killed and ate a waxbill, a greenfinch, and a Chinese quail. He discovered the rail making a meal of the quail, but did not witness the actual killing. He caught and released the water-rail, after which there were no more deaths.

THE DISTRIBUTION OF THE ORANGE-TIP BUTTERFLY, *EUCHLOE CARDAMINES*, IN SCOTLAND

F. W. Smith

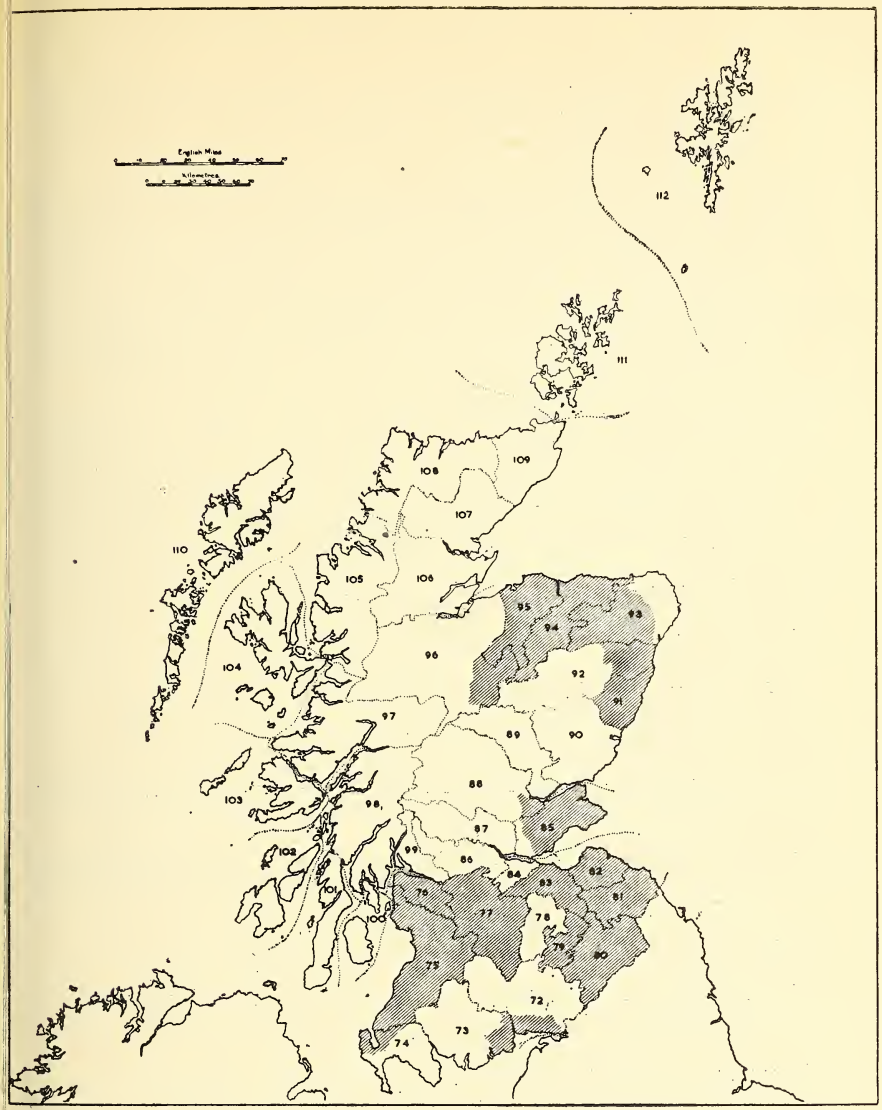
Boreland of Southwick, by Dumfries

This butterfly appears to have had a wide distribution up to some fifty years ago, and to have appeared in some numbers in certain localities. The earliest record I can find is that of the Edinburgh district (*Memoirs of the Wernerian Society*, 1811, vol. 1, p. 573). Logan, in his "Lepidoptera of Midlothian" (*Naturalist*, 1852, vol. 2, p. 123), gives Duddingston, Musselburgh, and Balgreen, now all built-up areas. Gray, in his "Lepidoptera of the West of Scotland and Fifeshire" (*Naturalist*, 1851, vol. 1, p. 83) says "in considerable abundance in Fifeshire and the West of Scotland."

Buchanan-White, in his "Fauna Scotica Lepidoptera" (*Scot. Nat.*, 1871-72, vol. 1, p. 240), gives as its distribution "East: Tweed-Forth-Tay-Dee-Moray—West: Solway-Clyde." To come to the present time, Dr E. B. Ford in his book (*Butterflies*, Collins: London, 1945, p. 129) says "common all over Britain except north Scotland and the Isles," a statement as far as it refers to Scotland not borne out by the records. I can only find three records for this butterfly in the present century, twice in Dumfriesshire, where it appeared not uncommon in the Gretna district in 1933, and near Hawick in 1902, where its appearance seems erratic. That the butterfly may have been seen in recent times and not recorded remains a possibility.

Aberdeenshire.—Pitcaple, Inverurie, Kintore, Monymusk, Cluny, and Aberdeen. The latest of these records was in the 1890's, and Mr Reid of Pitcaple was remarking "once common, now becoming very scarce" (*Ent. Rec.*, 1894, vol. 4, p. 154). [Still there.—Eds.]

Ayrshire.—"Generally distributed" (*Scot. Nat.*, 1871-72, vol. 1, p. 75).



KEY TO THE COUNTIES AND VICE-COUNTIES

W. LOWLANDS
72 Dumfries
73 Kirkcudbright
74 Wigtown
75 Ayr
76 Renfrew
77 Lanark

E. LOWLANDS
78 Peebles
79 Selkirk
80 Roxburgh
81 Berwick
82 Haddington
83 Edinburgh
84 Linlithgow

E. HIGHLANDS
85 Fife & Kinross
86 Stirling
87 Perth. S. & Clkn.
88 Mid. Perth
89 Perth N. (or E.)
90 Forfar
91 Kincardine
92 Aberdeen S.
93 Aberdeen N.
94 Banff
95 Elgin
96 Easterness

W. HIGHLANDS
97 Westerness
98 Main Argyll
99 Dumbarton
100 Clyde Isles
101 Cantire
102 Ebudes S.
103 Ebudes Mid.
104 Ebudes N.

N. HIGHLANDS
105 Ross W.
106 Ross E.
107 Sutherland E.
108 Sutherland W.
109 Caithness

N. ISLES
110 Hebrides
111 Orkneys
112 Shetlands

FIG 1.—Approximate distribution of known records of the Orange-tip Butterfly in Scotland. Some vice-counties are completely, others only partly, shaded.

Banffshire.—Aberlour and Carron : a number on the wing in May 1894 and 1896. Dufftown (Royal Scot. Mus. (Bowhill Coll.)).

Berwickshire.—Paxton, 1832, Swinton Mill, Coldstream, and Coldingham Moor, all in 1850's; Earlston, 1879, Eyemouth, 1887. George Bolam, " Lepidoptera of Northumberland and the Eastern Borders " (*Berwick. Nat.*, 1923-25, vol. 25, p. 522), can add no recent records, and never himself saw the insect on the wing in Scotland.

Dumfriesshire.—" Common in bogs and edges of woods," W. Lennon (*Dumfries and Galloway Nat. Hist. and Antiq. Soc.*, 1862-63, vol. 1, p. 54). Specimen from this collection in the Royal Scot. Mus. Gretna district, June 1933, common. Tynron, a few males, June 1943, none since.

East Lothian.—Tynefield, May 1860-61.

Morayshire.—Fochabers and Dallas, 1858-60.

Fifeshire.—" In considerable abundance," 1850.

Inverness-shire.—Strathspey, 1860's.

Kincardineshire.—Specimen in the Royal Scot. Mus. (Horne Coll.).

Kircudbrightshire.—Kirkennen in profusion, 1868, Robinson-Douglas specimen in my collection.

Lanarkshire.—No details, *teste* T. Chapman.

Midlothian.—Edinburgh district, Duddingston, Musselburgh, and Balgreen, last recorded in the 1850's.

Nairnshire.—Ardclach, banks of Findhorn, 1890's.

Perthshire.—Moncreiffe Hills, " never very common, not more than six specimens in a season," Sir Thomas Moncreiffe (*Scot. Nat.*, 1877-78, vol. 4, p. 39).

Renfrewshire.—Paisley, Renfrew, Gourock, T. Chapman (*Glasgow Handbook*, 1901, p. 242).

Roxburghshire.—Denholm and Gordon Moss, Hawick, Burnsoot, Homeshole, not uncommon in the 1890's. Hawick

area, common June 1901, only a few 1902, not seen before (W. Renton, *Entom.*, 1903, vol. 33, p. 130).

Selkirkshire.—Galashiels, rare, 1890's.

Wigtownshire.—Near Stranraer, several taken 1882.

I have not given all the references for the different records in order to save space, but they are available to anybody interested.

INTERNATIONAL ORNITHOLOGICAL CONGRESS

THE Permanent Committee for International Ornithological Congresses has instructed the Ornithological Society of Sweden to organise the Tenth International Congress. It is to be held at Uppsala on 10th to 17th June 1950.

According to the preliminary programme the opening of the Congress will take place on Saturday, 10th June, at 2 P.M. Sunday, 11th, will be devoted to a whole-day excursion; 12th to 17th to Congress discussions as well as another whole-day excursion and an afternoon tour. Before and after the Congress, excursions will be arranged to various parts of Sweden.

Ornithologists from all countries are cordially invited to attend. The Congress fee is 25 Swedish crowns, and applications should be sent in before the end of February 1950. Applicants will be furnished with a detailed programme.

At the Congress a few survey lectures will be held by lecturers specially invited. Other members may also lecture or give short announcements.

A preliminary invitation to the Congress will be distributed very soon through representatives in every country, and can also be obtained from the following address: Tenth International Ornithological Congress, Uppsala, Sweden.

FIELD NOTES ON SOME BADENOCH DRAGONFLIES

RICHARD PERRY
Holy Island, Northumberland

IN the period 1945-48, and more especially in the years 1947 and 1948, I paid some attention to the dragonflies on the east side of Spey in the parish of Kingussie and Insh, in which I include glens Tromie and Feshie, together with the western Cairngorms. Most detailed observations were made within two miles of Drumguish, a township at 950 feet, three miles east of Kingussie ; in peat-bogs on the fringe of the pinewoods, at pools on moors at a height of from 1,000 and 1,150 feet, on the flood-meadows at 750 feet alongside Spey, and in the birch and alder glen of the River Tromie. I approached their study as a novice and mainly as a relaxation from my more usual rôle of ornithologist, and, for various reasons, took no specimens. As, however, field notes on Highland dragonflies are scarce, and as one of my teneral colour-phases of *Aeshna* does not appear to have been recorded previously in Britain, the notes that follow may prove of interest. References in the text to Lucas and Longfield are to *British Dragonflies* by W. J. Lucas and to *The Dragonflies of the British Isles* by Cynthia Longfield. To the latter I am indebted not only for reading the original draft of these notes, but for previous correspondence on the subject.

CORDULEGASTER BOLTONII

ON WING.—Last ten days June to latter half August.

COLOURING.—As in Longfield : but wings of most individuals tinged bronze or copper. As this tinting was observed as early as 22nd June, it can hardly be restricted to aged individuals. Yet a specimen with the *green* thorax bands of full maturity on 12th August had *clear* wings.

Eyes glassy-brown early, passing through olive-brown and brown-green to enamel-green. In 1948, which was an exceptionally cold, cloudy, and wet summer, with two phenomenally hot spells from 8th to 21st May and 27th July to 3rd August, no fully mature specimens with green eyes were observed.

HABITAT.—Well distributed, though solitary and not numerous, in alder and birch glens and heather-clad peat-bogs at edge of pinewoods. Never seen at pools on open moors.

HABITS.—Characteristically, beats up and down drain or small burn, a few inches or feet above water, comparatively slowly; though will mount in pursuit of prey to height of 30 feet, alighting in heather to devour large prey such as beetles.

MATING AND EGG-LAYING.—Never observed: but eggs cannot be laid in pools favoured by most dragonflies. According to Longfield, eggs are laid in bottom mud or weed-mat of streams: so probably in feeding drains and burns in Highlands.

AESHNA JUNCEA
AESHNA sp. ? *CAERULEA*

ON WING: *A. juncea*.—First week August[1] to mid-October. *N.B.*—Two dead males on 23rd June 1949.

A. ? caerulea.—Last week June (22nd June) to second week August; though few on wing end July 1948, despite temperature estimated above 80° F.

COLOURING.—It was not until 1947-48 that I realised that there were two species of *Aeshna* on my beat, with the discovery in the middle of July 1947 of some black individuals in which all the blue, green, and yellow colouring was replaced by white. No dragonfly of this colouring had been recorded in the British Isles, but at the time I thought that they might prove to be specimens of *Brachytron pratense*.[2] During the winter, however, I studied Lucas and Longfield once again, and also corresponded with the latter, and decided that these black and white insects were definitely *Aeshnae* and probably a teneral phase of *A. caerulea*. During 1948 I was fortunate enough to discover an abundant colony of what will be termed hereafter *A. ? caerulea* (though their colouring at all ages differs, in greater or lesser degree, from that described in Lucas and Longfield), and to observe many scores of black and whites, and even to have them at rest on my chest. It

[1] In the earlier seasons, when I did not distinguish between these two *Aeshnae*, it is possible that *A. juncea* may have emerged at an earlier date, but in 1947 and 1948 I saw no recognisable live specimens of the latter before August.

[2] Longfield believes that this may possibly be the case.

was gratifying to find that the typical insect was indeed pure black and pure white, with no trace of any other colouring.

A. juncea.—Colouring differs somewhat from that described in Lucas and Longfield, and this may be a Scottish variation. Abdominal ground colouring of mature male is pure black (thorax: chocolate-brown or rich velvet-brown), only females and immature males being nigger-brown; while some females are so pale in colour as to appear yellow and brown insects in flight. As in the case of *C. boltonii* no fully mature males with blue eyes were seen in 1948, when *juncea* was scarce in comparison with previous years.

A. ? *caerulea*.—In the field the only immediately obvious distinction between the mature males of the two species was in the colour of the wings (see below). The blue patterning on the black abdomen was identical. In all but the oldest *juncea*, however, tiny yellow spots are included in the blue pattern: but are never present in ? *caerulea*. More noticeable are the broad yellow and often green bands on the sides of *juncea's* thorax, replaced in ? *caerulea* by *three* thin wavy bright-yellow or pale-yellow lines [1]: no male ? *caerulea* having any green on thorax or abdomen. (As in the case of *juncea* no fully mature ? *caerulea* with blue thorax lines and blue eyes were seen.) No doubt the average *juncea* was a longer, stouter, and longer-winged insect than any ? *caerulea*, but I did not find size an adequate diagnostic in the field: moreover, the latter varied greatly in size.

Ninety per cent. of all ages and sexes of ? *caerulea* were, however, immediately recognisable at a glance and at a distance by the unique *dark-brown* shade of their wings. Actually, the veining was deep copper, but in flight the wings appeared dark brown. This tinting was not confined to teneral insects, but was retained by the majority of the blue and black males, and as late as 30th July, when the species' season was nearly ended, most were still brown-winged. The colour bore no resemblance to the yellowish suffusion to be noted on the gilded wings of some of the older *juncea*.[2]

[1] I have only one note on the number of these thorax stripes. In the true *caerulea* there should only be *two* stripes.

[2] According to Longfield the above notes correctly describe differences between *A. juncea* and *A. caerulea*.

So much for the mature male ? *caerulea*. However, 90 per cent. of the ? *caerulea* observed in 1948, when they were numerous, were pure black and white and black and near white insects, and these teneral insects were on the wing from 22nd June to 30th July. With one or two exceptions, towards the end of the season, all were dark-winged.

I distinguished five phases of ? *caerulea* :—

(*a*) The majority—black abdomens with white patterning and thin white or palest yellow stripes on sides of black thorax, and the pale yellow black-lined face common to all phases of both species of *Aeshna*. In some instances face may have been white, but I cannot find any definite record of this in my notes. (Longfield believes that this phase may not be ? *caerulea*.)

(*b*) Another teneral phase with chocolate-brown abdominal ground, patterned with pale blue and white spots; almost white thorax stripes; near-white zigzagging along side of abdomen; and a very noticeable pale colouring on the last two or three segments of the abdomen. (This approximates to a phase of the true *caerulea* in Longfield.)

(*c*) Uncommon, and presumably females; black abdomen, heavily patterned with blue-green or pale green spots and three thin wavy pale yellow stripes on the side of the thorax. First seen 3rd July.

(*d*) Presumably males approaching maturity: black abdomen with tiny blue spots, instead of the heavy blue patterning on the adult males; and the yellow thorax stripes. (Longfield suggests that this may be the mature form of (*a*): but note that (*a*) has the *large* spots of (*e*).)

(*e*) Adult males—First seen 3rd July. ((*a*), (*b*), (*c*), and (*d*) cannot be confused with any *juncea*.)

HABITAT: *A.* ? *caerulea*.—Confined exclusively to vicinity of woods, usually pine, though birch and alder glens also frequented. *Never* seen at pools on open moor. Favourite retreat boggy morass on fringe of pinewoods, where, however, they frequent the drier parts containing young pines and heather, rather than the pools, and constantly work pinewood rides.

A. juncea.—While also frequenting above habitats, are very catholic in their distribution, being constantly seen at pools on open moors; flying far afield through crofting settlements and over heather moors, and over rivers in glens, commonly to a height of 2,000 feet and exceptionally above 3,000 feet on the Cairngorms.

HABITS: *A.* ? *caerulea*.—During cloudy intervals in fair weather shelters in the heather among the pines. Half a dozen may be flushed from a few square yards. If, however, inclement weather persists for several days, none are to be found in such cover, and none are seen on the wing. During sunny intervals its habits are erratic. It may circle for five or ten minutes at a time, at head height or lower, round a beat of a few square yards. At other times, especially on a breezy day, it will dart up with incredible swiftness to the pine tops, at a height of 60 feet, in pursuit of its prey, which it may consume in flight or at leisure at rest on a pine trunk. Others hawk up and down " rides " for perhaps hours, and are to be seen on their solitary beats day after day. A feature of the flight are the long glides, with all four wings well spaced and spread, and the *Libellula*-like rapidity with which it changes direction and accelerates. I imagine that there cannot be a more difficult dragonfly to net. It is very noticeably shyer than *juncea*, and though one or two settled on my chest, when I had been in one position for a long time, it was impossible to close one's hand over them even then. Normally, they appeared to have an intelligent perception of danger, and would not return to their beat if one or two passes had been made at them with a net.

A. juncea.—Much as ? *caerulea* in pinewoods, but does not shelter in heather, being the one dragonfly to be seen on the wing in all weathers, even on the moors in half a gale; and is characteristically to be seen hawking up and down a river gorge. At moor pools it adopts a different technique. Here it flies low, and frequently hovers, continually hawking round and round the sides of the pool only an inch or two, or foot or two, above the water, visiting every little inlet, with much rustling of wings as it turns and accelerates with extreme rapidity. Every now and again one will make a brief pass at another of its kind or at the clouds of smaller dragonflies, but

only once have I seen one of the latter taken. This was an adult male *S. danae*, which a male *Aeshna* seized by the thorax and carried to the heather surround, where it chewed it in half.

Juncea is a great lover of the sun, and an individual, especially an aged one of course, will return again and again to cling to the sunny side of a pine-trunk, or to the back of my hand, where it basks in the warmth.

MATING AND LAYING: *A.* ? *caerulea*.—A number of coupled pairs were seen in 1947, but only one (*in coitu*) in 1948, although I was present at their pine-morass headquarters on almost every suitable day throughout that season. Pairing is accomplished on the wing, and I have not seen the female knocked down to the ground, as in the case of *juncea*. I have not observed a female laying, and it is difficult to imagine where or when this can take place, in view of my constant attendance, but it cannot be at the pools favoured by most of the other dragonflies.

A. juncea.—Mating may be observed both in pinewoods, at some distance from water, and more commonly over moor pools. At latter haunts pairs in tandem are constantly present, sailing across the pool and occasionally looping the loop. In the capture the male knocks the female down to the ground or water. The two rise *in coitu* and, if in the woods, may sail up to alight on a pine-spray at a height of 25 feet. Mated pairs may be seen on the first day of the species' emergence. On the other hand in the unfavourable season of 1948, it was 4th September before the first pair were seen. I am at a loss to understand why I have never observed the females laying, as this must almost certainly take place at the moor pools, where *juncea* was very numerous in 1947, when I spent many hours watching them. (Longfield suggests that I never happened to be at pools where females were laying, but so few pools were available that this seems unlikely.) In both species of *Aeshna* males appear vastly to outnumber females. Is this a fact, or is the life-span of the male much longer than the female's ?

NYMPH: *A. juncea*.—On the extraordinary date of 23rd June 1948, in cool breezy weather with occasional intervals of sun, I found the remains of two male *juncea* at their main moor pool (1,150 feet) being cleaned out by ants, and at the

same place secured a nymph in the herbage surround, which appeared to me to be a *juncea*, and was subsequently confirmed as such by Longfield. I took it home with suitable herbage for it to cling to, and by 6.45 A.M. the next morning face, eyes, and the upper parts of the thorax were free: face and thorax being green and eyes opaque-brown. No further progress was made, however, and by the 27th the insect was dead, the face now being yellow and the eyes a clear lavender-white.

LIBELLULA QUADRIMACULATA

ON WING.—Second (more commonly last) week May to last days July.

COLOURING.—As Longfield. Recognised at a glance by over-all olive-brown colouring (gleaming golden-bronze in sun) and heavy saffron and black markings on hind wings and saffron border, about $\frac{1}{16}$ in. wide, along fore-edge of both wings; also by peculiar formation of front wings, which incline forwards from base to tip; and by characteristic flight (*see* Habits). Face yellow; eyes brown; female's abdomen broader and flatter than male's.

HABITAT.—The most aquatic of the larger dragonflies and never observed more than few yards from pool, which may be permanent or merely rain-water. Special haunts, peat-bog with pools at edge of pinewoods; also regular, though a third or quarter less numerous, at shallow ponds in sheltered hollows on moors, but never at exposed moor pools and, therefore, not above 1,000 feet. Not observed in deciduous glens, but heather "rides" in young pine plantations characteristic haunt in Rothiemurchus. Though so conservative in its haunts, some individuals must travel miles, as odd specimens occur at isolated temporary pools. (Immigration from the Continent reported as regular.)

HABITS.—Sunshine essential, and seldom abroad in cloudy weather. Effect of sun instantaneous; and, on sun emerging from cloud, six or twelve insects will come dashing in to previously deserted pool, even if strong breeze blowing, disappearing as suddenly on sun being obscured. Shelters in herbage and heather, but seldom flushed from this.

Very shy and erratic in flight (recognised in term " darter "), continually checking its very swift flight, to hover stationary for a second or two, before darting off at a tangent again. Two or three individuals will also whirr round and round a pool in pursuit of one another at extraordinary speed, altering direction and accelerating so swiftly and at such acute angles that it is with the greatest difficulty that the eye keeps track of a selected individual. It has a habit of returning again and again to a chosen resting-place on a weed stem, to which it clings with middle and hind legs. This swift and erratic flight makes it impossible to determine whether the insect flies only for the purpose of feeding or upon what insects it feeds. I have never, for example, been able to observe a definite insect actually taken. Though feeding almost exclusively at a height of a few feet or inches over pools and their immediate surround, will mount to a height of 20 feet over young pines, and infrequently alight to sun itself on the bole of an old pine.

Mating and Egg-laying.—From the very frequent " passages-at-arms " that take place over a *Libellula* pool I conclude that the males establish feeding territories, which also serve as mating territories. The hovering technique may possibly play a part in delimiting the areas of these territories. (Longfield notes that a male will both dart at trespassing males when his female is laying, and will also hover over that part of pool in which she is laying: but this does not appear to be always the case.) At any rate, the pairing of male with female would appear to be fortuitous; for, on a female coming in to a pool to lay her eggs, she is immediately seized by and couples with the male whose territory she enters. On the other hand, she may have laid half her series of eggs—which would appear to number between 20 and 50—before she is perceived by a male and is seized and couples. (According to Longfield, however, she has previously coupled with the same male.) Unlike most dragonflies, the mating, coupling, *and* release of a pair of *Libellulae* is normally almost instantaneous, and is achieved without the female being knocked down to the water—a remarkable feat when one considers the complex operation entailed in the complete mating. On occasions, however, a mated pair (*in coitu*) will

be chased round and round a pool by other males for a period of two or three minutes. On the male of one such pair uncoupling, he came to rest immediately on a weed stem. Consequently, on an egg-laying female being released by one male, she may be seized by another male when she leaves the pool after completing her laying operation.

Her laying procedure is remarkable. Hovering just above the water, with wings vibrating extremely rapidly and producing a humming sound similar to that of humming-bird hawk-moth's, she thrashes—one might say violently lashes—the water with her dipping abdomen at intervals of, say, six or twelve inches, mainly round the weedy edge of the pool, depositing a single egg at each strike. She may be alone while laying, or a male may come over from time to time to hover near her.

As to the age at which a dragonfly mates and lays, it may be noted that during that phenomenally hot spell in mid-May 1948, the first *Libellulae* were on the wing on the exceptionally early date of 10th May; and, at 10.15 A.M. on the 17th, the first females were seen already laying. Yet, after 20th May, I saw no more laying that season—there being several days of frost and snow after that date—though I was constantly visiting their pool until the autumn.

SYMPETRUM STRIOLATUM NIGRIFEMUR

ON WING.—Last days July to mid- and possibly end-September.

COLOURING.—Mature *red* males of this sub-species never observed: but, on the wing, deep chrome specimens gleam an over-all molten red-gold in the sun, for the wing veins are copper and there are small saffron spots at the wing attachments. Majority of specimens, however, have dull yellow-brown abdomens with a saw-edged black line along the side; orange and brown thorax with two mustard-yellow stripes on side; yellow face and brown eyes; black legs; and glassy wings with either cloudy white or black pterostigma. In specimens emerging, and in some on the wing, the sides of the face are pale green and the abdomen pale brown (black underneath); but the yellow stripes on the thorax are as

brilliant as in the adult. Three, newly emerged, were observed climbing up reed stems as late as 3rd September—a very humid day, with little sun and frequent heavy showers.

HABITAT.—A solitary and not at all numerous species, commoner in some years than others perhaps, occurring sparsely in the heather surround of open moor pools and in peat-bogs at edge of pinewoods.

HABITS.—A feeble cranefly-like insect, very different to the stout *S. danae*, seldom flying more than a foot or two above the heather, in which it appears to pass most of its time.

MATING AND LAYING.—Pairs in tandem observed, but none mating or laying.

SYMPETRUM DANAE (*S. scoticum*)

ON WING.—First week August to third week October.

COLOURING.—Faint yellowish bands are visible on black thorax of mature males. Not fully mature males are nigger-brown. Females and young males olive-brown with brilliant yellow stripes on side of thorax; and there is a reference in my notes to some with green faces—a true green, that is, and not Longfield's lemon-yellow. At breeding pools mature males are outnumbered by about 25 to 1, but by October majority surviving are mature males.

HABITAT.—Almost as widely distributed as *A. juncea* and much more numerous, occurring in numbers at open pools on the moors, peat-bogs, pinewood morasses, heavily wooded glens of birch and alder, and in birch "parks"; with odd specimens in the most varied situations to a height of 2,000 feet. Special association is, however, with heather; and clouds are always to be brushed up from heather surround of moor pools.

HABITS.—Extremely restless insects, they have hardly alighted before they are on the wing again: to dart erratically hither and thither, now hovering stationary, now shooting forward (and also backwards).

More attracted by sun than any other dragonfly, and will return again and again to sunny side of a stone dyke, to a

warm boulder, or to the back of one's hand. Resting on these places, with sparkling gauzy wings bent forward and downwards, they continually jerk their heads about in a curiously uninsect-like manner, and continually chase one another away from these favoured sunning-places. Naturally, this craving for heat is especially marked in late autumn among mature males, when these may be observed darting at the younger males frequenting such places, and knocking them down. So long as there is hot sun during the day, they can survive frosts severe enough to blacken potato haulms (as can *A. juncea*).

MATING AND LAYING.—When the female is laying, the pair in tandem take up a vertical position and continually dance, or rather bump up and down in one place, while the female dips her abdomen in and out of the water, depositing her eggs. During the operation other males may nose around the pair. On one occasion after one pair had separated, the male (or possibly another male) immediately knocked the female down again and coupled with her.

LESTES SPONSA

ON WING.—First days August to second week September.

COLOURING.—The mature male has a pale blue face, green head, and dull brown eyes.[1] The thorax varies, presumably according to age. It may be a scintillating bronze or copper-gold on top and sides (I cannot see any *green* in this colouring)[1] and pale powder-blue beneath: or it may be powder-blue all over, except for a jewel-like orange-red or chrome "slot" on the upper half of the side. The extremely thin and long abdomen is a gleaming metallic green and brown, except for the first and the last two or three segments, which are a pale powdery bluish-white. The wings are so clear and delicate as to be invisible from some angles, and the pterostigma is brown.

Females and young males are mainly brownish or straw-coloured, and all the paired females I have seen have been of this immature colouring, with no noticeable green about them. Eyes brown.[1]

[1] These colourings suggest that *L. sponsa* may not attain mature colouring in Scotland.

HABITAT.—Confined exclusively to pools and their banks, where plenty of reeds and weeds grow, though an occasional specimen may be found frequenting temporary rain-water pools several hundred yards from nearest permanent water. Pools may be on riverside water-meadows and marshes or on open moor at 1,150 feet. Though not associating in " shoals," like *E. cyathigerum*, a dozen or perhaps a score of solitaries or pairs may be present at one pool.

HABITS.—*L. sponsa* is such a fragile and feebly-flying insect (more resembling cranefly than dragonfly), seldom mounting more than a foot or two above the water, that one may have to watch at a pool for some minutes before one realises that here and there at its weedy edge, or on the fringes of islets in mid-pool, these delicate, attenuated, and lethargic insects are clinging to weed stems or embarking on short, slow flights from mooring stem to stem; and one must be only a few feet distant to observe the details of their delicate colouring. They are, however, less affected by weather conditions than other damsel-flies, and may be seen moored in mid-pool on dull, breezy days. When moored, the male may have wings either half-spread or folded. When the latter, it has a curious habit of jerking the extremity of its abdomen up and down between folded wings.

MATING AND LAYING.—In securing a female, the male knocks her down to the water, and they couple at the same instant.

When she is laying, the male's wings are folded and the female's four spread like a windmill's sails. Clinging to a reed stem, the latter loops up her abdomen, in the manner of a " stick " caterpillar, and begins looping down the stem into the water, until almost submerged: subsequently walking up the stem again, with the male still attached, and repeating the performance on another stem.

PYRRHOSOMA NYMPHULA

ON WING.—Mid-May to last days July.

COLOURING.—Maturely coloured insects observed within five days of initial emergence of species. Mature male mainly

scarlet and black. Female (paired) similar, but paler and duller with a thin yellow ring on each segment of abdomen, and with dull lake-brown instead of crimson eyes—the abdomen being definitely *red* and not yellow. Immature have bronze-green heads and brownish-yellow eyes, bronze-green thorax with orange-brown lateral stripes, and dull red abdomen with last few segments drab and pale yellow underparts. Their wings are *perfectly clear*, whereas those of most English specimens are tinged. On 20th May 1948—that is, on the fourth day after the species' emergence—numbers were already mated and laying, but 80 or 90 per cent. of those laying were partly immature, both males and females being reddish, with brown eyes, and the only marked difference between the two—and I had them coupled on my hand—was that the female bore a bronze-green mark on the upper side of each abdominal segment.

HABITAT.—Varied: from pinewood rides and peat-morasses to open pools on moors. Least numerous in latter situation, and not more than a score scattered over any one site. Will shelter in heather surround on breezy days.

HABITS.—Flies higher (at head height) than other damsels, particularly in " rides."

MATING AND LAYING.—Though many pairs were in tandem over a pinewood morass on that very hot day, 20th May, despite a strong north-east breeze, none were *in coitu*; and this species must remain coupled for several hours at a time, for I have no record of ever observing a pair in the act of coupling or uncoupling—though pairs may be observed in tandem as late as the third week of July.

During laying, the pair in tandem alight on the water, and nearly every female selects a leaf lying on the water. The latter then loops down her abdomen, probing its tip slowly here and there, before finally selecting a suitable spot on the underside of the leaf. The extrusion and fixing of the egg takes several minutes, without any apparent movement of the abdomen. Presumably she lays a number of eggs in one spot or around one leaf, and some females ultimately submerge almost totally. An occasional solitary female may also be

observed laying, or at any rate taking up the typical laying position. In getting her ovipositor into the right position, the female is able to articulate each abdominal segment separately.

The male remains attached to the female throughout the laying operation, and in the initial stages he is likely to be balancing solely on her neck, standing upright (like a praying-mantis), sometimes with wings in rapid motion. If there is a breeze, however, he is eventually forced to descend into a horizontal position, until she has finished laying: when his upright posture is assumed at the next laying spot.

ENALLAGMA CYATHIGERUM

On Wing.—Fourth week June to second week August.

Colouring.—Mature shimmering blue males appear to outnumber pale grey-green females by as much as 40 or 60 to 1. Young males (and some females ?) brown.

Habitat.—Not found in pinewood peat-bogs. Numerous at open pools and lochs on moors and water-meadows, provided plenty of vegetation; sheltering, frequently in pairs, in heather and grass at edge of pool in dull, windy weather.

Habits.—" Shoals " of scores fly an inch or two above the water. Individuals are continually leaving the " shoals " and mooring themselves to grass or reed stems at edge of water. In this position abdomen projects at right angles from stem and wings are folded down abdomen.

Mating and Laying.—Coupled pairs, with adult colouring, are to be observed on first day of species emergence. (Longfield suggests that they would actually have emerged a day or two earlier and probably have left the waterside for a period.) Mating may take place on the wing or when at rest on reed stem. The two may then uncouple; and the female climbs down into the water, completely submerging, and does not reappear for some minutes. During her absence, mate rests on a nearby blade of weed, and I never observed one to remain attached, as in Longfield's experience. Throughout July pairs in tandem are continually in evidence.

SOME FACTORS INFLUENCING THE FLUCTUATIONS AND DISTRIBUTION OF FILAMENTOUS ALGÆ IN BOGHALL GLEN, MIDLOTHIAN

E. Wyllie Fenton
Edinburgh and East of Scotland College of Agriculture

Boghall Glen was selected for algal investigation since it was easy of access, was reasonably isolated from other similar parts, and, judging by brief surveys of other areas, typical of the Pentland Hills and hence of the Moorfoot Hills. Algæ sent for identification from Loch Skene in 1938 showed much similarity to the flora of Boghall Glen (Fenton, 1940*a*). As Loch Skene lies towards the west side of Scotland, one may regard the conditions in Boghall Glen as typical of many valleys in the region lying south of the Clyde-Forth Valley, excluding bog areas.

From year to year there was great variation both in the quantity as well as the nature of the algal flora in the streams and ditches of Boghall Glen. A general survey of some of the factors at work is given in what follows.

Climatic Influences.—Obviously water is one of the most important factors in the life of most algæ. If water is insufficient, as in drought, algæ both in numbers and in kind are seriously affected (Stokes, 1940; Fenton, 1943). Fall in the water-level of streams and ditches, leaving isolated pools of water, stimulate *Cladophora* (temperature factor) and depresses *Spirogyra* and *Tribonema*. The after-effects of this may last for some considerable time.

Rainfall may stimulate algal growth and distribution, provided the rainfall is evenly distributed during the season. But, if very heavy rain falls, causing flooding, then the scouring out of streams and ditches will greatly reduce the number and kind of the algæ. Snow affects algæ if there is a sudden and rapid thaw causing flooding. Even freezing does not seem to damage algæ, provided the thaw is not sudden or there is not a continuous period of quick freezing and thawing.

There are two influences at work under light: (1) brightness or intensity of light; (2) duration of the hours of daylight. One of the most important factors in spring is good clear light. Most algæ are greatly stimulated by clear sunshine in spring. There is a very noticeable difference between a spring of dull weather and one of bright sunshine, provided there is no serious drought. The fact that, in spring, algæ kept in the laboratory lagged behind those under natural conditions was entirely due to the poorer light (north) under laboratory conditions (Fenton, 1937). *Draparnaldia*, *Zygnema*, *Oedogonium*, *Tribonema*, and *Spirogyra* readily react to good light. *Draparnaldia* reacts more to good light than to temperature. *Vaucheria* is not quite so sensitive to bright sunlight, provided the light is good.

The two red algæ, *Batrachospermum moniliforme* and *Lemanea mamillosa*, were not greatly affected by light. The latter alga occurred in a very shady position overshadowed by trees where the light was poor. The *Myxophyceae* are influenced by good light provided there is sufficient moisture. After midsummer there is a steady but definite decline in algæ, although an improvement is noticeable in autumn, often due to a more copious rainfall.

Temperature affects certain algæ more than others (Hodgetts, 1922). One of the chief results of high temperature is that it may lead to drought. Provided the temperature is not too high, *Myxophyceae* (Fenton, 1943), *Vaucheria*, *Cladophora*, *Stigeoclonium*, *Rhizoclonium*, and, to a lesser extent, *Tribonema* and *Oedogonium* are all stimulated, as shown by their growth. *Cladophora* only appears and increases in quantity towards early summer with the rise in temperature of the water in streams and ditches. *Vaucheria*, *Spirogyra*, and *Tribonema* seem to be stimulated by a combination of light plus temperature.

Grazing Animals.—Sheep are light on the hoof and therefore do not do any serious damage at springs, or to ditches and the banks of streams. Sheep and lambs wandering over and along streams and ditches may further the distribution of certain algæ (Fenton, 1937). Cattle are heavy on the hoof, so they puddle the soil round springs, break down, choke,

and upset drainage ditches and even the banks of streams. This has a very serious effect on algal growth and distribution. In Boghall Glen the introduction of cattle has reduced the algal flora both in quantity and distribution. In fact, the glen has never at any time, so far, regained its former varied algal flora since the introduction of cattle. As a factor of importance this would rank in order with drought, since it is practically continuous and not intermittent.

Introduction of New Species.—The appearance of certain algæ not previously found in Boghall Glen presents an interesting problem in distribution. Fortunately in some cases a reasonable explanation can be offered. *Batrachospermum moniliforme* occurs elsewhere in the Pentland Hills, but about two miles distant from Boghall Glen. In 1939 *Tetraspora gelatinosa* appeared first in Allermuir Dam, then spread down Boghall Burn and even appeared, for a time, in Boghall Dam. Just previous to this it had appeared in a stream flowing through Kitchen Moss in the Pentland Hills, over two miles distant. The appearance only once of the rare *Brachiomonas submarina* in a drainage ditch leading into Leips Burn could only have been introduced by some bird visitor from the Forth estuary, several miles to the east of Boghall. It is highly probable that birds also introduced *Batrachospermum moniliforme* and *Tetraspora gelatinosa*. Duck and snipe are not rare, and gulls also occur in the glen. That birds are the means of introducing algæ to the streams and ditches of Boghall Glen is further supported by the appearance in Allermuir Dam, shortly after it had been constructed, of *Chara delicatula*, which certainly does not occur within many miles of Boghall Glen. Perhaps the introduction and distribution of some of our rarer plants may be due to the same source of transport.

Competition between Algæ.—This question of competition between algæ has in some respects been dealt with in previous publications (Fenton, 1937). The *p*H of the water is a very important factor, since certain algæ have not a very wide range of tolerance (Fenton, 1936). All the factors previously mentioned play a part, sometimes an

important part, in depressing or stimulating certain algæ. The chief difficulty is not how to assess each of these factors, but how to estimate the various combinations and permutations of these factors. There is another fundamental matter of importance. Algæ are not the only living organisms present. As found in cultures (Fenton, 1940*b*), bacteria, fungi, protozoa, etc., as well as aquatic larvæ and fresh-water snails all play a most important rôle in the life of even a small pool of water. Hence algæ are only a small part of a much larger biotic community. Picken (1937) showed clearly the rhythm of such a community, and in many parts of Boghall Glen a similar condition of affairs may be found. Generally, however, there is what might be termed a grand period of growth or development for many algæ during any season and, although the date may vary, the general order remains fairly constant. *Vaucheria* often heads the list because it seems to overwinter better than most of the other algæ. *Spirogyra* and *Mougeotia* often take second place. *Zygnema* and *Ulothrix* follow, and a little later come *Tribonema*, *Microspora*, *Oedogonium*, *Stigeoclonium* and later in the season *Cladophora* and *Rhizoclonium*. Owing to multiple factors, the order may be changed and the quantity of any of these algæ may show great fluctuations from season to season. If conditions favour any of the algæ mentioned it may continue longer in a vigorous vegetative condition and delay and depress one or more of those which normally follow it during the seasonal rhythm, provided these algæ are all present in the same location.

Influence of the Weather of Previous Years.—Since weather plays a very important rôle in the distribution and quality of any alga, it naturally follows that conditions in previous years can influence algal populations of succeeding years. This is often very noticeable after dry summers or any long dry spell. After two moist summers there is usually an abundance of algæ and a more varied flora, provided always there has not been excessive rainfall causing scouring of the beds of ditches and streams. Nineteen forty-seven was a peculiar year, since heavy falls of snow early in the year caused flooding and much scouring of the ditches and streams. This was followed by cold dull weather and then came a long dry

sunny spell. The mild winter of 1947-48 and bright spring sunshine has had little effect in 1948, since there was a poor algal population and a very restricted flora in 1947. Even the rains of May and June were not sufficient to counteract the inhibiting weather effects of previous years. There are usually two peaks of algæ activity, one in spring and the other in autumn. If the spring peak, normally the most active, is below normal, it is often succeeded by a poor autumn period. A good autumn period, provided no unusual conditions follow, is often succeeded by a good spring period. Exceptional conditions in spring or autumn may reverse these rhythmic fluctuations.

When we consider all the factors outlined, it is obvious that any accurate assessment is well-nigh impossible. It is not safe to rely too closely on laboratory experiments, since it is practically impossible with small isolated experiments to reproduce natural conditions. It is not the algæ alone which must be considered but the whole biotic fauna and flora, not as individuals but as an intricate and intimate pattern of a balanced community. Another point emphasised by Fritsch (1931) is the need for accurate identification of the species of algæ. This is very difficult and often impossible to do, so long as they are in the vegetative state. Unfortunately, it is extremely difficult to induce some of these algæ to develop their reproductive stage to enable accurate identification. That is why work by many investigators is needed to gather much more information, for under differing conditions there is a greater chance of finding algæ in an identifiable condition. It would also provide a more accurate assessment of the various factors affecting algæ and their distribution in Scotland.

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CURRENT LITERATURE

THE titles and purport of papers, notes, and letters relating to Scottish natural history which have appeared during the period September 1948-February 1949 inclusive in the *Field* and *Country Life*.

ZOOLOGY

1. *Field*

OYSTERCATCHER AND DUMMY, by Field-Marshal VISCOUNT ALANBROOKE, 4th September 1948, pp. 267-268.—Illustrated article on reactions of breeding birds to stuffed dummy in Scotland.

FARMING, FORESTRY, AND SPORT, by Lieut.-Colonel J. C. WYNNE-EDWARDS, 11th September 1948, pp. 290-291.—Illustrated article on problems of marginal and hill lands in Britain.

HELPING THE INCREASE OF BLACKGAME, by DUGALD MACINTYRE, 11th September 1948, p. 100.—Letter stating that as there is small increase this season, few young birds should be shot.

REPORTS FROM THE MOORS, Editorial, 18th September 1948, pp. 315-316.—Brief summary of results of grouse-shooting in August 1948.

SALMON MIGRATION, Editorial, 18th September and 2nd October 1948, p. 316 and p. 372.—Short note on marking of salmon and sea-trout carried out by Scottish Fisheries Department in Montrose area.

SCOTLAND'S MOORS AND DEER FORESTS, Editorial, 2nd October 1948, p. 372.—Short note referring to letter in *Scotsman* on utilisation of hill land.

GLITTERING IN GOLDEN COATS, by BRIAN VESEY-FITZGERALD, 9th October 1948, pp. 406-407.—Illustrated article with some remarks on present status of golden eagle in Scotland.

TICK IN GROUSE, Editorial, 23rd October 1948, p. 456.—Short note stating reports of infection this year.

GANNETS AND THEIR YOUNG, by DUGALD MACINTYRE, 23rd October 1948, p. 469.—Letter stating that writer has on several occasions seen old gannets feeding young at sea.

SOCIABLE LITTLE BIRDS, by C. A. GIBSON-HILL, 30th October 1948, p. 490.—Illustrated article on breeding of puffins; some Scottish references.

MIGRATIONS OF SALMON, by W. J. M. MENZIES, 6th November 1948, p. 524.—Letter referring to previous editorials.

Preserving Wildfowl, by Eric Parker, 27th November 1948, p. 608.—Illustrated article on the work of the International Wildfowl Research Institute.

Woodcock carrying Young, by R. H. L. Webb, 27th November 1948, p. 614.—Letter giving details of observations made in Dunbartonshire.

Capercaillie in Scotland, by Ian D. Pennie, 27th November 1948, p. 614.—Letter requesting information on status in Scotland.

Spawning of Salmon, by Dugald Macintyre, 25th December 1948, p. 735.—Letter concerning time taken in expelling ova.

Not in the Books, by Dugald Macintyre, 1st January 1949, p. 14.—Illustrated article; personal observations of Scottish natural history; mainly birds in Kintyre.

Salmon Spawning in 1948, by Richard Waddington, 8th January 1949, p. 42.—Illustrated article on conditions in North-east Scotland.

Sutherland Grouse Prospects, by G. S. R., 8th January 1949, p. 45.—Illustrated article reviewing state of grouse population in the county during 1948.

Summer Encounter, by R. B. Talbot-Kelly, 8th January 1949, p. 46.—Illustrated article on bird life of Aberlady Bay.

Hawks at Airfields, by Dugald Macintyre, 15th January 1949, p. 76.—Letter mainly concerning behaviour of falcons in Kintyre.

Gannets Feeding at Sea, by R. M. Lockley, 22nd January 1949, p. 104.—Letter referring to statement in article of 1st January 1949; writer considers that there are probably no authentic records of young gannets being fed by regurgitation at sea.

Waxwings in Kincardineshire, by J. M. St John Yates, 5th February 1949, p. 162.—Letter; parties of about 12, and 20, on 27th November 1948, and 3rd January 1949 respectively.

The Deer-stalking Season, 1948, by G. Kenneth Whitehead, 12th February 1949, pp. 178-179.—Illustrated article.

Scarcity of Corncrakes, by Hugh Rankin, 12th February 1949, p. 189.—Letter; no scarcity at Blairgowrie, Perthshire, in summer 1948.

Herons Feeding at Night, by J. Vivian Ward, 12th February 1949, p. 190.—Letter stating that herons frequently fish at night in Loch Etive, Argyll.

Education of Young Gannet, by Dugald Macintyre, 26th February 1949, p. 245.—Letter replying to previous criticism (see above, Gannets Feeding at Sea).

Salmon Migration, by C. E. Lucas, 26th February 1949, p. 246.—Letter referring to recovery of marked salmon.

2. *Country Life*

Where are the Lapwings ? by Seton Gordon, 10th September 1948, p. 527.—Article discussing decrease and present status in Scotland.

The Shetland Sheep, by Richard Perry, 24th September 1948, p. 639.—Article on native sheep.

Frontier Outposts of Garden Birds, by Richard Perry, 1st October 1948, p. 675.—Article dealing mainly with Scottish Highlands and Islands.

A Bird Observatory on Fair Isle, 8th October 1948, p. 727.—A notice concerning establishment of Fair Isle Trust.

A Large Flock of Herons, by Collingwood Ingram, 8th October 1948, p. 735.—Letter; flock of eighteen seen on Hoy, Orkney.

Young Guillemots face a Hostile World, by John Peterson, 3rd December 1948, pp. 1158-1159.—Illustrated article on breeding and fledging at Noss, Shetland.

Roe Deer and their Fairy Rings, by Anthony Buxton, 17th December 1948, pp. 1266-1268.—Illustrated article on behaviour of roe, and the significance of their " rings."

Can Birds see through Mist ? by Seton Gordon, 7th January 1949, pp. 36-37.—Article on homing of shearwaters to burrows on Rhum.

Grey Phalarope in Ayrshire, by E. R. Chadwyck-Healey, 21st January 1949, p. 150.—Letter; one in full winter plumage found dead beside upper River Girvan.

Afforestation in National Parks, by J. C. Cadbury, 28th January 1949, p. 205.—Letter concerning forestry development near Loch Morlich, and stressing need for conservation of natural features in the district.

Photographing the Golden Eagle, by C. Eric Palmer, 4th February 1949, pp. 246-248.—Illustrated article describing a successful photographing in the Highlands.

Afforestation in National Parks, by E. W. Hodge, 11th February 1949, p. 321.—Letter referring to previous correspondence (28th January 1949).

Entomologist's Monthly Magazine

Notes on *Herse convolvuli* L., *Pararge aegeria* L., and other Uncommon Scottish Lepidoptera, by J. A. Downes, Vol. 83, pp. 217-218, 27th September 1947.—Notes on occurrences of these species and also *Drymonia trimacula*, *Enargia* (=*Cosmia*) *palaecea*, and *Macroglossum stellatarum*.

Cordulia aenea (L.) (Odonata) in Scotland, and a Note on *Somatochlora arctica* Zett., by J. A. Downes, Vol. 83, p. 219, 27th September 1947.—Only Scottish record of the first-named dragonfly, in Loch Lomond area of Stirlingshire, on 20th May 1946. Identity of Scottish specimens of the second species, which have been re-examined, is confirmed.

Some Lepidoptera of Western Scotland, by J. A. Downes, Vol. 84, pp. 203-204, 30th August 1948.—Records of marsh fritillary, red admiral, peacock, silver-Y, chimney-sweeper, thrift clearwing, and purple hairstreak.

CORRECTION

In Mr Dacker's article on " Mortality of Birds in the Cold Weather of January-March 1947," which appeared in the last number, the statement (Vol. 60, p. 175) that " tawny owls were practically wiped out near West Calder " should refer to barn owls. Mr Halliday, who supplied this observation, has no reason to believe that tawny owls were affected by the cold weather.

CORRESPONDENCE

To the Editor of *The Scottish Naturalist*

SIR,

We, the author and editors of the book, *Natural History in the Highlands and Islands*, have read with interest your review of it in the first number of the revived *Scottish Naturalist*. We regret the mistakes which you have pointed out (for which we are jointly and severally responsible) and we will correct them in the new edition of the book. We are glad that you have drawn attention to them, though we are surprised by the manner in which you have done so.

We are sorry that you did not have much to say about the *ideas* in the book, some of which are new, and some of which might have been worth discussion.

Some of the things which you believe to be mistakes are, in our opinion, not so. May we take these in the order in which they arise in your review ?

1. Your remarks about *Carex rigida* imply that the author makes no mention of this species as one important constituent of alpine grassland. In describing this grassland (p. 150) he records it, in fact, as one of the " common alpine sedges." Further, the author's description of alpine grassland, in which grasses, especially forms of *Festuca ovina*, are normally the dominant plants, as " nutritious," is an accurate one. In addition, this description is part of the page of recapitulation of the whole chapter and does not mention either Grampian plateaux or Cairngorms. Your remarks read as if these particular areas were under discussion.
2. High precipitation is a prime requirement for peat formation, and your remarks about the tundra appear to be irrelevant, if not actually untrue.
3. The author's views on the preadaptation of alpine plants to seaside high-salinity habitats are not belied by the presence of alpines also by the shores of great fresh-water lakes.
4. The author's phrase, " smolts marked in one river are never taken as grilse or salmon in any other river but their own," is so far true, though he might more tidily have said, " have never been taken." Your dissertation on smolts and grilse, prompted by this, seems mostly irrelevant.

You say that the author refers to the occasional spawning of parr " almost as if it were a new thing discovered by the author." How could this be, when the author expressly mentions in the text at this point certain facts relating to this kind of fish described in the Howietoun Experiments of 1887 ? As a matter of interest, the author did discover the fact for himself, but did not presume that he had done so first.

5. The author's remarks about ospreys, in their context on p. 247, seem to be quite valid and innocent, and undeserving of your contradiction.

6. Your remarks about herring-gulls apply to a different sub-species, and for that reason are of little value. There is no evidence that the social breeding of the British herring-gull is regulated by food-supply.

7. A grouse could " control its emanations " by pulling its feathers close. The author's remark, " as far as we know birds have no sense of smell," may be a little too sweeping, but you would be hard put to find any critical research demonstrating that birds have a sense of smell.

8. The chart (not graph) on p. 127 is not surrealist, and the reality which it demonstrates is perfectly clear. Your other remarks about deer show that you confuse sensitivity with wildness.

You end your review, " I feel merciless only towards those (the editors) who dared to say that ' every care has been taken. . . .' " To this we reply that you have strained the quality of mercy and betrayed your extolment of care.

Yours faithfully,

(Signed) Frank Darling
James Fisher
Julian Huxley
John Gilmour
L. Dudley Stamp
Eric Hosking

London, 25*th June* 1948.

[I have withheld publication of this letter, which was received on 30th August 1948, during a long correspondence between the signatories and myself. I deeply regret that they should regard my review as unfair, either because it makes little mention of the ideas in the book or because of the manner in which it was written.

I do, however, reaffirm the statements of fact contained in it (*Scot. Nat.*, lx, 59-61), and in particular those which, without further evidence, are questioned in the numbered paragraphs of this letter. It is not possible to deal briefly with each, but regarding No. 2 it is sufficient to point out that peat does not normally form on steep slopes, or anywhere else where the drainage is good, even in the West Highlands; it does form on level moors, old lake beds, etc., in all parts of the country, including the driest. Poor drainage appears to be a much more essential requirement than high precipitation. My observations on arctic peat have been made in Labrador, the Yukon Territory, and Finnish Lapland.

Referring to No. 7, I founded my statements that birds have a sense of smell, which may be reduced and retained only for tasting what they eat, on the fact that they have olfactory nerves leading to the brain from the sensory surface of the nasal chambers. Critical treatment and a review of the subject may be found in a valuable paper by W. G. Walter, which appeared in 1943 in *Archives Néerlandaises de Physiologie*, xxvii, 1-73. Though Walter's experiments on birds' ability to distinguish odours turned out negative, some other investigators have obtained positive results, and the subject is still an open one. As an undoubtedly extreme case, the kiwi is believed to depend largely on scent for finding its food.

The claim is made in the same paragraph of the letter that a grouse could control its emanations by pulling its feathers close. A bird pulls its feathers close when it is active or hot, and fluffs them out when it is resting or cold; thereby it regulates the thickness of the insulating blanket of air held in the interstices of the plumage. When the feathers are pulled closer the bird emits heat faster, and it seems impossible to doubt that this would increase the emanation of scent.—EDITOR.]

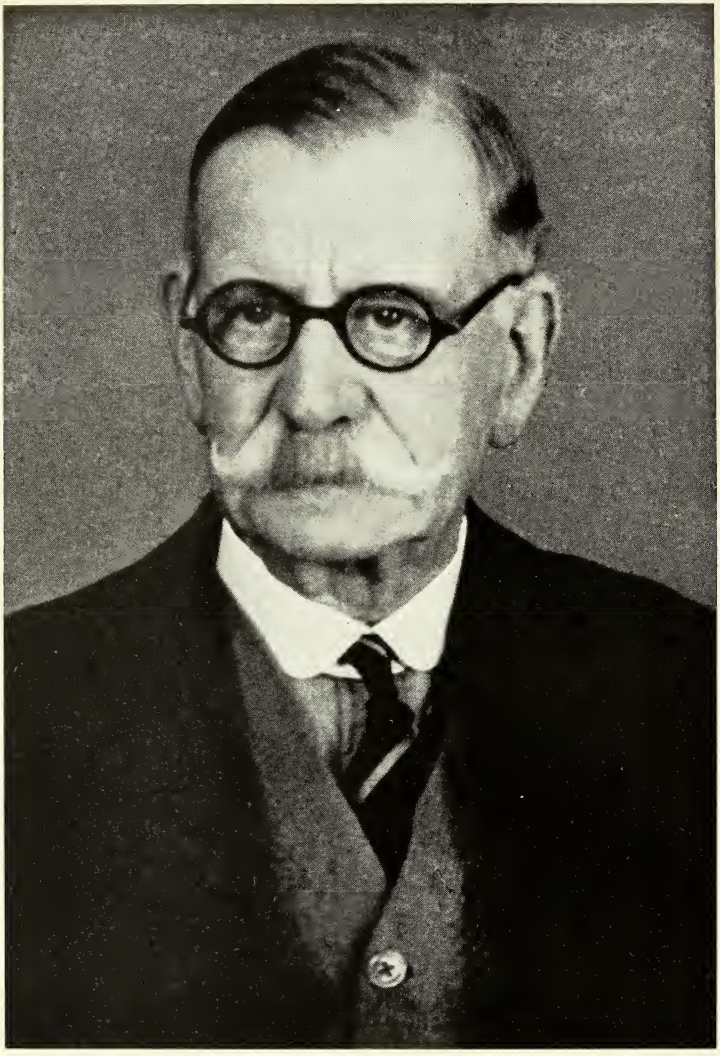

PLATE 3.—Sir Hugh Gladstone

Obituary

Sir HUGH GLADSTONE

1878 – 1949

The death of Hugh Steuart Gladstone at his home at Capenoch in the county of Dumfries on 5th April 1949 robs British, and more particularly Scottish, ornithology of one of its outstanding figures. His long association with *The Scottish Naturalist*, where his name featured so regularly as a contributor and so long as an assistant to the editor, may serve as an excuse for writing a personal rather than a formal notice of his life.

Gladstone was the only son, and, as his sisters were a dozen years his senior, in some ways almost an only child, of Samuel Steuart Gladstone, sometime Governor of the Bank of England, and Sophia Musgrave, daughter of the tenth Baronet of Edenhall. He was thus the heir to the two most vital influences of the nineteenth century, his father being a member of a junior branch of the great trading and merchanting family that gave Britain one of her best-remembered Premiers, and his mother inheriting the traditions of a more ancient lineage. Educated at Eton and Trinity Hall, Cambridge, he reached manhood in an atmosphere of wealth, privilege, and security that died with the end of the Edwardian era. After serving with the local militia in the South African War and enjoying a couple of sporting trips to India and East Africa in the early years of the century, he married Cecil, daughter of Gustavus Talbot, M.P. for Hemel Hempstead, by whom along with three sons and one daughter he is survived, and settled down to a happy life on his Dumfriesshire property. Here through the bewildering changes he "carried on" (a favourite expression), an unrepentant Edwardian, who regarded the first fourteen years of the century as the years of normalcy.

A great deal of his time and energy was devoted to local affairs, and he strove tirelessly to advance the interests of his beloved Dumfriesshire through the years in the ceaseless, tiresome, and utterly unrewarding work that is local government. His outstanding services in this sphere—he was for sixteen years Convener of the County, a chairman of the County Councils Association of Scotland, and a member of many departmental committees and the like—was rewarded by a knighthood and his appointment as Lord Lieutenant of the County, honours he greatly merited and greatly enjoyed.

It is Gladstone as a Scottish Naturalist, however, that must be the main theme of this notice. Here his interests were confined to birds and to certain well-defined areas even within this limited field. He was not, nor did he claim to be, a field naturalist of any great competence, but rather his interests lay along the four lines of shooter, protectionist, bibliophile, and local chronicler.

As a game shot he was not only a first-class performer—and here I must record that as recently as October 1948, at the age of 70 and with the signs

of his fatal illness already plainly noticeable, I saw him kill twenty-one head of driven game with twenty-four cartridges—but he had an intimate knowledge of all matters appertaining to the management of game.

As a protectionist his approach was legalistic rather than that of a conservationist, but to the cause of bird protection he was able to render very great services by the wisdom, experience, and tact that he brought to the many committees he adorned, whether Scottish, British, or International.

In that strange half-world where ornithology and antiquarianism mingle, his knowledge was probably unsurpassed by anyone alive to-day. The Capenoch library of books on British birds is, within the limits he set, as complete and perfect as any ever likely to be formed, and certainly the finest in private hands to-day. Nearly every one of the 2,000 books (titles not volumes) is in perfect condition and contains an autograph of the author and notes by H. S. G. always informative and often both amusing and pungent.

As a local chronicler he was thorough and tireless. Although the *Birds of Dumfriesshire* was published as long ago as 1910 it still remains one of the most outstanding of our local avifaunas, which is all the more remarkable when it is remembered that field work was really no part of Sir Hugh's equipment. The *Birds of Dumfriesshire* was kept up to date by a supplement in 1923 and later papers in the Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society—a society of which he was President for many years.

Such then is a brief outline of the life and interests of Sir Hugh Gladstone. Let us give one last look at the man himself: a tall, spare, slightly stooping but very distinguished figure in an old green shooting suit (doubtless his suits were sometimes new, but they always had a well-worn look), wearing a tie that pronounced him to be either a former pupil of Eton College or a present member of the Marylebone Cricket Club, two institutions he regarded with an affection almost amounting to reverence: a man carrying on with his diverse and often exacting public duties in times that were very strange and not a little distasteful to him: lonely, in the latter years of domestic sorrow and in the final months of distressing illness, he kept on to the end courteous, kindly, cultured and lovable—a country gentleman in the true tradition of Elwes, of the Gurneys, of Herbert Maxwell.

Sir Hugh Gladstone may not have been a great man; he was a greater than most of us will be privileged to know again.

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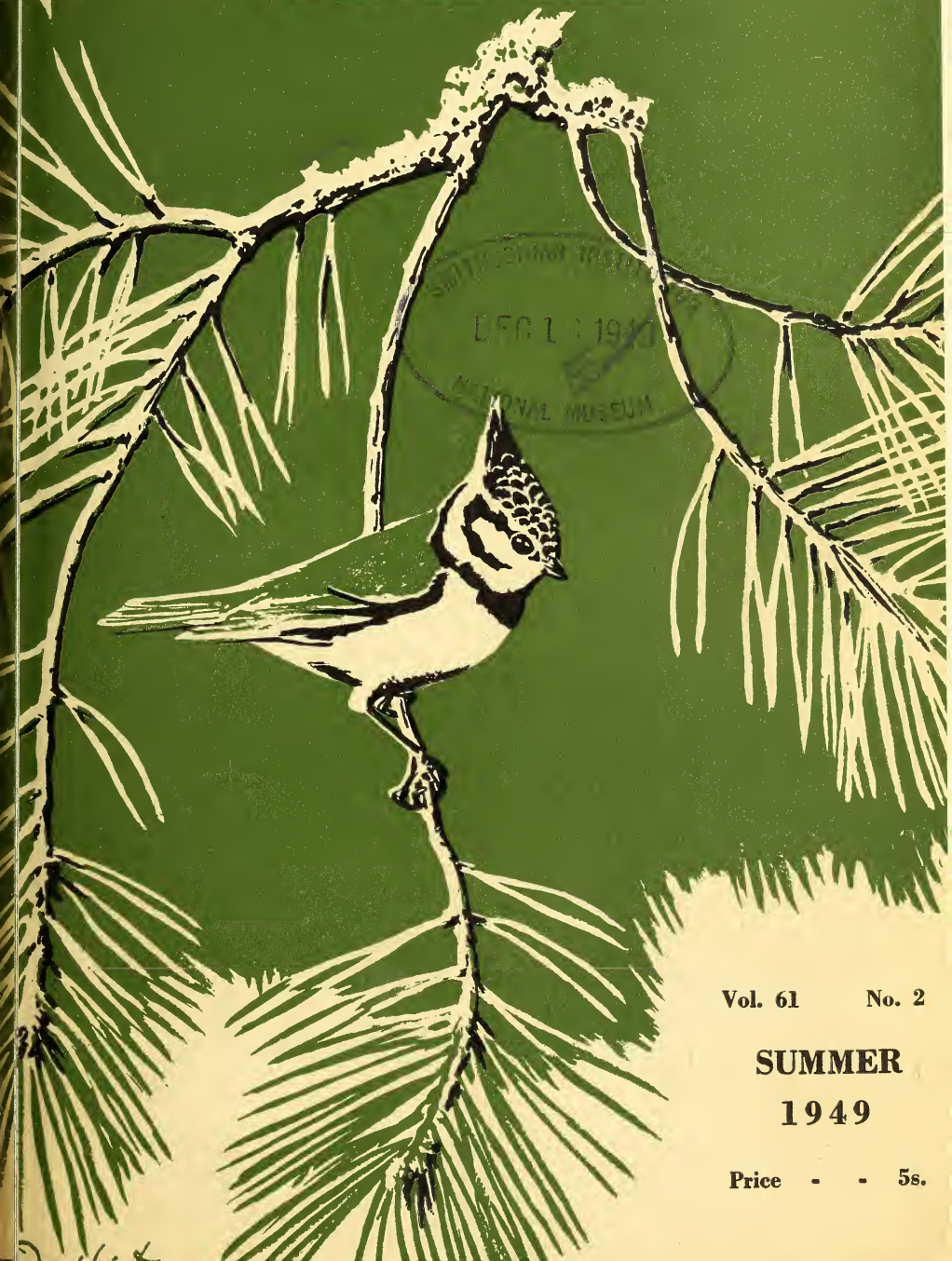

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STALKED BARNACLES ON THE SHORES OF THE BRITISH ISLES

James F. Anton
Bridge of Cally, Perthshire

On 28th June 1938 I was " birding " in one of the wildest parts of Tiree, near Craignish Point, when my attention was drawn to a very large batten of wood cast up by the sea. With other flotsam and jetsam, the log lay above high-water mark in a gully below the rocky headland.

Examination showed some areas of the log to be closely covered with stalked barnacles, *Lepas anatifera*. Other parts appeared to have been rubbed clean of them by contact with the sea bottom or rocks, prior to the log being cast ashore. Unfortunately all the barnacles were lifeless and partially dried up through exposure to sun and wind, and were consequently of no value for biological purposes.

There appears to be a good deal about the life-history of this barnacle which remains rather obscure, but it seems they only arrive on boats or logs which have been at sea for a long time and are thus not often observed.

I have seen an allied species, *Lepas anserifera*, attached to ships put into dry dock for hull cleaning in Malaya and Sumatra.

A further opportunity of seeing some particularly fine specimens of *Lepas anatifera* occurred on 3rd September 1943 while I was on active service with the Royal Navy in Dartmouth, Devon.

DEC 12 1949

A minesweeping trawler, on duty in the western English Channel, took in tow a raft, which she brought into harbour. The raft was handed over to my department for examination and investigation as to its origin.

It was of a type similar to that carried by Allied merchant vessels, lashed to the rigging for use in emergency.

Practically the entire under-water surface of the raft was covered with stalked barnacles of varying size. The Marine Biological Association Laboratory, Plymouth, were informed, and a biologist later removed considerable numbers of the stalked barnacles—identified as *Lepas anatifera*.

It is possible that the raft may have broken loose from a ship in rough weather or it may have gone down with a ship through enemy action, where the lashings would in course of time rot through, releasing the raft to come to the surface.

The late Dr Stanley Kemp, F.R.S., then Director of the Marine Biological Laboratory, Plymouth, forwarded the following interesting information after he had examined the specimens of *Lepas* from the raft at Dartmouth :—

The barnacle is *Lepas anatifera*, and the specimens are the finest we have seen. The greatest length hitherto recorded is, so far as we can discover, 16 inches, but a few of yours reach 19 inches.

It is unfortunately impossible to form any reliable estimate of the time the raft has been in the water from the size of the barnacles. There are very few data on the growth-rate of *Lepas*; what there are frequently refer to another species, *Lepas anserifera*, which, however, is a very similar form reaching similar dimensions.

I have consulted the British Museum authorities on the matter, and the only information on rate of growth is as follows :—

(*a*) A French authority, who measured specimens when just settled on a hull and again on the return of the ship, gives the rate of growth (presumably of the head or " capitulum ") as about 1 mm. per day.

(*b*) A buoy put out in Indian waters on 23rd February and taken in on 3rd March had *Lepas anserifera* with capitulum 8 mm. long.

(*c*) The s.s. *Siboga* in the Malay Archipelago was found to have *L. anserifera* with capitulum 21 mm. long 40 days after cleaning. On another occasion specimens 25 mm. long were found 107 days after cleaning.

From this very meagre evidence one may guess that 1 mm. per day is the maximum growth rate, probably attained only in tropical waters. In temperate seas it would almost certainly be slower, perhaps 1 mm. in 2-4 days.

The *Lepas* on the raft at Dartmouth have capitula with length varying from 35-50 mm. and, for the largest, on the above figures this will represent from $3\frac{1}{2}$-7 months growth—and might easily be more. I should myself be inclined to put the time at 6-8 months, but as you will see it is only a matter of guesswork and quite impossible to arrive at any accurate figure.

We made careful search for other organisms which might afford better clues, but were unsuccessful.

Turning up data on drift in the North Atlantic we find that a derelict ship did the full distance, arriving off the north of Scotland, in 10 months. This ship probably moved faster than your raft, as it would have presented a better surface to the westerly winds ; but the course, which is plotted, shows some setbacks during spells of easterly winds.—*Excerpt from* Dr Stanley Kemp's *letter, 7th September* 1943.

NOTES ON THE CAAING WHALE

KENNETH WILLIAMSON
Fair Isle Bird Observatory

THESE miscellaneous notes on the caaing whale, *Globicephala melaena* Traill, and the communal whale-hunting of the Faeroe islanders are supplementary to the full accounts of this aspect of Faeroe life which have already appeared (Williamson, 1945 and 1948).

During the last week of July 1947 no less than three big whale-hunts, in which more than a thousand caaing whales were killed, took place in the Faeroes. I witnessed two of these, the first at the capital, Tórshavn, on 23rd July, when some 250 whales were converted into rather more than five kilos of meat for each of some 6,000 people; and another at Nordhratgøa, Eysturoy, embracing about 500 whales, on 26th July. On the day after the Tórshavn *grind* the island of Sudhuroy had its turn, 450 whales being driven ashore at the head of Trongisvágsfjørdhur, near the fishing port of Tvøroyri. The only whale-hunts during 1948 were very minor affairs at Tórshavn (there being insufficient meat for general distribution) and Klakksvík on the island of Bordhoy, the latter taking place in the autumn.

A novel feature of the 1947 *grind* at Tórshavn was that, for the first time in the history of Faeroe whaling, a mobile crane was used to haul the mammals out of the water and deposit them on the quay. At the head of the harbour, where there was plenty of room for manœuvring in an open space at the end of the main street, a tractor and wire hawser did the work of the crane. This mechanisation is not without a sociological significance, besides being a sign of the Faeroeman's desire to keep abreast of the times, for in warm weather the whales decompose quickly, and the new saving in time and manpower assures that distribution will be completed whilst the meat is fresh.

As little seems to have been recorded on the colour of the

Picture Post (reproduced by permission)

PLATE 4.—Newly-born Caaing Whale on the quay at Tórshavn, Faeroe Islands. 23rd July 1947.

eye and mouth in the various species, it is perhaps worth while putting on record a few observations made at Tórshavn on the day of this hunt. In the eye of the caaing whale the sclerotic area is pinkish-white, the pupil is bright green, and the hazel-brown iris is lightly flecked with black. There is no eyelid, but there are small pleats in the skin above and below the eye, as shown in Fig. 1, which facilitate opening and closing. The interior of the mouth appears to be entirely black except for the tongue, which is dark flesh-colour, but these features were difficult to examine properly as *rigor mortis* had rendered the jaws practically immovable.

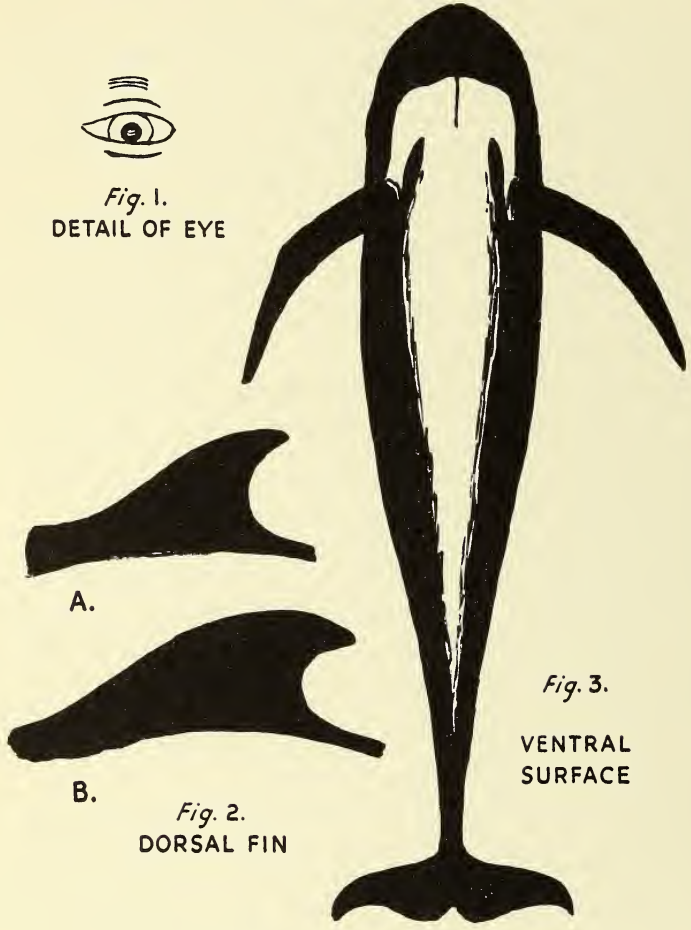
The flipper is quite noticeably angled on the anterior margin (Fig. 3 and Plate 5), and not an even curve as is shown in the plate of the young caaing whale prepared for Professor Murie's classic paper. The characteristic form, long and narrow, of this flipper in the adult is in marked and interesting contrast with the rounded, spatulate shape seen in the newly-born young (Plate 4), and which may well be the primitive form in *Globicephala*, as it more nearly approximates to the form of the flipper in the allied killer, *Orcinus orca* (L.), and false killer, *Pseudorca crassidens* (Owen).

The distribution of the white or greyish-white area on the ventral surface is well seen in Plate 5 (indicated also in Fig. 3); this is individually variable in extent, but substantially the pattern was the same in all cases, and fairly consistently so on the underside of the head. The greyish-white is sharply delimited in this region, but this is not so between the flippers and on the belly, along which the whitish band extends irregularly as far as the ventral groove.

Practically all the beasts had groups of several whitish lines, either straight or curved, running closely parallel to each other, conforming to no set pattern and quite unequally distributed on various parts of the body. Professor Flower's plate of *Grampus griseus* Cuv., and the reproduction of it in Millais' work, show these picturesque groups of markings well; they are at least as numerous and as diverse on most caaing whales, and I incline to the view that they are deep scratches caused by the teeth of other whales during fighting. The region around the mouth, in all the specimens examined, was pitted with the sucker-marks of the cuttlefish on which

these animals feed. Ectoparasites were looked for, but none was found.

Morphology now becomes the handmaid of folklore! Whilst I was making notes on the whales I was told by a



FIGS. 1-3.—Details of Caaing Whale.

Faeroese that there are two kinds of caaing whale—one with a high, pointed dorsal fin (an example of which is to be seen on the left-hand side of Plate 5), and the other with a markedly falcate dorsal fin, wider at the base. There is certainly a good deal of variation in the shape of this fin, and although

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PLATE 5.—The *Metingarmenn* measuring and valuing a Caaing Whale, Tórshavn, Faeroe Islands.

two types (Fig. 2, A and B) are broadly recognisable it is not always easy to say to which type a particular individual belongs. On pursuing inquiries, I found that discrimination between the two among the *grindamenn* is quite general, and that type B with the *breidhahorn* ("wide horn") is said to occur sometimes in homogeneous schools. It is reputed to be more nervous and lively than type A, and when the school consists wholly or largely of *breidhahorn* whales it is very difficult to drive, and not infrequently eludes the hunters. This belief, implying a physiological difference correlated with the morphological one, is most interesting, and the Faeroeman's very extensive experience of these mammals demands that serious attention should be paid to this item of local lore.

There do not appear to be any other morphological distinctions, nor is the difference one of sex. Some consider that it is due to age as the majority of the *breidhahorn* type are large mammals, and therefore presumably older than the others; but it is interesting to note that in two cases I found big females with the wide falcate fin, to whose bodies fœtuses having the same type of fin in miniature were still attached by the umbilical cord. These young were prematurely born, as they often are, when their dams were dying.

Dr Francis C. Fraser, to whom these miscellaneous notes were submitted, has sent me his own notes on the shape of the dorsal fin in members of a school of tropical caaing whales which he watched near the Cape Verde Islands in 1946. He recorded that "there was great variation in the shape of the dorsal fin. All those seen were falcate, but the hinder concavity was relatively shallow in some, whilst in others it approximated to the semicircular. The larger animals had the more pronouncedly falcate shape."

Plate 5 shows the *metingarmenn*, who are appointed by the district officer to measure and value the whales, at work on the Tórshavn quay, attended by the sheriff's officer, who records their observations. Noteworthy features of the fœtus shown in Plate 4 are the short, rounded flipper and falcate dorsal fin (already mentioned), the semicircular blow-hole, and the prominent "beak."

My thanks are due to my father-in-law, Hr. Niels C. Rein,

of Tórshavn, for help in pursuing these inquiries ; Dr Francis C. Fraser of the Department of Zoology, British Museum (Natural History), for reading these notes in typescript and allowing me to quote his own observations ; and to the magazine *Picture Post* for their kindness in permitting the use of photographs taken by their staff photographer, Mr R. S. Kleboe, as Plates 4 and 5.

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The following item should be added to the literature of this fascinating aspect of whaling :—

GREG, EDWARD HYDE., 1855. *A Narrative of the Cruise of the Yacht Maria among the Feroe Islands in* 1854. London.

This work, for a copy of which I am indebted to Colonel Alexander Greg of Westmill, Buntingford, Herts, and which was privately printed, contains a vivid eye-witness account of a whale-hunt at Vestmanna, in the north of Streymoy, and a fine coloured plate.

THE BREEDING OF THE HERON IN THE OUTER HEBRIDES

James W. Campbell
Strathtay, Perthshire

Introduction.—During the sixty years which have elapsed since the publication of Harvie-Brown and Buckley's *A Vertebrate Fauna of the Outer Hebrides* there have naturally been changes in the status and distribution of birds in the Outer Isles. Some of these, as for example the spread of the fulmar, *Fulmarus glacialis*, have been fully investigated and recorded, but a few have passed almost unnoticed. It was evident on my first visit to the Islands in 1932 that there had been a remarkable change in the status of the heron, *Ardea cinerea*. The earlier writers were unanimous that the heron, although abundant at all seasons, did not breed in the Outer Isles, and Harvie-Brown knew of no record when his book was published in 1888. It was 1902 before the first authentic breeding record was obtained, yet by 1932 the heron was well-established as a breeding species and colonisation was still proceeding. This change seemed worth investigating and, therefore, from 1932 to 1939 an attempt was made to trace and visit as many of the nesting sites as possible. It had been hoped to carry out a complete census, but unfortunately this proved impossible owing to the outbreak of war.

Some data obtained since 1939 are included in these notes.

Past History.—The following is a summary of references in ornithological literature to the breeding of the heron in the Outer Hebrides :—

In 1902 a pair of herons bred for the first time on the west side of Lewis near the Harris march. This is the first record of breeding in the Outer Hebrides. In 1903 there was again a single nest in the same spot, but it was disturbed, and in 1904 two pairs nested in a fresh place farther inland. In 1905 and 1906 there were three nests at the same site (*A.S.N.H.*, 1907, p. 81). During the next few years this heronry, which

was at the Tarsnig rock above Loch Resort, at the west end of the Lewis-Harris march, increased " to a fair size," but in 1910 ravens took possession of the rock and devoured the herons' eggs. Since then no herons bred on the Tarsnig, although some still nested on other rocks near the Lewis-Harris march (*A.S.N.H.*, 1912, p. 21).

In 1903 Richard Kearton is reported to have seen a heron sitting on its nest in North Uist (*A.S.N.H.*, 1904, p. 57). This, at the time of publication (1904), was the first good record of nesting in the Outer Hebrides. In 1910 two pairs nested in the tops of some fir trees to the south-west of Stornoway Castle gardens. There were young in the nest when found, but they were killed before they could fly, and it was stated that the nests appeared not to have been used since (*A.S.N.H.*, 1912, p. 185).

In 1912 a nest was found in a tall larch in Stornoway Castle grounds; three young were successfully reared. It was reported that a nest was found in the same place " five years ago," *i.e.*, in 1907 (*A.S.N.H.*, 1912, p. 211). No information additional to that already summarised above is given in a paper on Scottish heronries by H. Boyd Watt published in 1914 (*A.S.N.H.*, 1914, pp. 112-115). One reference to the early breeding of the heron in North Uist seems to have been overlooked by ornithologists. On page 161 of Erskine Beveridge's *North Uist, its Archæology and Topography*, published in 1911, it is stated that Dun Ban (in Loch Hunder, which lies some two miles south of Lochmaddy village at the foot of North and South Lee) " . . . serves as a nesting place for herons, being evidently regarded as a secure retreat free from any intrusion." The large photograph of this dun (between pp. 160-161) shows several herons' nests and changes in the vegetation characteristic of those caused by nesting herons. It is probable that this was the site where Kearton saw his nesting bird.

In 1918 F. S. Beveridge in an account of the birds of North Uist includes the heron as a breeding species, stating that " a few pairs nest in the vicinity of Loch Eport, but there are no heronries in the Island " (*A.S.N.H.*, 1918, pp. 253-254).

The " Report on the *British Birds* Census of Heronries, 1928 " (*Brit. Birds*, **22**) contains the following references to

breeding in the Outer Hebrides: page 343, " . . . while in South Uist where the herons only settled in 1922 . . ."; page 352), " . . . on North Uist where they have only bred in recent years there has always been a large non-breeding stock and still is; on South Uist there are about fifty non-breeders against eighteen breeding pairs "; page 353, " At Ronay Island, North Uist, a new-laid egg was found by about February 17th."

In the " Supplementary Report " (*Brit. Birds*, **23**, page 335), " A small heronry on South Uist visited by Mr W. A. S. Lewis on June 30th, 1929, had nests with eggs c/5 one, c/4 four, and c/3 one. In addition, two nests contained respectively two and three newly-hatched young and there were eight ' fully-grown young birds.' "

In 1932 Miss Baxter and Miss Rintoul were informed that herons bred that year for the first time on Wiay, a small island off Benbecula, and that they first began to breed in South Uist " about seven years ago and now nest there in two places " (*Scot. Nat.*, 1932, p. 181).

Apart from a note of two counts made by me at Wiay in 1936 and 1937 (*Scot. Nat.*, 1937, p. 175), which are referred to later in detail, no further information on breeding in the Outer Islands has been traced.

Results of the Present Inquiry.—1. *Breeding Sites in North Uist.*—(*a*) Loch an Tomain, one mile east of Eaval. N. Macphail, Loch Eport, told me in 1938 that herons had nested beside this loch for at least twenty years and had never been interfered with. I first visited this extensive colony on 7th July 1937. The nests, which were in three main groups, were placed on ledges on the rocky cliffs rising from the loch, in scrub bushes on the cliffs and on an islet in the loch, and on the ground in long heather. Fifty-one nests were counted in two of the groups, and it was estimated that the third in a steep cliff held between twenty and thirty. Another visit was paid on 27th June 1938, but although a long time was spent on a count, it again proved impossible to complete it owing to the rough terrain and the many scattered nests. One hundred and two nests were counted, and there were at least twenty or thirty more on an inaccessible cliff. This estimate

was based on views through field-glasses from the opposite side of the loch. Fifty-five of the nests counted were on the cliff site, where it had been estimated that there were between twenty and thirty in 1937. J. B. Munro and A. G. Bryson reported (*in litt.*, December 1937) that they visited a heronry of " perhaps fifty nests " in this district in 1934. Subsequent checking showed that this observation referred at least to part of this scattered colony.

(*b*) Loch Crogavat, one mile north of Loch an Tomain. N. Macphail, Loch Eport, informed me on 27th June 1938 that at least fifty to sixty pairs had nested on an island at the extreme north-east part of this loch for " the last five or six years."

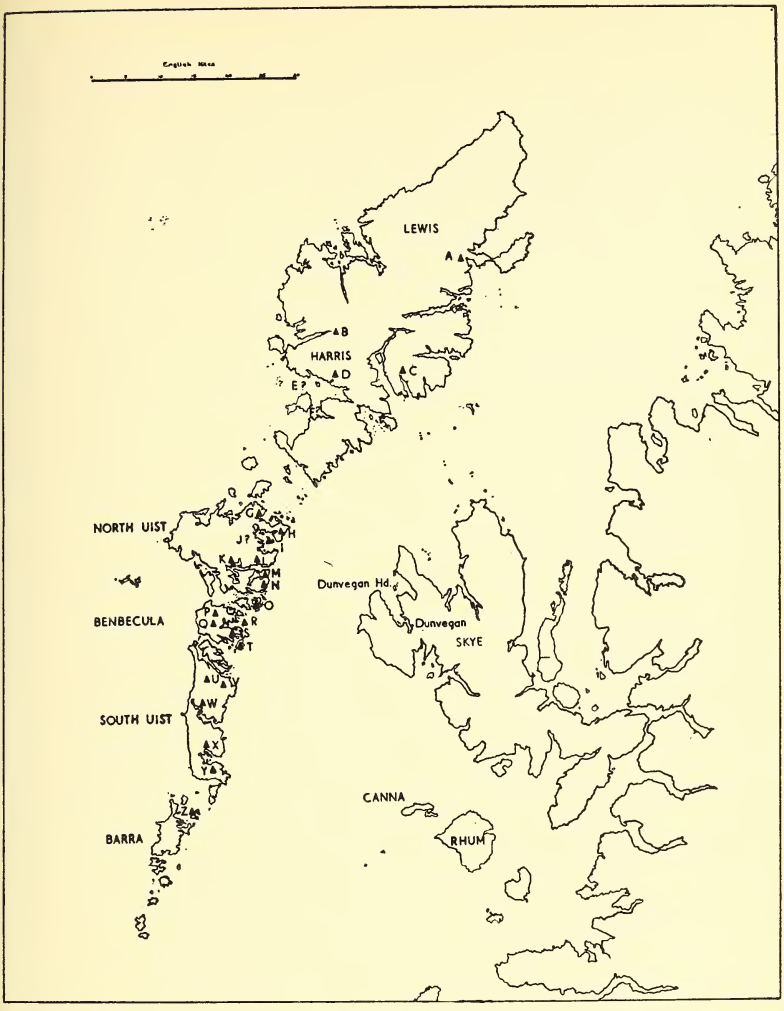
(*c*) Cliasay More and Cliasay Beg, one and a half miles north-north-east of Lochmaddy pier. The nesting of herons on these islets in Loch Maddy was first reported by Dr A. J. MacLeod. It is thought that there was a single nest on Cliasay More for some years before 1939. By 1947 there were not less than twenty pairs, and another islet in the same group was first occupied that year.

(*d*) Loch Iosal an Duin, one and a half miles east of Newton Lodge. First colonised in 1945 when there were fifteen to twenty nests on the dun. There were twenty-six nests in 1946 and about the same number in 1947. (John MacAskill, Newton.)

(*e*) Cliffs midway between Weaver's Point, Loch Maddy and the entrance to Bagh Chaise. Herons first bred here in 1945, and again in 1946; no estimate of numbers. (Norman MacLeod, Lochmaddy.)

(*f*) Loch an Duin, Breinish, one and three-quarter miles south-east of Langass. A pair nested successfully in 1935, but the site was not used again. (N. MacQuarrie.)

(*g*) The Island of Ronay (part of North Uist Parish). The presence of a heronry on Ronay is mentioned in the "Report on the *British Birds* Census of Heronries" (*Brit. Birds*, p. 353). W. B. Alexander tells me that on a map of Scottish nesting sites, filed at the Edward Grey Institute with the 1928 schedules, Ronay is marked as a site with over twenty nests; no other site is marked in North Uist.



KEY TO MAP

A Stornoway
B Loch Resort
C Loch Claidh
D River Meavaig
E ? Soay
F ? Luskentyre
G Loch Iosal an Duin
H Cliffs between Weaver's Point & Bagh Chaise
I Cliasay More & Cliasay Beg
J ? Loch Fada
K Loch an Duin, Breinish
L Loch Hunder
M Loch Crogovat
N Loch an Tomain
O Ronay
P Dubh Loch
Q Loch nam Fennag
R Wiay Beg
S Loch Dubh Fhalasgaidh
T Wiay
U Loch Druidibeg
V Loch Bein
W Allt Volagir
X Loch Coragrimsaig
Y Loch Marulaig
Z Bishop's Lagoon, Gighay-Hellisay

▲ Breeding sites of the heron

FIG 1.—Map showing breeding sites of the heron, *Ardea cinerea*, in the Outer Hebrides

Angus MacAskill kindly visited this heronry for me in July 1938, and counted forty nests in several scattered groups. They were built in long heather and bracken on cliffs rising from fresh-water lochs and from the sea. The shepherd on Ronay stated that herons first bred here in 1915; he remembered the year well because he was of opinion that the bombardment on the Continent had frightened the herons over to the island. Since the original colonisation the birds have moved about quite a lot, breeding at several different places on the island. He said that they were on the increase, although there were not so many nests in 1938 as there had been in past years. The late Andrew Mackinnon told me that he had seen eggs which had been taken on Ronay in 1918. In 1945 the colony was reported to be thriving.

(*h*) Loch Fada, three miles north-west of Lochmaddy pier. Herons were reported to be nesting on an islet in 1947, but this has not been confirmed.

2. *Breeding Sites in Benbecula.*—(*a*) Island of Wiay, five and a half miles south-east of Rueval. Neil Monk, a native of Wiay, says that herons first bred here in 1929 or 1930. The late Andrew Mackinnon confirmed these dates, which are two or three years earlier than that reported to Miss Baxter and Miss Rintoul (*Scot. Nat.*, 1932, p. 181). There were about six pairs. I have visited this colony on many occasions since 1933, and have made three complete counts—forty-seven nests on 3rd June 1936, forty-five nests on 27th May 1937, and thirty-four nests on 2nd June 1938. Forty nests were reported in 1934. My last visit was on 30th July 1947, when it was estimated that there were quite as many nests as previously. It was impossible to count the nests as there was no boat for the loch. The nests are placed in scrub and on the ground in long heather, on the islets in Loch na Beiste.

(*b*) Dubh Loch, half a mile north-east of Rueval. Three pairs first bred in scrub on an islet in this loch in 1933, and a few pairs were reported breeding each year up to 1938 (late Andrew Mackinnon). One pair was still breeding at this site in 1947 (D. J. Mackinnon).

(*c*) Loch nam Fennag, one mile south of Rueval. There was one nest in 1935, and the site seems to have been occupied

by one pair up to and including 1938, but there is no recent information (D. J. Mackinnon).

(*d*) Island of Wiay Beg, two and a half miles east of Rueval. One pair bred in 1938; there is no subsequent information.

(*e*) Loch Dubh Fhalasgaidh, three miles south-east of Rueval. In 1946 D. J. Mackinnon found a new heronry at this loch. Twelve dozen eggs were counted here that year. In 1947 the site was still being used, but the nests were not quite so numerous.

3. *Breeding Sites in South Uist.*—(*a*) Loch Bein, one mile south-east of Loch Skipport pier. John Macdonald informed me in 1938 that this was the first site occupied by herons in South Uist. This was "soon after the 1914-1918 War," and there have always been a few nests here since, although the herons have been kept in check. Formerly there were up to twenty nests, but in 1938 there were only six. G. W. Sandeman and A. G. Bryson, who visited the colony on 8th July 1932, estimated that there were about twelve nests. E. Mackintosh told me in 1947 that the heronry was still in existence, although not as strong as formerly. In July 1947, when Miss Mary Henderson visited it, five birds were disturbed from the islet, where there were signs of at least one nest.

(*b*) Loch Druidibeg, Grogarry. It appears that herons first bred here in 1922. In 1927 Hon. G. L. Charteris counted twenty nests in bushes and stunted trees on the islets, but a number of breeding birds had already been destroyed. W. B. Alexander informs me that the eighteen nests for South Uist included in the 1928 census, referred to the Druidibeg colony, and that it was reported as having been founded in 1922.

L. S. V. Venables found twelve occupied and seven empty nests on 29th June 1929 at Druidibeg, " . . . I think the only heronry on the island." In 1935 it was reported to W. B. Alexander that there were only two nests left at the old site, and that the herons had scattered. In 1938 John Macdonald told me that there were then still five nests at the original site, but that they had been "attended to." He estimated the largest number of nests ever at Druidibeg as about eighteen.

In spite of persistent persecution, herons still attempt to breed here (J. McColl, 1945; E. Mackintosh, 1947).

(*c*) Allt Volagir, one mile south of Beinn Mhor. Herons first bred here in 1932 or 1933. There were then six nests in the long heather and scrub on the steep escarpment above the burn. I have read an account in a periodical of the discovery of this site, but have failed since to trace the reference. The site is said to have been occupied every year up to 1938, when there were fourteen nests which were destroyed (E. Mackintosh). I visited the ravine in July 1947, but found only remnants of four or five old nests in the long heather, and the site had certainly not been used for some years.

(*d*) Loch Marulaig, one mile south-east of Lochboisdale pier. In 1936 Mrs R. A. Chrystal found herons breeding in the scrub on the islets in this loch. When I visited it on 14th June 1938 there were seventeen or eighteen nests; there was no boat, so the count had to be made through field glasses from the shore. At least thirteen nests were occupied. It was evident from the condition of the scrub that the site had been used for several seasons, although prior to 1936 its existence was quite unknown. E. Mackintosh reported that the site was still occupied in 1947.

(*e*) Loch Coragrimsaig, one mile north of Lochboisdale pier. Herons first bred on a scrub-covered islet at this loch in 1938. I visited it on 8th June 1938, but the islet was inaccessible and difficult to view satisfactorily. There was one nest at least. Ten days previously six herons had been flushed from the scrub. In June 1946 Mrs Upton twice flushed forty from the island when the heronry was reported to be much enlarged; twenty-three were disturbed from nests in 1947.

4. *Breeding Sites in Barra.*—Bishop's Lagoon, between the islands of Gighay and Hellisay. In August 1945 James Ferguson-Lees discovered a nesting colony on the rocks surrounding the " lagoon " between these two islands. The nests were placed in hollows between rocks close to the water. It is thought that there were at least thirty pairs. Ferguson-Lees could obtain no information locally about the date of colonisation, other than the vague statement that the heronry had been in existence for " quite a long time."

5. *Breeding Sites in Harris.*—Information on breeding in

Harris during recent years is somewhat meagre and unsatisfactory; the position needs further investigation. Prior to 1940 I explored much of North and South Harris, especially for heronries, with no success, but the following reports of nesting were obtained :—

(*a*) South Harris. Macdonald, head stalker at Amhuinnsuidhe, told me in 1939 that herons had bred for some years past on rock ledges near the sea below the Bay of Luskentyre.

(*b*) North Harris. Macdonald stated in 1939 that five or six pairs had nested, for at least seventy or eighty years, as far as he could ascertain, on rock ledges at Taran More and Taran Beg on the Harris side of the entrance to Loch Resort. This information is of special interest as it was in the neighbourhood of Loch Resort that the first authentic record of breeding in the Outer Islands was obtained by N. B. Kinnear.

Breeding is also reported to have taken place occasionally on the Island of Soay (? Beg or More), which lies north of Taransay at the entrance to West Loch, Tarbert. The keeper at Tolmachan had only once seen a nest—a single one built in a bush, by a pool near the River Meavaig in 1936.

The above information was obtained verbally in August 1939, but unfortunately commitments elsewhere immediately afterwards prevented any follow-up. James Fisher (1948) tells me that he has no knowledge of any Harris colonies.

6. *Breeding Sites in Lewis.*—Loch Claidh, a sea loch east of Loch Seaforth. T. B. Macaulay, Stornoway, saw three nests " about 1933 " built in rowan bushes on the side of the loch. In 1942 W. Taunton heard that there was a small heronry on one of the sea lochs on the east coast of Lewis near the Lewis-Harris march. It seems probable that this refers to the above site. In July 1938 when I was at Morsgail, Ferguson, the keeper, told me that none had ever bred on his ground; he was born in the district. An assistant of his, however, remembered that they had bred at Loch Resort in Harris. All other information for Lewis is negative, and exploration of large tracts of country throughout the island has also failed to discover further breeding colonies. T. B. Macaulay and John Morrison in 1939 knew of no breeding at Stornoway other than that recorded in *The Annals of Scottish*

Natural History for 1912. In 1949 James Matheson told me that a pair attempted to breed in 1938 near the rookery in the castle grounds. Eggs were laid, but the nest was robbed " by boys."

Situation of Breeding Colonies.—These heronries are situated in rough, rocky moorland which is nowadays remote from human habitation and rarely visited. It is very different country from the fertile west coast *machair* with its many townships and easy communications. To one unaccustomed to Outer Hebridean conditions, the description " one and a half miles north-north-east of Lochmaddy pier " or " one mile north of Lochboisdale pier " does not, perhaps, imply a high degree of remoteness or inaccessibility, but in the Islands there is often a vast difference between the distance as flown direct by the hoodie and that involved in a journey to the same spot on foot. Several heronries are on lesser islands—Ronay, Wiay, and between Gighay and Hellisay. Those on Cliasay More and Beg are protected by the tidal channels of Loch Maddy, while the colonies at Loch an Tomain and Loch Crogavat are tucked away beside the Minch coast, with ramifications of sea and loch protecting them from the west.

The Outer Hebridean herons show a definite preference for nesting in such woodland as still exists. The native scrub woodland that has survived the widespread heather burnings is confined to those places that could not be reached by the fires—to islets on lochs, to cliffs and escarpments, or beside burns and wet places. The islets in the lochs hold the largest quantity of scrub at the present day, and it is here that the colonies have been founded in nearly every case. The protection afforded by a water barrier, in country where boats are just about non-existent, has been important. Only Loch Druidibeg, which incidentally laps the keeper's house, has a boat and the herons have suffered accordingly. The scrub woodland beside the Allt Volagir near the head of Loch Eynort is protected only by its remoteness; there is no water barrier and one could walk straight into the nests, so it is not surprising that the heronry, probably founded by birds driven off Druidibeg, was soon extirpated. There is no mention of scrub at the

Barra colony, or at the cliff site between Weaver's Point and Chaise Bay which has not been investigated, nor apparently is it now used at Ronay, although in the past some was occupied.

None of the man-made plantations or woodlands has been successfully colonised. The nesting in the Stornoway woods soon petered out; apparently there have been no recent attempts. Proximity to roads and habitations with their interference are probably partly responsible, although on the mainland herons successfully occupy sites subject to far greater disturbance.

Situation of Nests.—Initially there is a preference for scrub. Rowan and willow are now the most abundant of the native trees, and rowan is by far the most popular with the herons; it grows several feet taller than the average willow, but even so I have found no scrub nests higher than six feet from the ground, for this is about the greatest height reached by rowans on these wind-torn islets. At Wiay in 1936, out of a total of forty-seven nests, all were built in rowans; in 1937 forty-two were in rowans, one in willow, and two on the ground; in 1938 thirty-two were in rowans, one in willow, and one on the ground. Aspen, which is confined more to rocky outcrops and cliffs, is used at Loch an Tomain, and one nest there in 1937 and 1938 was built in a wild rose bush growing in a rocky face above the water. At Loch an Tomain most of the nests are placed on the ground in long heather, or on ledges, or in crevices on the low rocky cliffs rising from the loch; only two out of the one hundred and twenty to one hundred and thirty nests were placed in islet rowans. At the Bishop's Lagoon, between Gighay and Hellisay, Ferguson-Lees found the nests placed simply in hollows between the rocks close to the water's edge.

The fouling caused by the herons' occupation quickly leads to the death of the scrub in which the nests are built, but even when the bushes are quite dead, nests are built in them as long as lodgment can be found. At Wiay in 1936, twenty nests (total 47) were in dead rowans; in 1937, twelve (total 45), and 1938, nine (total 34), the gradual decline in numbers being due to the disintegration and collapse of the decayed bushes.

At successful colonies the destruction of scrub soon causes a scarcity of tree sites; then nests are built on the ground among long heather, although there is also a well-marked tendency to spread to fresh scrub areas, if such are available near at hand. This has been well demonstrated on the islets at Loch na Beiste, which house the Wiay colony. When the herons first settled and bred, either in 1929 or 1930, there were about six pairs which nested together on the most easterly islet. This, like the others, was covered by thick scrub rowan, with a fringe of long heather, and a belt of royal fern by the water side. In November 1933 when I had my first views of the heronry, the birds had spread to other islets nearby; in June 1936, when the first landings were made on the nesting islets, it was found that besides the original islet (A) three others (B, C, D), which are the islets nearest to (A), were occupied. They are some thirty to forty yards apart. The scrub on islet (A) was quite dead in 1936, and the heather fringe had gone. The scrub on the other three islets was healthy.

In May 1937 the scrub on islet (B) was beginning to be affected, and in June 1938 was decaying. Counts of the nests for each islet were as follows:—

	1936.	1937.	1938.
(A) . . .	20	14	9
(B) . . .	17	20	14
(C) . . .	4	3	4
(D) . . .	6	8	7

On my last visit to Wiay in July 1947 it was impossible to land on the nesting islets, so observations had to be made from the shore and no complete count could be carried out. There appeared, however, to be more nests than in 1938. Islet (A) held none; the only sign of scrub was a few rotten stumps. Islets (B, C, D) were still fully occupied with much of their scrub still alive. At least two other islets west of (D) now had nests, the majority built in scrub, with a few on the ground in long heather.

The heather also suffers from the proximity of nesting birds; eventually it dies out completely. At Loch an Tomain some ground nests were fully exposed, being separated from the existing long heather by a zone of some yards of bare ground, from which the heather had disappeared.

This gradual destruction of their favourite nesting sites, through the effects of the birds' occupation, is interesting. Since the colonisation of the Uists and Benbecula is on quite a large scale, the ultimate fate of the island scrub, which is by no means extensive, and the effect which its destruction might have on the status of the heron in the future, will be worth watching.

Nests and Nesting Material.—Most of the nests examined at Wiay and Loch an Tomain were bulky structures. Many of those on the ground, which from their appearance had been in use for some years, were quite as big as any I have seen in normal heronries on the mainland. A few, however, placed in long heather were decidedly sketchy. The nesting materials were recorded in detail for the whole Wiay colony in 1936, 1937, and 1938 (a total of 126 nests). They were all built of dead "branches" of heather, *Calluna vulgaris*.

"Branches," by the way, gives some indication of the calibre of the pre-1940 heather produced on the island, so it is not surprising that Colonel Fielden after his visit to Wiay in 1870 described that walk as the hardest bit of work he did in the Isles (*A.S.N.H.*, 1902, p. 83).

It was noticed that the dead heather was placed with its thickest parts at the periphery of the nest. Four nests contained some dry stems of the previous season's wild angelica, *Angelica sylvestris*; three had similar withered stalks of foxglove, *Digitalis purpurea*. The cups of the nests were composed of fine wiry heather stems and twigs, and in a few there was also dead bracken, *Pteris aquilina*. Some nest cups contained fresh green vegetation reminiscent of the "decorations" found commonly in buzzards' nests. Three had sprays of the fern, *Dryopteris dilatata*; two, sprays of rowan leaves, *Pyrus aucuparia*; two, strips of the greyish-green lichen, *Lobaria pulmonaria*, which grows on the rowan scrub; one, a large

bunch of bell heather, *Erica cinerea*; and another a long trailing spray of honeysuckle, *Lonicera periclymenum*. Fresh green tufts of moss occurred in several.

There was no opportunity for such detailed examination of the Loch an Tomain nests, but they were built of dead heather as at Wiay, and no unusual materials were noted there or at the other colonies visited. It is worth noting that although the herons gradually destroy their favourite nesting sites, their occupation produces a plentiful supply of nesting materials.

Ferguson-Lees found that the Barra nests were composed chiefly of heather stems and bits of beach refuse, on a base of seaweed.

Fertility—Results of Census at Wiay.—On the visits made to Wiay on 5th June 1936, 27th May 1937, and 2nd June 1938 it was interesting to find how many of the stages in the breeding cycle were represented. There were empty nests ready for eggs (except in 1937), nests containing a single quite fresh egg, and others with clutches at various stages of incubation. There were young also in all stages, from those just chipping the shell to some that were full grown and able to fly as efficiently as their parents.

A complete survey of the nests and their contents at Wiay was made on each occasion, and the results are given here in some detail, as there is comparatively little published information on heron fertility in Great Britain, and practically none relating to Scottish heronries. Completely accurate counts of the young at these Outer Hebridean heronries are just about impossible, for so many of the birds clamber from their nests at the first sign of danger and either go into hiding in the thick scrub and ground vegetation, or escape to the shore or adjacent islets. On this account the details of clutch size recorded at Wiay are certainly on the low side, and therefore it will be unwise to press comparisons too closely with results made from counts of tree nests, where such leakage does not arise. The most important data mentioned in the "*British Birds* Census, 1928," are the examination of sixty-four nests, in trees, of the colony at Fawley Court, Bucks, containing 228 eggs and young, an average of 3·56 (*Brit. Birds*, **22**,

p. 350). Particulars of other English counts are given (pp. 350-351), with averages ranging from less than one young reared per nest to a case, reported in 1887, of above five young per nest. The only Outer Hebridean example that I have traced is that given in the "Supplementary Report on the *British Birds* Census of Heronries" (*Brit. Birds*, **23**, p. 335) referring to a small heronry in South Uist, visited by W. A. S. Lewis on 30th June 1929, which had nests with eggs c/5 one, c/4 four, and c/3 one; two others contained two and three recently hatched young and there were eight "fully-grown young birds."

Results of Census at Wiay, Benbecula

	5th June 1936.	27th May 1937.	2nd June 1938.
Total new nests	47	45	34
Nests with eggs	17	12	5
Nests with young	16	21	24
Nests with young and eggs	1	7	1
Nests empty but ready for eggs	3	0	3
Nests recently used	10	5	1
Nests, old, unused	0	4	11
Number of eggs	43	45	16
Number of live young	61	64	54
Addled eggs	1 [1]	8	2
Young dead in nest	0	6	3
Young dead out of nest	0	2	2
Estimate of young out of nest—			
(*a*) Able to fly	12	not made	5
(*b*) Hiding	30	,,	several
Clutch sizes: number of eggs and/or young—			
1	3	4	3
2	8	8	14
3	9	9	9
4	12	19	3
5	2	0	1
Average	3·05	3·07	2·5

[1] In recently used nest.

At Loch an Tomain, North Uist, on 27th June 1938, details of clutch size were not recorded, but it was noticed that few nests contained more than two young, while many had only a single bird. John MacAskill reported a clutch of six eggs

in a nest at Loch Iosal an Duin, but he was of opinion that an egg had probably rolled into this nest from an adjacent one.

Behaviour at the Heronry.—The herons at Wiay appear to use the nesting scrub for resting and social purposes outside the breeding season, which is interesting, for a similar state of affairs occurs with other species that breed in colonies. Thus, on 22nd November 1933, and 11th November 1935, I disturbed thirty or more birds from the islet scrub. On 27th January 1936 forty to fifty were at their nests; they were very loth to leave, flying only a short distance before settling on the ridge, which is their usual habit when disturbed in the breeding season. In the breeding season, when disturbed by man, the adults leave their nests and congregate on the heather slopes and rocks on this ridge above the loch, some four hundred yards from the nests, where they are joined by those young which are capable of full flight. Against the purple-brown of the hillside the grey beauty of the birds makes a magnificent picture. The reaction of those young which are not quite capable of sustained flight is, unless one has experienced it previously, somewhat unexpected. Flapping and clambering from their nests or the branches where they have been resting, they immediately take to the water and swim at considerable speed, either to neighbouring islets or to the shores of the loch. When swimming they appear remarkably buoyant and are perfectly at ease. Their carriage on the water reminds me of that of an outsize great crested grebe. They swim by powerful back thrusts of the legs, with no excessive body movements. The wings are used only for balancing when they touch bottom or reach shore. Swimming is resorted to by these largest birds at the first sign of danger, as soon as one tops the skyline some quarter of a mile from the shore of the loch and comes within sight of the nests. Some young birds not quite capable of making a full flight to the shore have been seen to settle on the water, swim for a while and then rise comfortably from the loch, and continue their flight. Cases of swimming by adult herons have been previously recorded, but there appears to have been no report of this regular swimming by young birds in Great Britain.

The disturbance-response of the young remaining in the

nests varies. The most active and well-developed birds, when a landing is made on their islet, immediately endeavour to get out of the nests. Those that succeed clamber over the scrub, using their wings a lot as extra supports, and sometimes they become badly entangled in the branches. Some hide in the ground vegetation below the bushes, and in fissures among the rocks; others simply seek cover below the nests, or in the fabric of ground nests. When all is quiet they start the journey back. This is often a lengthy business owing to persistent attempts to get into wrong nests, which are hotly resented by the rightful occupants. It is curious how even very small herons in their rightful abode successfully repel the invasions of much older and far more vigorous and aggressive birds. Response to danger varies very noticeably, for some, seemingly as fully developed as those that take to the water and swim, remain placidly in their nests. The behaviour of birds remaining in the nests also varies, often irrespective of age. The most recently hatched huddle together in the nest, their heads to the centre and covered by their bodies so that only their backs and rumps are exposed. The youngest birds keep up a queroulous cheeping " titer-chitter " even when one is standing at their nests. Half-grown and larger birds tend to crouch flat, quite motionless and silent in the nest, but others when they are approached strike a threatening attitude with crest feathers erect and snapping bills, and have a habit of lunging dangerously. Some often stand bolt upright in the nest, resting on their tarsi, with necks fully extended in the manner of a bittern, so that they face the intruder whom they menace with their bills. There is considerable noise. A very few vomit their stomach contents when their nests are threatened. I have a note that only three out of sixty-four young did so in 1937, and four out of fifty-four in 1938.

RINGING.—Nineteen young birds were ringed at Wiay and Loch an Tomain. There have been two recoveries of those ringed in 1937: one was shot on 2nd October 1937 within three miles of Kingussie, Inverness-shire, and the other was found floating in the sea at Stornoway on 12th November 1937. I am indebted to Miss E. P. Leach for this information.

COLOUR OF SOFT PARTS.—The body skin of recently hatched young is a pale olive-green. The tarsus is the same colour; in older nestlings it has a distinct yellowish tinge. Soles of the toes are a pale lemon-yellow. In birds just hatching, or recently hatched, the lower mandible is pale yellow, the upper dullish horn grey. In older birds, up to those nearly fully fledged, the lower is orange-yellow, varying from a dull to a gold-orange, and the upper is dull reddish to a very dark brown horn, almost black. The iris of the youngest birds is pale lemon; in full-grown birds it is a bright yellow-gold.

FOOD.—In view of the apprehension which this breeding of the heron has caused in certain angling circles in the Islands, efforts were made to obtain evidence of the birds feeding habits. No pellets were found below the nests, but seven "meals" vomited by nestlings were preserved for examination. The following were identified:—

Fish.—10 eels, *Anguilla vulgaris*; 9 wrasse, probably *Labrus bergylta* and *L. mixtus*; 8 long-spined sea scorpions, *Cottus bubalis*; 6 fifteen-spined sticklebacks, *Spinachia spinachia*; much fish débris, mainly wrasse, but no salmon or trout.

Crustacea.—Remains of 7 crabs, including a shore crab, *Carcinides maenas*, and a swimming crab, ? *Portunus arcuatus*; remains of several prawns, *Leander serratus* and *Hippolyte* sp.; 19 Amphipoda, *Gammarus locusta*, *Hyale nilssoni*, *Orchestia littorea*; 8 Isopoda, 7 of them probably *Idotea granulosa*, and 1 *Ligia oceanica*.

Diptera.—2 small Mycetophilid larvæ and 1 adult "blue-bottle" fly.

Four small pellets of grey fur, a dozen heron feathers, fragments of moss, fern, heather, dock, *Fucus* and other seaweeds, were also present.

I am indebted to the late J. R. Norman and Dr I. Gordon for the identifications of fish and crustacea.

Field observations largely support these findings of a coastal diet. In the Hebrides the majority of herons fish

around the shores, particularly those of the east coast and the sounds. Only a few use the fresh-water lochs, including, it is only fair to state, some of the shallows and burns at spawning times. The heronries are all situated close to large areas of suitable coastal fishing ground.

Changes in Habitat.—In summer the scrub forms a dense leafy canopy over the greater part of each islet. This green dome is fringed by thick rank heather, with a broad belt of royal fern, *Osmunda regalis*, between it and the water. The whole forms a delightful combination of colour, a pleasant contrast and relief from the prevailing drab browns of the surrounding moorland.

Underneath the canopy of closely interlaced branches there is a luxuriant ground vegetation of the " shade flora " type, among which, at Wiay, the wild hyacinth, *Scilla nonscripta*, predominates. By crawling below the scrub one enters a habitat having in miniature much of the character of mainland woodland.

There was, unfortunately, no opportunity during the visits to the heronries for recording details of the effects which the herons' occupation was having on the surrounding vegetation, but briefly the following were noted. The scrub, as previously mentioned, soon begins to die from the fouling of the birds' droppings. How soon has not been precisely determined, and the rate of decay must, of course, depend on a number of factors. For instance the intensity of occupation is of importance, a single heron's nest causing far less fouling, with consequently slower reaction in the scrub, than that produced by several nests crowded together in the same area. There is also the mechanical factor, for the weight of these packed nests is considerable, so that the accumulation of several seasons often leads to the collapse of supporting branches. The age and " constitution " of the scrub, as well as other modifying influences, have also to be considered.

The ground vegetation below the scrub suffers too; at Wiay for a time, as the canopy thinned, the hyacinths thrived exceedingly. In areas where there was no longer any scrub shade, large patches of sorrel, *Rumex acetosa* and *R. acetosella*, were rampant on the richly manured ground, and there were

no hyacinths. There was also a mass of sorrel at Loch Marulaig and Loch an Tomain. In places chickweed, *Stellaria media*, was well established, probably introduced by the herring gulls, *Larus argentatus*, which use the islets when the scrub has gone. The foxglove, *Digitalis purpurea*, normally somewhat local in the Uists, is an early colonist of the open areas from which scrub, shade flora, and long heather have disappeared. It occurs abundantly now on the Wiay and Loch Marulaig islets and on the bare patches beside the ground nests at Loch an Tomain, one group of nests in 1938 being surrounded by a belt of tall plants in full bloom. a particularly beautiful setting for herons' nests. On the mainland of Scotland foxgloves also appear regularly in moorland areas that have been cleared of heather by burning. At Loch an Tomain, one of the nesting cliffs where the heather had died out was gay with golden rod, *Solidago virgaurea*. In 1947 views from the shores of Loch na Beiste indicated that the vegetation on islet (A), first occupied by herons in 1929 or 1930, now consisted predominantly of " rough " grasses.

The whole question—no new discovery, by the way, and tree-nesting cormorants, rookeries, roosting starlings, and others provide similar conditions—is one well worth careful ecological examination over a period of years.

Relations with Other Species.—The accumulation of food débris around the nests attracts a few hoodies, *Corvus cornix*, especially, I think, recently fledged young which find that this scavenging provides easier meals than elsewhere in the heather country. Adults also hang about the colonies, where I have seen them at times pillaging unguarded nests as fast as they can without any protest from birds on adjacent nests. They fly off with a single egg at a time, and do not eat them at the heronry.

The rotting material below the nests supports a large insect population, so that a well-established colony, in spite of its rowan blossom and hyacinths and honeysuckle, is remembered as a somewhat fly-blown oasis in the heather. Even the young herons, when the wind drops, have bluebottles crawling over them. Rats also scavenge below the nests, but, apart, from the hoodies, vermin does not cause much interference,

for there are no foxes, weasels or stoats in the Islands, and since the shieling custom has died out south of the Sound of Harris, the nearest sheep dogs which might menace ground nests are now several miles away.

The young herons at Wiay, when they stray to islets where the herring gulls breed, are violently mobbed; swimming birds provoke particularly vicious attacks, but even so little damage seems to be done. A pair of great black-backed gulls, *Larus marinus*, were nesting on an islet close to the Loch Marulaig site in June 1938. In the literature, ravens, *Corvus corax*, have twice been cited as responsible for disturbing Outer Hebridean heronries.

In the "Census Report on Heronries, 1928," reference is made to information received from South Uist accusing herons of driving away geese and duck from the loch (presumably Druidibeg), and it is stated that several pairs of greylag and duck used to nest on a certain island, but have not done so since the herons established themselves there (*Brit. Birds*, **22**, p. 343). While it is unlikely that either species would nest for choice beneath a well-established group of nests, I am certain that the presence of the heron colonies constitutes no serious threat whatever to the breeding stock of geese and duck in the Outer Isles. Far more greylag and duck have been saved in the shooting season, through the herons' readiness in giving the alarm and thus spoiling wildfowlers' stalks, than have ever been "disturbed" by them at the nesting season.

Mallard, *Anas platyrhyncha*, teal, *Anas crecca*, and goldeneye, *Bucephala clangula*, are regularly at Loch na Beiste during the winter months; in summer broods of mallard and red-breasted merganser, *Mergus serrator*, are reared there, and a bachelor party of mallard finds it quiet enough as a moulting retreat. Twite, *Carduelis flavirostris*, reed bunting, *Emberiza schoeniclus*, song thrush, *Turdus ericetorum hebridensis*, stonechat, *Saxicola torquata theresae*), hedge-sparrow, *Prunella modularis hebridium*, and wren, *Troglodytes troglodytes hebridensis*, breed beside the loch; eventually, no doubt, decay of the scrub and old heather in which they breed may influence their status, but there is no justification at present for the destruction of herons on account of disturbance caused by them to other species.

Man is the only serious enemy that the heron has in the Outer Isles, but fortunately it is only in South Uist that much interference has taken place, although there has been some egg smashing in Benbecula, including Wiay. Eggs, young and old birds, have been destroyed in the alleged interest of angling, but it would have been more reasonable to have endeavoured to obtain some evidence of excessive destruction of fish before interfering and dispersing the birds into smaller groups. There is still no evidence that the heron is having an adverse effect on angling in the Outer Hebrides. For the herons' sake it is worth recording here that Neil Monk, who was born on Wiay and knows it intimately, assures me that the fresh-water lochs on the island have never held trout in his lifetime.

Herons should certainly be prevented from destroying the scrub at the Allt Volagir in South Uist, for this is the finest area of native woodland remaining in the Islands, but elsewhere they should be left alone so that an extremely interesting change in status can develop naturally.

POPULATION.—Unfortunately recent figures are not available for all these heronries for any one season, but in 1938 there were 210-230 occupied nests in North Uist, 37-40 in Benbecula, and 39 in South Uist. This is a total of 286-309 occupied nests, in the area of 174,606 acres which constitute the parishes of North and South Uist, a density of one nest for each 610-565 acres. In the "Report on the *British Birds* Census of Heronries, 1928," 3,744-3,843 breeding pairs were reported in the 58,340 square miles of England and Wales. The three leading counties were Norfolk, 331-351 pairs, Somerset, about 273-280, and Sussex, 268-276 pairs, with about 3,856, 3,759, and 3,428 acres per nest respectively. The Uist figures show a remarkable concentration, but it should be borne in mind that the acreage of each of the English counties is far greater than that for the area under consideration in the Outer Hebrides, which forms only a small part of the County of Inverness.

The average size of the Uist heronries in 1938 was 23-25 nests. In the 1928 census it was 54-55 in Sussex, 38 in Dorset, with the average for England about 14, but only one heronry

of over 50 nests was recorded north of a line from Gloucester to the Humber. The largest heronry contained 135 nests (Northants), with one of about 112 (Dorset) the next largest. These figures give an idea of the extent and success of the herons' colonisation of the Outer Islands. The concentration of 170-190 pairs of herons in the Loch an Tomain-Loch Crogavat district in 1938, in an area of two square miles, is certainly unique for Great Britain.

Evidence obtained since 1945 shows that the expansion continues. Since 1939, new heronries have been founded in North Uist (three, possibly four) and Benbecula (one), and a well-established colony, apparently in existence prior to 1939, discovered in Barra. There has, to date, been no suggestion that any colony has been abandoned, except the one at the Allt Volagir in South Uist, which was unoccupied in 1947 and had obviously not been used for several years.

The intensity of the colonisation of new sites is interesting. It is not a gradual process, with colonies being built up from a successful occupation by one or two pairs, but a sudden invasion by quite large groups, well illustrated most recently at Loch Iosal an Duin, where fifteen to twenty pairs suddenly bred for the first time in 1946. The rapid extension of the colonies that have been established in the Uists, provided they were not interfered with by man, is also noteworthy.

Factors which may have Influenced the Change in Status.—Gray, writing in 1871 (*The Birds of the West of Scotland*), describes the heron as abundant throughout the Outer Hebrides, but not breeding there. He quotes Elwes as being at a loss to explain this, for the country was in every way suitable, including many small islets similar to those used for breeding purposes on the mainland. Incidentally, on the west coast mainland and some of the Inner Islands, including Skye, only comparatively short distances away across the Minch, the heron has for years been a common breeding species.

Harvie-Brown in 1888 (*A Vertebrate Fauna of the Outer Hebrides*) also knew of no breeding record; curiously he states that Gray "is silent as regards its occurrence *at any season*," although in my copy of *The Birds of the West of Scotland*

Gray has quite a lot to say on the subject. As has been shown already, there was no breeding record before 1902, yet by 1939 at least 286-309 pairs were successfully established in the Outer Hebrides. Kearton's record, and Erskine Beveridge's " chance " photograph, show that breeding on a small scale was taking place in North Uist before 1910. Recently, in 1948, I was privileged to meet the late Hector Mackenzie, factor of the North Uist Estate for over fifty years, who knew Kearton well in the Outer Isles. He confirmed the presence of breeding herons in the Loch Eport area in the period between the Boer and 1914 Wars, and told me that there was an estate employee in that district who was in the habit of serving herons, apparently young birds, for dinner on special occasions.

W. B. Alexander has suggested to me that this breeding of the heron has been overlooked in the past, but I do not think this has been the case except for isolated nests or small groups. Well-established colonies on the present scale would certainly have left their mark on the surrounding vegation, and there is no such evidence. The heronries are certainly situated in remote areas, well off the beat of visiting ornithologists, but against their being overlooked on this account must be placed the fact that they lie in areas forming the best woodcock ground in the Uists, which was regularly visited on this account up to 1930 at least, by shooters and keepers, the latter, by the way, being exceptionally able field observers. The keepers are agreed that there were no heronries in the Uists before the 1914 War. It must be admitted, however, that heronries are very easily overlooked even in districts where there are plenty of observers, and W. B. Alexander tells me that there is hardly a county where at least one heronry was not missed in the 1928 census.

There are, however, two factors which I feel sure have had an important influence on this change of status. About 1840 evictions took place in the Uists; the local inhabitants were removed from the fertile west coast, and their holdings were incorporated in large farms. Many of the displaced persons emigrated, but those who chose to remain were compelled to settle on the poor lands of the east coast and lesser islands. There was thus a shift of population from west to east. Subsequently the policy was reversed, the large farms being broken

up once more into crofts. This started first of all in North Uist about 1898 and the abandonment of isolated and unprofitable holdings on the east coast continued until recent years, so that most of the heather country is now deserted and undisturbed. Briefly the important point is that from 1840 until 1900 there was much disturbance on the east coast; after 1900, and particularly after 1914, this decreased as the east coast was abandoned. This depopulation made large tracts of otherwise suitable country available for breeding herons. There was a large non-breeding population of herons in the Uists able to take advantage of this change provided they were physiologically fit to do so. The gradual disappearance of the shieling custom also meant less disturbance on the east coast. Before the coming of the large farms, the west coast crofters, after sowing their crops, were accustomed to take their cattle into the interior of the island, for a few months each summer, in search of fresh grazing. Here the people lived in stone and turf bothies close to the hill pasture. There are still signs of these shielings throughout the east coast and interior. They persist in the moorland wilderness as pleasant green places, often with turf of bowling green texture, patches of yellow iris, and clumps of nettles beside the bothy ruins. There are also many traces of the *cabhuil*, the stone dam which they built in the burns and lochs for taking trout with the *tabh*, the splash net, a far more destructive implement, by the way, than a heron's bill. The old accounts show that there was much of the picnic atmosphere about the summer shielings. There would also be sheepdogs and other disturbing influences distasteful to ground-nesting herons. The custom had died out in North Uist by 1902. North of the Sound of Harris it still lingers. The Uist crofters were also attracted to the east coast after the spring sowings, for the working of the kelp shores, until foreign competition and alternative sources of supply strangled the industry.

In 1922 disaster overtook the heronry situated at Dunvegan in Skye, which is only some twenty-two miles across the Minch from North Uist, a gale blowing down the nesting trees. In 1888 Rev. H. A. Macpherson found thirty to forty nests at this site, but subsequently a remarkable increase occurred, the total being given as " now two hundred nests " in an

article on Scottish heronries by H. Boyd Watt in the *Scottish Naturalist* for 1914 (p. 114). W. B. Alexander informs me that there were fifteen nests at Dunvegan in 1928, only four to six in 1936, and two in 1937. In 1937 twenty were also found at a new site. In 1944 and again in 1945 five nests were reported at Dunvegan. It seems very likely that the birds dispersed from the Dunvegan heronry at a time when much of the Uist east coast had become suitable for breeding purposes may have made a substantial contribution to the colonisation of the Outer Hebrides.

Acknowledgment

I wish to acknowledge my thanks to the numerous correspondents and others, whose assistance made a completion of this investigation possible.

Summary

1. Before 1902 there was no record of the heron breeding in the Outer Hebrides, although it was abundant at all seasons. Up till 1914 sporadic small-scale breeding had been reported for Lewis, Harris, and North Uist.

2. In 1915 a successful colony was established on Ronay, North Uist, and by 1925 there were two colonies in South Uist. Wiay, Benbecula, was colonised either in 1929 or 1930. Between 1930 and 1939 more colonies were discovered in South Uist, Benbecula, and North Uist, and further heronries have been established there, and a colony discovered in Barra, since 1940.

3. In Harris and Lewis the position is still obscure, but no evidence was obtained before 1939 to suggest that colonisation on anything like the scale of that in the Uists had taken place.

4. It is suggested that depopulation of the east coast of the Uists, resulting in a substantial decrease in human disturbance by 1920 and subsequent years, made large areas of suitable nesting habitat available in close proximity to an abundant food supply which had always supported a very large non-breeding population.

5. The dispersal in 1922 of the large heronry at Dunvegan, some twenty-two miles from North Uist, has also probably been of importance.

6. Details are given of each colony so far as they are known, of breeding biology, and of changes in habitat produced by the herons' occupation.

Addenda

The following information was obtained during a visit to the Uists and Benbecula in June 1949:—

1. New Nesting Sites. (*a*) South Uist—On 20th June I found two herons' nests in scrub willow on an islet in Loch Drollavat, which lies to the west of Loch Snigisclett. Four adults were flushed from the scrub, and young were heard calling from one of the nests. Ewan Macintosh tells me that none has nested here before.

(*b*) North Uist—D. Sadler found a solitary nest, placed on the ground, on an islet in Loch Obisary, " a few years ago."

2. Additional Information on Nesting Sites. (*a*) North Uist—(i) Loch Iosal an Duin—I waded to the dun on 23rd June, and counted forty-four nests crowded into a space only a little larger than that occupied by two full-sized billiard tables. There were eggs and young in various stages of development, but the majority of the birds were full winged; we counted forty-eight " fliers," which included a few adults. Only one young was seen to swim. A few nests were built in brambles, two or three in clumps of nettles, but the majority were placed in red-currant bushes which cover the main part of the islet! The presence of red-currant bushes on this dun, probably spread by birds from Newton Lodge gardens, is mentioned by Erskine Beveridge in his book on North Uist, previously referred to, which was published in 1911. The nest materials were dead heather and dead red-currant branches. The rapid increase in nests since this site was first occupied in 1945 is interesting. A mute swan had successfully hatched three eggs on the dun and I flushed a red-breasted merganser from a nest containing nine eggs underneath one of the herons' nests.

(ii) Cliasay More and Cliasay Beg—Dr A. J. MacLeod told me that there were at least eighteen nests on the group in 1948.

(iii) Loch Crogavat—I visited the loch on 22nd June. Herons were breeding over a wide area of rough country, and nests were found in scrub—mainly rowan—long heather, and among rocks at many places round the shores and on islands. Much of the scrub has died out so that the herons are now scattered over a wide area, breeding wherever they can find suitable sites near the loch. It was quite impossible to make anything approaching a complete count, but seventeen nests were found from the shore.

(iv) Loch an Tomain—Herons are still breeding numerously, but there was only time on 22nd June to visit the group of nests on the " inaccessible " cliff previously mentioned. Twenty-five nests were counted here, and there were probably others out of sight.

(*b*) Benbecula—(i) Dubh Loch—D. Sadler told me that there were five pairs breeding this year (1949).

(ii) Loch Dubh Fhalasgaidh—I visited the heronry on 16th June. The nests were built on islets at the south end of the loch, and at least six islets were occupied. Thirty-two nests were counted, but it was impossible to reach most of the islets in order to make a full count. Most of the nests were in rowan scrub, but six were in willow. The scrub was showing the usual signs of distress, and some was already quite dead. The ground vegetation showed characteristic changes. M. Richardson, who has visited Benbecula regularly for angling during the last twenty-one years, told me that he explored some of the islets at this loch in 1947; he has kindly sent me photographs of the nests which show perfectly healthy scrub. It was refreshing to hear his views as an angler, that the heron far from interfering seriously with the trout fishing is probably *improving* it in many lochs. His detailed fishing records show that there is still no justification whatsoever for any " reprisals " against the herons.

THE APPEARANCE AND DISAPPEARANCE OF THE HOUSE-SPARROW AS A BREEDING SPECIES ON THE ISLE OF MAY

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The house-sparrow, *Passer domesticus domesticus*, has disappeared as a breeding species from the Isle of May, and it is thought that these notes on its status and history as a breeding species may be of interest.

The appearance and records of the house-sparrow up to 1933 are fully detailed by Rintoul and Baxter.[1] From 1934-38 and from 1946 onwards observations have been carried on by the Isle of May Bird Observatory. We are also fortunate in having some records for the years 1939-44, made by Lieut.-Commander R. J. H. Williams.

The records briefly are:—

1881-85: Scattered records of from 1 to a few. No record of breeding.

1907: 1 pair bred, but after this year they disappeared.

1911: Single male found dead in May.

1925, Spring: 5 were recorded when the observers arrived on 7th May. A flock of 19 arrived on 16th May but they did not remain. Two pairs bred but 1 pair and brood disappeared. Autumn: 1 pair with 4 young noted.

1926, Spring: 6 birds. Autumn: 22 birds.

1927, Autumn: 40 birds.

1928-33, Autumn: 40 to 50 birds.

1934-38, Spring: 6 pairs bred each year. Autumn: about 30 birds.

1939-44, Autumn: About 30 birds.

1946, Spring: 12 birds. In June, however, it was noted that there appeared to be only 2 females, although it is possible that other females were sitting on eggs. Autumn: 8 only, 6 males and 2 females.

1947, Spring: 6 to 8 birds. Only 1 female was recorded. At least 1 pair bred, 3 nestlings being ringed. Autumn: 13 in September, but by the end of October the number had dropped to 11 birds.

1948, Spring: March to 21st April 1 pair seen daily; 23rd April a single bird, sex not recorded; 24th April none noted.

From 24th April 1948 to present time (end of October 1948) no house-sparrows have been seen.

The house-sparrow population seems to have been constant at 6 pairs from 1927 to 1946. It is impossible to say whether the breeding stock was reinforced by birds from the mainland or not. There are no records which would indicate such a reinforcement, but it is hard to believe that they were the progeny of 1 pair in 1925, although the breeding strength of 2 birds (1925), 6 birds (1926), and probably 12 birds (1927) rather indicates this possibility.

On the island the house-sparrow seemed to be very dependent upon man, always being seen round the Lighthouse buildings; and, except during the breeding season, when they nested in holes in the field boundary walls, in the ruins of the Chapel, etc., or when they were occasionally seen going to roost on the cliffs, a house sparrow was very rarely seen on any of the outlying parts of the island. The whole flock sitting on the garden wall waiting for the hens to be fed was a common sight. Because they appeared to be so dependent upon man, when we returned to the island in 1946 we expected to see an increase in their numbers as there had been a very great increase in the number of people and livestock on the island during the war, and we were surprised to see the usual 12 birds.

We can suggest no real reason for the disappearance of the house-sparrow. The following facts may or may not have influenced the population, but we think that they should be put on record:—

(*a*) The horse which was kept on the island was taken off in the autumn of 1947.

(*b*) The flock of goats, which numbered about 8 up to

1938, was gradually reduced in number and there is now only one.

(*c*) Within the last year there is a cat on the island which has gone wild and lives on what it can catch.

(*d*) As the house-sparrow was a nuisance in the trapping garden, we sometimes transported trapped birds to the Fife coast. Between 1934 and 1938, 10, mainly birds of the year, were released at Anstruther. In the spring of 1946, 2 adult males and 1 adult female, and in the autumn of 1947 one bird of the year were released on the Fife coast.

(*e*) Southern in 1936[2] found that the young birds were heavily infested by a bird fly, *Ornithomyia fringillina* (Curtis).

The trapping records of this species are of some interest. We found them very difficult to trap in the " Heligoland " traps. The birds of the year could be driven in fairly easily, but it was rare to catch an adult bird. They sat in the bushes under the wire roof, but always flew out over the heads of the observers beating the trap. It is not at all certain that all the house-sparrows on the island were ringed, but between autumn 1934 and autumn 1938 we ringed 92. None of the birds transported to the Fife coast was retrapped on the island.

Owing to the fact that the birds grew more cunning with age and difficult to retrap, we have very few records to show length of life, the longest being a female trapped in August 1935, age not recorded, found dead four and a half years later in March 1940.

We wait to see whether the house-sparrow will recolonise the Isle of May or whether it has disappeared for a long time like the tree-sparrow, which bred on the island up to 1922.[1]

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"THE BOREO-BRITISH COLEOPTERA. A STUDY OF THE FAUNISTICAL CONNECTIONS BETWEEN THE BRITISH ISLES AND SCANDINAVIA." By Dr CARL H. LINDROTH (Motala, Sweden), 1935, in *Zoogeographica*, Band **2**, pp. 579-634. Jena.

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THOUGH published so long ago, this important paper has not received the notice it deserves from British coleopterists—a fact the more to be deplored that the author has paid us the compliment of writing in English. The fact that he adds another species of the Carabidæ to the British List also seems to have escaped notice.

This boreo-British group comprises 15 species, of which the area of distribution outside Britain is confined to Scandinavia and the extreme north of Europe, most of them occurring also in northern Siberia and a few being circumpolar, *i.e.*, they do not occur in the Central European plain, nor in the mountain masses of Central Europe. They thus conform in definition to Group B of Sainte-Claire Deville's classification, "Peuplement des Iles Britanniques," Coleoptera, 1930, with 19 species. Only 10 species, however, are common to both lists; many of Deville's species are excluded by Lindroth on the ground that they have also been recorded from the northern part of Central Europe and should therefore belong to the next group, the boreo-alpine group, although, as they have not reached the high alpine regions of Central Europe, one might as well refuse to accept them in this group. By way of compensation, Lindroth includes 5 species not included by Deville. Three of these, when Deville wrote, were not known to inhabit Britain. These are *Nebria nivalis* Payk., which had not then been recorded from Britain; *Lathrobium punctatum* Zett., of which it was thought that the British records were in error for *L. fovulum* Steph.; and *Philonthus scoticus* Joy, which had not then been recognised as identical with the arctic *P. finmarkicus* Munst. Two

others come in later groups which were not fully considered by Deville.

The known distribution of these 15 species is given in detail, in all cases except 2 accompanied by a distribution map. They are:—

1. *Nebria nivalis* Payk.

This, so far as is known, has not previously been recorded from Britain, but this record stands on a single specimen in the Zool. Museum of Amsterdam, labelled "Ben Nevis, ex coll. D. v. d. Hoop."

Norway, Sweden, Finland, Russia, Siberia.

Almost exclusively alpine, only accidentally met with below tree level. Usually on very wet ground near the edge of melting snow.

This is a most interesting addition to the British List. It will be interesting to see whether Ben Nevis is our only "top" on which it is at home, and if so, why?

2. *Pelophila borealis* Payk.

Scotland: Shetlands, Orkneys, Clyde area (?).

Ireland: North and West, as far south as Kerry.

Norway, Sweden, Finland, Germany (?), Russia, Siberia (to Kamtschatka), North America (Labrador, Hudson Bay Territory, Alaska).

Mainly sub-alpine, frequenting the sandy or stony margins of lakes and rivers.

3. *Elaphrus lapponicus* Gyll.

England: Skiddaw, Cumberland.

Scotland: Highlands, Tay and Dee districts, Hebrides, Orkneys.

Norway, Sweden, Finland, Lettland, Siberia, and North America (?).

Mainly about springs on mountain slopes.

4. *Bembidion virens* Gyll.

Scotland: Loch Maree, the only known locality.

Norway, Sweden, Finland, Russia, Siberia.

On gravelly beaches close to water; usually in some numbers.

As the species occurs throughout Norway, it is curious that it should be limited to the one locality in the British Isles. Or does it still await discovery elsewhere ?

5. *Pterostichus adstrictus* Eschsch.

England and Wales from Church Stretton northwards.

Scotland: On high ground generally; Orkneys and Shetland.

Ireland: coastal except in S.W.

Faroes and Iceland.

Norway, Sweden, Finland, Russia, Siberia, and North America (Newfoundland and Alaska).

Under stones in dry grassy places and open places in woods; not above forest limits.

6. *Amara alpina* Fab.

Scotland: Highlands, few localities.

Norway, Sweden, Finland, Russia, Siberia.

Alpine heather moors.

7. *Agabus arcticus* Payk.

England: North.

Scotland: Highlands and west coast.

Ireland: Antrim, Dublin, and Wicklow.

Norway, Sweden, Finland, Russia, Siberia, and North America.

Prefers shallow standing waters, usually with rich vegetation.

8. *Gyrinus opacus* Sahlb.

Scotland: Highlands, Aberdeen, Outer Hebrides.

Norway, Sweden, Finland, Russia, Siberia; Greenland and Labrador.

In small standing waters with vegetation.

9. *Anthobium lapponicum* Mann.

Scotland: Rannoch, a single specimen.

Norway, Sweden, Finland, Russia.

Marshy areas, in flowers, especially *Rubus chamaemorus*.

10. *Bledius arcticus* Thoms. (*annae* Sharp).

England: R. Severn.

Scotland: Dumfries, Moray, Perth.

Norway, Sweden, Finland, Russia, Siberia.

Sandy banks of rivers, mainly sub-alpine.

11. *Lathrobium punctatum* Zett.

England: North. Most of our records probably refer to *L. fovulum* Steph.

Scotland: Highlands and Clyde areas, Edinburgh, Wigtown; as *atripalpe* Scriba.

Ireland: Antrim, Waterford, Kerry.

Norway, Sweden, Finland, E. Prussia, Poland (?), Russia, Siberia.

Under moss and leaves in damp places.

12. *Philonthus scoticus* Joy (*finmarkicus* Munst.).

Scotland: Kingussie. (Surely must occur elsewhere in the Highlands.)

Norway, Sweden, Finland, Russia, Siberia (always northern).

Under moss in damp places.

13. *Gnypeta coerulea* Sahlb.

England: North and West, as far south as Devon.

Scotland: Kinross, Ross-shire, Dumfries.

Norway, Sweden, Finland, Russia, Siberia.

Sandy margins of lakes and rivers; in Britain in wet moss.

14. *Liodes punctulata* Gyll.

This species should not have been included in the boreo-British group. Lindroth is obviously following Fowler, who gives *litura* Steph. as a synonym, but it has since been found that these are two distinct species. In our later lists, Hudson Beare (1930) and Kloet and Hincks (1945), it appears correctly as *litura* Steph. In Junk, *Col. Cat. Liodidae*, the distribution of this appears as England and Germany to Corsica and Morocco, and the boreal *L. punctulata* Gyll. does not occur with us.

15. *Aphodius lapponum* Gyll.

England: North, and Wales; southernmost in Black Mountains, Hereford.

Scotland: widely distributed, especially in Highlands; Hebrides, St Kilda, Shetland.

Ireland: Widely distributed, mainly coastal.

Iceland, Faroes.

Norway, Sweden, Finland, Russia, Siberia.

Usually dependent on sheep and other domestic animals of man and hence considered of post-glacial introduction, but has occasionally been found in carrion and in rotten grass, so may have been able to exist before the arrival of man and perhaps subsequently changed its habits.

In addition to these 15 species there are 3 species of *Atheta*, *A.* (*Dimetrota*) *Sparre-Schneideri* Munst., *A.* (*Microdota*) *Nesslingi* Bernh., and *A.* (*M.*) *Ellimani* Bernh., each only once recorded from Britain, with no suggestion of boreal distribution, but of which what few continental records we have are all markedly northern. It may be, however, that future records will show that they extend much further southwards, and should be excluded from this boreo-British association.

Further, *Ocyusa hibernica* Rye may have to be added to the list. This species has been incorrectly placed in synonymy with *O. laticollis* Thoms. The author has examined a specimen sent him by Mr P. Harwood and finds that it is really identical with "*Chilopora*" *rugipennis* Sahlb., 1890, and that Rye's name therefore has priority. Also that the species is correctly placed in *Ocyusa* Kr.

It will thus be seen that this boreo-British group is by no means a homogeneous aggregate, some species being circumpolar in distribution, though the majority are confined to the Old World arctic; some seem to require a certain degree of dryness in conjunction with cold, while for others moisture seems to be an essential requirement. This is reflected in their distribution within the British Isles; some are essentially high mountain species of our northern area only, others come much farther south, mostly in our western areas, while yet others are spread more generally over the country, even avoiding elevated regions, so that were not the full range of the species

taken into consideration there would be nothing to suggest a boreal habitat in connection with them.

The author points out that it is not only in the beetles that we find this boreo-British element in our fauna, but that it is traceable also in other insect orders as well as in the birds and, perhaps more markedly, in our flora. On the other hand, amongst our beetles of alpine type are some which are not boreal, but on the Continent occur in the mountain masses of Central Europe and are absent from Scandinavia (*Nebria Gyllenhali*, *Amara Quenseli*, and *Otiorrhynchus dubius*).

He then proceeds to consider their possible sources of origin and to inquire how far we can determine the time of their arrival. He considers it almost axiomatic that they must have come from the north, from Scandinavia—further, that some of them must have come direct, though others may have been able to come by way of the old " Dogger " land, before the sinking of the land and the formation of the North Sea.

Could they be of recent, *i.e.*, with present distribution of land and water, introduction ? From a consideration of the present occurrence of the several species and of their ecological requirements, he concludes that this is impossible. They bear all the marks of a relict fauna, not of recent arrivals. They form a southern outlier of an otherwise almost even northern distribution, of obviously older origin.

Next, could they have come in during post-glacial times, before the inundation of the North Sea area ? For some of them, *Nebria nivalis*, *Amara alpina*, and *Lathrobium scoticum*, he considers that existence on the old " Dogger " land would have been impossible, but that for others, *Gnypeta coerulea*, *Aphodius lapponum*, and perhaps *Agabus arcticus*, such existence might have been possible ; but in that case how is it that they did not spread to Central Europe ? Thus we are driven to the conclusion that the beetles of this group, or at least most of them, must have arrived in Britain before the last period of glaciation. That they could have survived this period, either in southerly regions never covered by the ice, or in ice-free, elevated regions, seems fairly well established, and he considers it not improbable that such of these species as are found now only on our highest mountain tops did, in fact, survive the last (Wurm) glacial period in those same

regions and have never since spread beyond them; and that the more moisture-loving species could have survived in ice-free areas in the south and west.

He concludes then that this boreo-British group in our fauna arrived before, and survived, the last phase of glaciation (Wurm), and that the next group, the boreo-alpine, is of yet older origin and was formed by the previous (Riss) glacial epoch.

Finally, the author suggests the possibility of some of our northern forms being still older residents in Britain, of pre-glacial or at least pre-Riss arrival, but dismisses the suggestion summarily as little likely. The point that he notes, but does not discuss in detail, that some of our northern species are circumpolar (holarctic) in distribution, while many are not found on the American continent, probably requires further examination. There appear to be two possible explanations, either that at one time all were circum-polar but many have since died out in America, or that the palaearctic group may have retreated to our arctic regions subsequent to the separation of America and never have been able to penetrate there. As regards this latter possibility the beetle fauna of Greenland merits consideration.[1] Of the 48 species recorded thence 15 have been more or less certainly introduced by man; 1 has not yet been found elsewhere, 20 are holarctic; 10 are European but have not been found in America, but only two American species not found in Europe have been recorded and both of these depend on old specimens with no definite locality that have not been confirmed in recorded collections; both are found in Labrador, so that the Greenland captures of both must be regarded as doubtful. Thus it will be seen that while the European element is strong the American element is slight and doubtful at that. This, considering the very much greater breadth of sea separating Greenland from Europe (about 50° along the Arctic Circle) than that between it and America (10°, much less farther north) is rather remarkable, but the theory of Continental Drift (Wegener's Theory [2]) affords a possible explanation. According to this the Atlantic rift, starting in the south about Cretaceous times did not become complete until at least the end of the Tertiary period; indeed, Wegener's map of the older quaternary shows an extensive rift

between Greenland and America as already in existence, while its contiguity with Europe was as yet unbroken. Though this drift of Greenland away from Europe may have now ceased, owing to the Greenland block having bumped up, subaqueously, against the block of North America, it may well account for the considerable European affinities of the Greenland beetle fauna as against the slender American affinities, and may infer the greater antiquity of our holarctic European element compared with the palaearctic element. This does not necessarily imply that this holarctic element has survived in our islands since Tertiary times; it may have entered them later with others of the boreo-British invasion. In any case the point would require further examination.

A third possibility would appear to be that some members of the originally holarctic population were of a more conservative disposition and have remained unaltered in all regions, whereas the more adaptable have altered slightly, probably in both continents, so that now the European and the American races are no longer identical. The apparent rise of a new species in Greenland (*Micralymma brevilingue* Schiodte) since its separation from Europe would support this suggestion. A critical comparison of these American races, their distribution and ecology, with their European counterparts would be necessary before any decided opinion could be formed.

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"NEUROPTERA" AND SOME LEPIDOPTERA FROM ARGYLL AND WEST INVERNESS

C. Ethel Evans
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ARGYLL

During the second half of July 1938 I was staying near Bridge of Orchy, mainly on the lookout for dragonflies, though other insects were not ignored. I was again in the same neighbourhood for a few days at the end of June 1939. The following is a list of the species noted on these two occasions:—

Odonata (Dragonflies).

Cordulegaster boltonii. Common, two males taken in 1938; also seen in 1939.

Aeshna juncea. Common in 1938; one taken in 1939.

Aeshna caerulea. One taken and at least one other seen in 1938, but not so many as in 1937 (see my note in *Scot. Nat.*, 1938, p. 9); probably it was rather late for it. Seen in 1939.

Somatochlora arctica. In fair numbers in 1938; female seen ovipositing in a shallow peaty pool in which sphagnum moss was growing. Numerous in 1939.

Libellula quadrimaculata. Several seen in 1939.

Leucorrhinia dubia. One pursued but not captured in 1939.

Pyrrhosoma nymphula. Common in 1938.

Enallagma cyathigerum. Very common both in 1938 and 1939.

Trichoptera (Caddis-flies).

Phryganea obsoleta (Hagen).

Neuronia ruficrus (Scop.). Between Inveroran and Loch Dochard, 23rd July 1938.

Sericostoma personatum (Spence).

Mystacides azurea (L.).

Tinodes waeneri (L.).
Odontocerum albicorne (Scop.).
Polycentropus multiguttatus (Curtis).

The late K. J. Morton considered that *Neuronia ruficrus* was probably a new record for the county.

PLECOPTERA (Stone-flies).
Isoperla grammatica (Poda). Glen Etive, 1938.
Nemurella inconspicua (Pictet).
Leuctra moselyi (Morton). Glen Etive.
Nemoura variegata (Olivier). 1939.

MECOPTERA (Scorpion-flies).
Panorpa germanica (L.).

LEPIDOPTERA (Butterflies).
Erebia aethiops. Near Shian Ferry, Appin, 1938.
Argynnis selene.
Coenonympha tullia.
Polyommatus icarus.

WEST INVERNESS

Unless otherwise stated, all records in the following list are from the neighbourhood of Loch Ness—the south-west end —the dates falling between 14th and 24th June 1939:—

ODONATA.
Cordulegaster boltonii. Loch Lochy and also Loch Hourn.
Aeshna caerulea. Several seen with certainty alighting on tree trunk but not taken.
Somatochlora arctica. Seen with certainty at same spot as above but no captures made; also at another locality in the district.
Libellula quadrimaculata. Numbers seen.
Leucorrhinia dubia. At least half a dozen seen at one place, both males and females, the crimson of the males and the yellow of the females being very striking.

Pyrrhosoma nymphula. Very numerous. Also taken at lochan between Loch Quoich and Loch Hourn.

Enallagma cyathigerum. Very common. Also between Loch Quoich and Loch Hourn.

TRICHOPTERA.

Sericostoma personatum (Spence).

Hydropsyche pellucidula (Curtis).

Philopotamus montanus (Donovan).

MEGALOPTERA.

Sialis lutaria (L.).

LEPIDOPTERA.

Coenonympha pamphilus.

Coenonympha tullia.

Argynnis selene.

Polyommatus icarus.

Pieris napi.

Carterocephalus palaemon.

All my specimens were identified for me by Mr K. J. Morton shortly before his death in 1940.

ZOOLOGICAL NOTES

Leuctra fusciventris Steph., one of our most common and widespread stone-flies, Plecoptera, can be found regularly in the adult stage in Aberdeenshire from June to November. There appears to be only a single record of its occurrence in December in Great Britain (H. B. N. Hynes, 1940, " A Key to the British Species of Plecoptera with Notes on their Ecology," *Freshwater Biol. Ass., Sci. Publ.* **2**, p. 31).

On 10th December 1948 a single female specimen was caught on scrub willow by the edge of the Crynoch Burn, which runs into the River Dee about 7½ miles from Aberdeen. It survived in the laboratory under appropriate conditions until 24th December. This late appearance may be accounted for by the fair weather towards the end of last year.—J. H. Mundie, Aberdeen.

The Peacock Butterfly in Stirling.—During the eight years I have resided in the western limits of the town of Stirling I have never seen the peacock butterfly, *Vanessa io*, but in September of this year (1948) two were in my garden, and a young naturalist friend, a girl of fifteen years, captured a specimen in the garden of her home situated in another part of the town.

One of the specimens I failed to capture at first, but next day, a colder day, it was easily taken as it hung from the brickwork of a house which is in course of erection adjacent to my garden.

The specimen captured on the wing is small and shows signs of frayed and weathered wings, while the other specimen is larger—2⅝ inches across the two outstretched forewings—and is in splendid condition.—J. D. McAinsh, Stirling.

Oleander Hawk-moth at Grangemouth.—An oleander hawk-moth, *Daphnis nerii*, was captured near the docks at Grangemouth, Stirlingshire, on 7th October 1948. This hawk-moth is an immigrant species that is exceedingly rare in Scotland, its usual habitat being the fringes of the Mediterranean, the Near East countries, and India, and it is probable that the Grangemouth specimen came over by ship to the docks.

The oleander hawk-moth is an insect of striking appearance, having a large wing expanse, and a thick, heavy body. The forewings are greyish, with a pinky tinge, and are mottled with greens and browns, some of the markings being edged with white. The hind wings are grey-brown, with a wavy white line across them. The body is coloured like the wings with a variety of greys, greens and browns.

According to South's *Moths of the British Isles*, the first specimen of *Daphnis nerii* to be captured in Britain was taken at Dover in 1835. A Scottish specimen was recorded at Crieff in 1873, but in 1891 it was shown to be not a *Daphnis nerii* but a *Daphnis hypothous*, an allied species, which is found in India, Ceylon, and some of the East Indian islands.—A. Baptie, Grangemouth.

Large Oyster from the Firth of Forth.—Oysters, *Ostrea edulis*, were at one time exceedingly common in the Firth of Forth, and productive fisheries existed. Towards the end of last century, however, through over-fishing, pollution or other causes, the species seems to have more or less died out. While old shells are frequently secured in the dredge, live specimens are only very rarely found by fishermen. It may, therefore, be of interest to record that a large individual was received by the Royal Scottish Museum last year. It was taken on the 17th February 1948 by a ring net just west of Granton. It was over-wintering as a male and was full of sperm. The shell was very solid. Its greatest length was $4\frac{1}{2}$ inches and it weighed $9\frac{1}{2}$ ounces.—A. C. Stephen, Edinburgh.

Scottish Reptiles and Amphibians.—Amphibians and reptiles form a small but interesting part of our fauna. Although to some they are objects of dislike, if not actual abhorrence, to others they are a fascinating study. That a renewal of interest in these creatures is taking place is shown by the formation of the British Herpetological Society. Its objects, apart from bringing together those interested in the subject, are to increase our knowledge not only of the scientific side, including such subjects as anatomy, physiology, genetics, embryology, and taxonomy, but also more of the natural history side which would include distribution, behaviour, hibernation, feeding, and breeding habits. England has been much better served by its naturalists than has Scotland. A glance at the maps in the *Journal*[1] for each species shows how much is still to be done. Wigtownshire, for example, would seem to have no toads, frogs, newts, or slow-worm. While in Shetland the absence of land amphibians and reptiles is actual, in the case of Wigtownshire the indication is that no one has made records.

Even where the distribution is given, it is not certain in all cases that the map represents the present status of the species. The newts, for example, can well be revised, as more recent study has shown that older records cannot be entirely relied on. Again, the status of a species such as the natterjack toad is still uncertain. One authority

[1] *Journal, British Herpetological Society*, No. 1, June 1948. 4s.

has reported it from Moray, while a later writer does not refer to it at all. One hears of its occurrence in Arran, where it has not yet been officially recorded, and doubts exist of its continued presence in areas where it is supposed to occur.

The Natural History Department of the Royal Scottish Museum would be glad to receive records of distribution and notes on the biology and other matters of interest concerning our Scottish species. In the case of the newts, since their identification presents some difficulty, specimens would be appreciated.—A. C. Stephen, Edinburgh.

Chimaera or Rabbit-fish at North Berwick.—A specimen of the rabbit-fish, *Chimaera monstrosa*, was washed up alive on the beach at North Berwick on 13th February 1948, and secured for the Royal Scottish Museum by Mr Auld, North Berwick. *Chimaera* is a fish of the deep water of the eastern North Atlantic, and is taken along the edge of the continental shelf to the west and north of Scotland; also in the northern North Sea. On occasions individuals may be taken in shallower water nearer the coast. There is only one previous record of its occurrence in the North Sea so far south (from Montrose in 1902). The usual limit is about the line of the southern shore of the Moray Firth.—A. C. Stephen, Edinburgh.

Tadpole-fish at North Berwick.—A well-grown specimen of the tadpole-fish, *Raniceps raninus*, was taken off North Berwick on 1st June 1947 and forwarded to the Royal Scottish Museum by Mr W. J. Fairbairn, St Abbs.

This species has been recorded from the Firth of Forth on only some half-dozen occasions. The last record was in 1917, given by Mr W. Evans in the *Scottish Naturalist* (1917, p. 94).—A. C. Stephen, Edinburgh.

Shrews in Upper Strathspey.—The Common shrew, *Sorex araneus*, is fairly well distributed in Strathspey. It occurs in the woods, on the arable, and on the foothills of the Cairngorms. Once, when after foxes on a day in late May, we lunched at about 2,350 feet. I noticed one of the terriers scraping, and was curious to see what it was after. Soon it unearthed a litter of half-grown common shrews, the highest record I have for this mammal. I have no record of the pygmy shrew, *Sorex minutus*, in this district, although Millais says it has been found in Morayshire. There is the record, too, of the specimen taken into the Ben Nevis Observatory by the domestic cat, so evidently this little shrew occurs well up on the mountains. Actually I do not think that the common and pygmy shrews would

do well together, and that one finds either, but not both, species in a district. We have a few water shrews, *Neomys fodiens*, in Upper Strathspey. I have seen this big shrew in Nethybridge, and I picked one up at a farm near Kingussie. Actually this is not typical water shrew country. Most of our streams are too fast-running for them, and there are not enough of the sluggish, muddy ditches they prefer. Water shrews come into houses, and are readily caught in ordinary nipper mouse-traps. On 18th July 1945 we moved a tarpaulin in a stackyard and found seven young water shrews dead underneath. Millais gives the number in a litter as five to six. I have seen both the light and the dark-bellied types of water shrew here, but the dark seems to predominate. One adult specimen trapped last year had a reddish tinge on its skin and underparts of the neck. This tinge may have been due to the shrew frequenting a ditch with " iron " water, like the whooper swan we saw on its nest in Iceland. Its head and neck, and those of its mate, were stained a dull red, and the result was really striking.—W. MARSHALL, Nethybridge.

MAGPIES IN STIRLINGSHIRE.—The magpie, *Pica pica*, seems to have increased in numbers west of Stirling in the Drip Bridge locality. This year (1948) I have noted a group of five and another group of eight, while in the neighbouring trees I heard several more.

Last year (1947) I noted only a family group of four and an odd one or two in the nearby tall hedges.—J. D. MCAINSH, Stirling.

CHAFFINCH NESTING ON WAGON BRAKE BLOCK.—On 11th June 1948 a locomotive had coupled up to a line of wagons which had stood for some time unused. When the brakesman was attending to the brakes preparatory to moving, a chaffinch, *Fringilla coelebs*, flew from a nest, containing three young birds probably less than one day old, which was built on top of the wagon brake block.

The nest was taken and placed in the same position on another wagon which occupied a similar position on the railway line behind. In a few minutes the female chaffinch had returned and was again sitting on the nest in its new position.

The nest was built with the usual materials and decorated with lichen, which did not serve as camouflage in this position. About fifty yards from the nest there was a cutting of about half an acre with a growth of well-grown sallow bushes and an occasional elder.—HUGH HALLIDAY, West Calder, Midlothian.

SNOW BUNTINGS IN WEST MIDLOTHIAN.—On 15th November 1948 I saw a flock of over two hundred snow buntings, *Plectrophenax*

nivalis, on the main shale bing at Addiewell, 800-900 feet above sea level. From that date snow buntings have been seen regularly in this area, and were still present on 5th March 1949. They fed frequently on oat stubble fields adjoining the bings at a level of 600 feet.—Hugh Halliday, West Calder, Midlothian.

Snow buntings have been abundant in many parts of the Highlands and Lowlands during the past winter (1948-49).—Editors.

Tree-pipit Singing on Passage.—Passing a walled garden close by the shore of Loch Ewe on 8th May 1948 my attention was drawn to the distinctive song of the tree-pipit, *Anthus trivialis*. The songster was perched on the sunny side of an apple tree and but a few yards from the foreshore alive with migrant pipits. The locality did not appear suitable for nesting, and the bird was not heard again.—P. A. Rayfield, Aultbea, Wester Ross.

Pied Flycatcher in North Perth.—As there are very few records of the pied flycatcher, *Muscicapa hypoleuca*, in North Perth, the following occurrences are worthy of record. On 11th May 1948 I found a male singing from old trees beside a small river. This was within five miles of the place where a male and female had been seen by another observer at the end of April 1948. On 12th June 1948 a male appeared in a different locality. This bird disappeared on 17th June 1948. During its stay it sang persistently, and paid frequent visits to hollows in an old ash tree, but no female was ever seen.

I am indebted to a correspondent, who desires to remain anonymous, for the information that he saw a male within ten miles of this last locality in the summer of 1944.

The status of the pied flycatcher in North Perth is given as " occasional, has bred," in the *Geographical Distribution and Status of Birds in Scotland*.—James W. Campbell, Strathtay, Perthshire.

Grasshopper Warbler in Stirlingshire.—With reference to the previous notes on the grasshopper warbler, *Locustella naevia*, in Scotland (*Scot. Nat.*, **60**, p. 218), it may be of interest to record that I heard a bird singing on 10th August 1947, on the slopes of Ben Lomond, Stirlingshire. The place was in trees above Rowardennan on Loch Lomond, about 500 feet above sea level, fairly near to the path which runs from Rowardennan to the summit of Ben Lomond. The song was distinctive, the peculiar series of notes like a fishing reel running out, which gives the bird the country name of " reeler."—Alan F. Airey, St Annes-on-Sea, Lancashire.

The grasshopper warbler has not previously been recorded for West Stirling, although its status is given as that of a summer visitor

to Dunbarton and East Stirling (*Geographical Distribution and Status of Birds in Scotland*, 1928, p. 105).—Editors.

Sedge Warblers Increase in Wester Ross.—Following a mild winter and early spring, an abundance of coarse herbage about Aultbea crofts in the summer of 1948 caused a 100 per cent. increase in the breeding pairs of sedge warblers, *Acrocephalus schoenobaenus*. They were certainly not colonial, being very widespread, and one pair nested in bracken nearly 100 yards from the nearest marshy patch.—P. A. Rayfield, Aultbea, Wester Ross.

For previous note on status at Aultbea, see *Scot. Nat.*, **60**, p. 30. —Editors.

Sedge Warbler in West Sutherland.—During a visit to Scourie, Sutherland, in the first half of June 1948, I heard two sedge warblers, *Acrocephalus schoenobaenus*, in full song. One bird, which I frequently listened to, inhabited a territory lying just south and west of Scourie Lodge, and not far from the hotel; the other was established about half a mile away to the south, in a marshy field just west of the road between the post office and the school. I did not devote much attention to them, nor did I find or attempt to find nests, and for all I know the birds may have been solitary cocks; but it seems probable that breeding took place. These observations are offered for record in view of the present status of this bird as very rare in the north-west of Scotland (*Handbook of British Birds*).—R. I. Morrison, Aberdeen.

The Iceland Redwing in Argyllshire.—An example of the Iceland race of redwing, *Turdus musicus coburni*, was taken at Cairnbaan on the Crinan Canal, Argyllshire, on 26th October 1948. The specimen, a very typical example of the race, is an adult female (wing 123 mm.), and was in very fat condition. It was one of a pair at roost in hazel scrub. There is no other record of the race for Argyllshire.—P. A. Clancey, Glasgow.

Nesting of the Barn Owl in Banffshire.—It is worth placing on record the nesting of the barn owl, *Tyto alba*, in Banff in the years 1943 and 1944. This took place in the disused chimney-head of the Episcopal Church in the High Street of Banff. I had many opportunities of observing the male bird, which showed little concern at my presence, often alighting on a wall within 10 feet of me. The female was much more reserved, although I have had her alighting on the sill of the window from which I was observing the nest. On 14th August 1943 I first saw the young, three in number, although I had heard them hissing or snoring in the nest. They were then well

grown, one slightly smaller than the others, but still with considerable down; they created much noise, and mystification and alarm to the public, as they sat on the flat top of the chimney waiting for their parents to feed them. From a window of my house about 15 feet from the nest I had quite a good view of them. Unfortunately, the cock bird met an untimely death in the third week of August, when he flew into a motor car, breaking his neck. I had the dead bird in my possession but did not have him set up. The hen carried on with her duties and fed the young faithfully and well. The food brought seemed to be almost wholly small rodents, sometimes carried in the claws and sometimes in the beak. The birds were soon taking little flights round the house tops and over the gardens, until latterly, as darkness fell, they would come out of the chimney and fly straight away. Some of them were with us all winter, as I often heard their " churring " whistle during the night.

In 1944 a pair bred again, but nested about a fortnight earlier, and the three young seemed altogether stronger birds when they first appeared. I am not sure whether the hen was the same bird as that which nested in 1943. She was also shy. The cock bird in this case was entirely different in temperament. If he happened to be about when I came into my garden be would greet me with that well-known screech, flying round about, but not with any signs of attack. The behaviour of the young birds was much the same as in 1943.

I heard barn owls in the area until well into the spring of 1945, but no nesting took place and I have no authentic record of any being seen since that year.—W. H. Maxwell, Banff.

Golden Eagle *versus* Wild Cat.—A mounted specimen of a golden eagle, *Aquila chrysaetos*, was recently offered to the Royal Scottish Museum, together with the following particulars, by General Sir Philip Christison:—

" This female golden eagle was recovered by me in January 1909 on Mam Ratagan in Kintail.

" Just after dawn I was out with a shepherd, John McRae, and an old professional fox-hunter whose name I have forgotten.

" Through the glass we saw a wild cat making a meal of a white hare. There was frozen snow on the hill at the time. Suddenly the eagle swooped down several times, and then alighted a few yards from the cat. It then sidled up to it and the cat went for it. A struggle ensued, when the eagle raised flight by hopping to the edge of a small cliff with the cat hanging on. The eagle flattened out and began to gain height. When very high—I should guess 1,500 to 2,000 feet above the hill—we saw the cat coming down and found it dashed to pieces on the rocks. Next day I got information that a

sick eagle had been seen about three miles away, and we found this bird unable to stand or move. There was a terrible wound on the inside of one thigh and some entrails were protruding. McRae despatched it and I had it stuffed by Macpherson, Inverness, as it seemed a unique occurrence."

Montagu's Harrier in East Lothian.—A male Montagu's harrier, *Circus pygargus*, was unfortunately killed near Binning Wood in April 1947. I think the bird would have nested, as a female was with it, and they had been in the vicinity for some weeks. After the male was killed the female left. Binning Wood has now been cut down, but when the harrier and a bittern (see below) were obtained the ground was in a condition that I consider ideal for both species. The memorial to the Earl of Haddington, who planted the woods at Tyninghame more than two hundred years ago, states that the ground was an undrained barren waste. Having seen the ground since the woods were cut I can imagine what it was like, and that probably it was then the home of the bittern, and most likely the harriers as well.

Since the birds were obtained, this ground has been re-drained, and the débris and undergrowth cleared for replanting, so that as far as these two species are concerned it will have lost all its attraction. The harrier has been preserved.—W. Thomson, Tyninghame, East Lothian.

This is an important note as there are very few Scottish records. *The Handbook of British Birds* states: "Rare vagrant, about seven in southern half of mainland, one of which (June 15, 1881) may possibly have nested in Solway." *The Geographical Distribution and Status of Birds in Scotland*, in addition, shows the bird as occasional in Orkney. This is the first record for the Forth area. The bird which is in Mr Thomson's possession has been examined and is probably in its second summer, for the upper parts are brownish, including a faint tinge of brown on the head.—Editors.

Bittern in East Lothian.—In August 1947 a bird was brought to me by one of my assistants, which I at once saw was a bittern, *Botaurus stellaris*. It had been picked up by a prisoner of war engaged in clearing débris from Binning Wood, which had recently been cut down. The bird had its bill fixed in an oyster shell, and was in an emaciated condition. I placed it in a large open-air pen, but it refused to eat the suitable food which was provided, and eventually died. It was seen on 20th August, while still alive, by a keen ornithologist. The bird has been preserved.—W. Thomson, Tyninghame, East Lothian.

The bittern is an occasional visitor to East Lothian.—Editors.

Grey Geese in Ayrshire.—During the last decade there has been a complete replacement of the formerly common bean goose, *Anser f. fabalis*, by the larger grey lag, *Anser anser*, in south Ayrshire and probably throughout the whole county.

Paton and Pike in *The Birds of Ayrshire* (1929) state: "The bean goose is undoubtedly *the* grey goose of the uplands and moors of Ayrshire." My own earlier observations agree with this statement. The same authors are able to give very few definite records of the grey lag, which in recent years has become a common autumn visitor and to a considerable extent a winter resident.

The last bean geese of which I have any record were four birds seen by me on 26th February 1944 on the shores of the Girvan Reservoir at Penwhapple. Since that date all identifiable geese which I have seen, either on that sheet of water or elsewhere in the county, have been grey lags.

Some idea of the rising tide of grey lag visitation can be had from the following maximum counts made at Penwhapple during the past six autumns: 1943, none; 1944, 30; 1945, 22; 1946, 100-110; 1947, 115; 1948, 270-280.—G. Hughes-Onslow, Barr, Girvan.

Garganey in East Lothian.—On 26th March 1948, while painting on the East Lothian shore opposite Fidra, I was surprised to see a fine pair of garganey, *Anas querquedula*, in a rock pool. I had a close view of the birds in excellent light through binoculars, and finally watched them fly off in the direction of Gullane.—Donald Watson, Edinburgh.

This appears to be the first record for East Lothian. There is a breeding record for the Forth area, and there is some evidence suggesting that it is now of more frequent occurrence in certain parts of Scotland than was formerly suspected. The species is easily overlooked. Further investigation of its present status is needed.—Editors.

Wigeon Breeding at Linlithgow Loch.—During the first week of August 1948, when at Linlithgow Loch in company with Mr D. R. Anderson, we were both surprised to see a female wigeon, *Anas penelope*, with a brood of young. The ducklings were quite small and only about two weeks old, so they must have been hatched on the island, where most of the ducks at the loch nest. The old bird led the young over almost to where we were hiding, but on observing us took them back to the island. A brood of tufted duck, *Aythya fuligula*, similar in size and continuously diving, formed quite a contrast to the surface feeders floating past.

So far as we know this is a new record for Linlithgow Loch, and

we are not aware of any record for the county. The brood was also seen independently by Miss A. N. White and Mr Duncan, both resident at Linlithgow.—David Hamilton, Edinburgh.

American Wigeon in Angus.—On 6th November 1948 a drake American wigeon, *Anas americana*, was seen on the Long Loch of Lundie. It appeared to be associated with a pair of common wigeon, *Anas penelope*, and all three rose within a few seconds of sighting, followed by a further twenty or so of wigeon nearby. The trio was followed with the binoculars and appeared to drop on the far end of the loch. Later, the American wigeon was watched at a range of about seventy yards for ten minutes or so. In sunshine the dark green-glossed areas on the head were conspicuous.—Henry Boase, Invergowrie, by Dundee.

The American wigeon has been observed and a few obtained on several occasions in Scotland. It is, however, a species often kept in captivity, so that records of occurrences must be treated with caution, as they are open to the suspicion that they refer to " escapes " rather than genuine visitors from abroad.—Editors.

Ferruginous Duck near Dumbarton.—Three ferruginous ducks, *Aythya nyroca*, have spent several weeks this winter on Loch Bowie, a fresh-water loch of seven acres area, with abundant vegetation, near Dumbarton. The brown head, dark back, and prominent white wing patch were seen, the latter very conspicuous when the birds rose on the water to flap. While under observation, the ducks dived almost continuously, and on 9th January 1949 they showed very plainly their white under tail coverts, but a few days later they slipped under the water, giving only a very fleeting glimpse of white under the tail. This duck is not mentioned in *Birds of the Firth of Clyde* by J. M. McWilliam.—Elizabeth R. Brock, Dumbarton.

This duck is a very rare visitor to Scotland. There is no previous record for Clyde. Unfortunately records are open to the same suspicions as those expressed by us under American wigeon.—Editors.

Turtle Dove in Wester Ross.—A turtle dove, *Streptopelia turtur*, visited Aultbea from 20th to 29th August 1948. At night it went to roost in a clump of trees beside the Free Church manse, but was to be seen on the ground and stone dykes during the day. It was not tame but was reluctant to fly far when flushed.—P. A. Rayfield, Aultbea, Wester Ross.

The turtle dove is an occasional visitor to Wester Ross.—Editors.

Phalaropes in Midlothian.—At Leith Docks, Edinburgh, on the 10th November 1948, I saw a probable grey phalarope, *Phalaropus fulicarius*. It was swimming about on the sea close in to the outer sea-wall of the eastern portion of the docks. I obtained very close views, and at one time was looking down on top of it from a height of approximately 12 feet. The following description was taken: The forehead and centre of the crown were white. There were two dark streaks on either side of crown, either above or through the eyes. From the base of the crown and down the back of the nape there ran a dark patch which joined a brownish patch running across the back of the shoulders. The rest of the back, looking down from above, was as follows: Centre clear light grey, having a narrow V-shaped patch well forward and pointing towards the neck. There may have been another narrow patch of something the same colour on either side of the centre grey of the back and then the dark, almost black, wings at the sides of the body. There was a faint flush of reddish colour on the neck. Cheeks and rest of underparts white. Tip of tail with a black bar. The bird was about common sandpiper size and had a blackish slender bill. In flight it resembled a large sanderling with the white bar along the wings. It swam, turning from side to side and pecking at the surface in characteristic style, and frequently took flight and returned to the same spot.

On 29th January 1948 I had seen another phalarope (? species) on the sea close to the east breakwater at the Docks.—Gerard L. Sandeman, Edinburgh.

While walking along the beach between Levenhall and Musselburgh in the late afternoon of 7th November 1948, I had the good fortune to observe a phalarope—whether grey or red-necked I am unable to say. The bird, which was swimming close inshore and feeding actively, was very tame and allowed me to approach to within 15 yards, but owing to the poor light and the continual movements of the bird, observation was difficult even with the help of glasses. At the time I made the following rough notes: Small; white underparts; back dove-grey; beak black; white on sides of face with dark mark through or slightly above eyes; appeared to have dark stripe down back of neck and slight orange or red tinge above breast. The buoyancy and the spinning movements described in Fisher's *Bird Recognition* were very noticeable.—R. MacDonald, Edinburgh.

Curlew Sandpiper in Sutherland.—During the period 31st October to 2nd November 1948 a curlew sandpiper, *Calidris testacea*, haunted the muddy banks at the mouth of the Dornoch burn. This

appears to be a rather late record. In *The Handbook* the autumn migration of the species is stated as " mid-July to mid-October, with stragglers (rare) to mid-November."—D. MacDonald, Dornoch, Sutherland.

Temminck's Stint in East Lothian.—On 5th September 1948, while watching a flock of dunlin, *Calidris alpina*, at Aberlady Bay, East Lothian, we observed a Temminck's stint, *Calidris temminckii*. Our attention was drawn to it by its call. This was a pipit-like trill, fairly high-pitched and metallic-like. We managed to approach to within 30 feet of it and obtained good views through 6 × 30 binoculars and a telescope. The following points were noted: Noticeably smaller than the dunlin, bill short and straight, and, like the legs, appeared black. The back was a uniform grey-brown with inconspicuous dark markings, the top of the head being darker. The underparts were white, except for a buffish zone which spread across each side of the breast from the shoulders and did not meet.

In flight it tended to fan its tail, which was white with a thin black central line. It flew low with quick wing beats, generally gliding before alighting. The wings then appeared greyish with a slight bar.

On the 6th both observers returned, and on this occasion it " towered " to a height of about 30 feet when flushed. Quite often it remained feeding after the dunlin had left, but always trilled when put up.

On both occasions it was feeding on short grass, where the tide had left many pools. We noticed that it picked, rather than probed, for its food, often running quickly in the manner of a sanderling, *Crocethia alba*.

This appears to be the first recorded occurrence of this bird in East Lothian.—Allan M. Watt and K. S. Macgregor, Edinburgh.

Occurrence of American Pectoral Sandpiper, *Calidris melanotos*, in East Lothian.—On 10th August 1948 A. D. W. noticed an unusual-looking wader in Aberlady Bay, East Lothian, and watched it for several hours. As the bird appeared to be of exceptional interest, he telephoned for reinforcements. A. G. S. B., J. H. B. M., G. L. S., and G. W. duly arrived, and all had excellent views before the light failed. Even at low tide it kept to the short grass at the edge of the mudflats, and although it flew out over the estuary when disturbed it quickly returned, and was only once seen to alight on the exposed mud. It stood still or crouched on the grass, even occasionally sitting on the ground and freezing, but on closer approach would run swiftly with neck stretched up and forward like

a reeve, showing some reluctance to fly without being as approachable as are many reeves. While feeding among the grass it probed in dunlin fashion, sometimes with legs very much flexed. It was not seen to feed on the mudflats. It kept very much to itself, so not enabling us to make an exact comparison of size with other waders, but we had the impression that it was perceptibly smaller than a reeve although a little larger than a dunlin. It was more like a small reeve than anything else, particularly in flight when its slow low wing-beat and the white of the coverts on either side of the base of the tail were noted. It was silent when on the ground, but when flushed it rose with a rather sharp "srreet," and on the wing uttered a weak "treu treu." The very slightly decurved bill was dark, with paler brownish bases to both mandibles, and seemed relatively shorter and more slender than a dunlin's. The centre of the crown was dark, an irregular lighter line on either side separating it from dark sides to the crown. Below this was a fairly prominent superciliary stripe. The nape was dark and streaked, the streaks continuing on to the mantle, so that there was no paler area between crown and mantle as in the reeve. The back, mantle, scapulars, and wing coverts were more boldly and less tidily marked than in the reeve; the strongest pattern was made by the dark centres and light creamy-white edges to the longer scapulars, the greater and median coverts showing a like pattern a little less clearly defined; but on the back and mantle the colour was more uniformly dark and the pattern more streaky. Light feather edges tended to form two light lines in the shape of an incomplete V over the upper parts, recalling a little stint. The breast was streaked fairly finely with black or dark grey, these streaks finishing abruptly so as to give the impression of a band contrasting with the whitish underparts. This feature was noticeable and served to remove all possibility of the bird being a small reeve. The legs were also diagnostic. They looked distinctly shorter than those of a reeve, only a little if any longer than those of a dunlin, and were pale yellow (yellow ochre) in colour.

The American pectoral sandpiper has been recorded in Scotland on four previous occasions (*Handbook of British Birds*), but this is the first recorded occurrence in the Forth area.—A. G. S. Bryson, G. L. Sandeman, J. H. B. Munro, George Waterston, Donald Watson, Edinburgh.

Uncommon Waders in Wester Ross.—On 19th August 1948 a party of four sanderling, *Crocethia alba*, of which two at least were juveniles, alighted together with two ringed plover, *Charadrius hiaticula*, on the shore of Loch Ewe at Aultbea. Immediately on settling all proceeded to take a quick bathe and then to snooze with

bills tucked into the scapulars. Half an hour later the ringed plover were busy feeding and alone.

No more sanderling were seen until the evening of 6th September, when six in snowy winter plumage were observed asleep on a pebble beach in company with a dozing knot, *Calidris canutus*, and a dozen other small waders. The knot apparently left that night, but a few sanderling were present on the following day and also on the 9th. This last day was notable, too, for a very close view of a bar-tailed godwit, *Limosa lapponica*, probing deep at the tide edge on a small sandy beach.—P. A. Rayfield, Aultbea, Wester Ross.

Black Tern in Edinburgh.—On 17th September 1948 I observed a black tern, *Childonias niger*, at Lochend pond, Edinburgh. The bird appeared about 12.30 p.m. and I watched it until it left at 5.30 p.m. A strong wind was blowing and it spent much of its time hawking for insects in a sheltered corner, but several times it alighted on a grassy slope with some gulls. The upper wing was distinctly grey tinged with brown, the forehead white, crown black, and nape white, with a conspicuous dark line down the side of the neck just in front of the wing. The bill appeared black and the legs were dark in colour. The underparts were white and the tail only slightly forked.—Keith S. Macgregor, Edinburgh.

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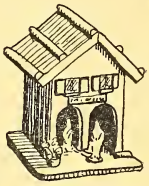

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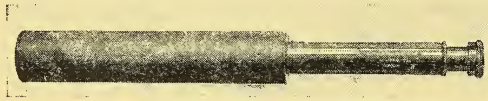

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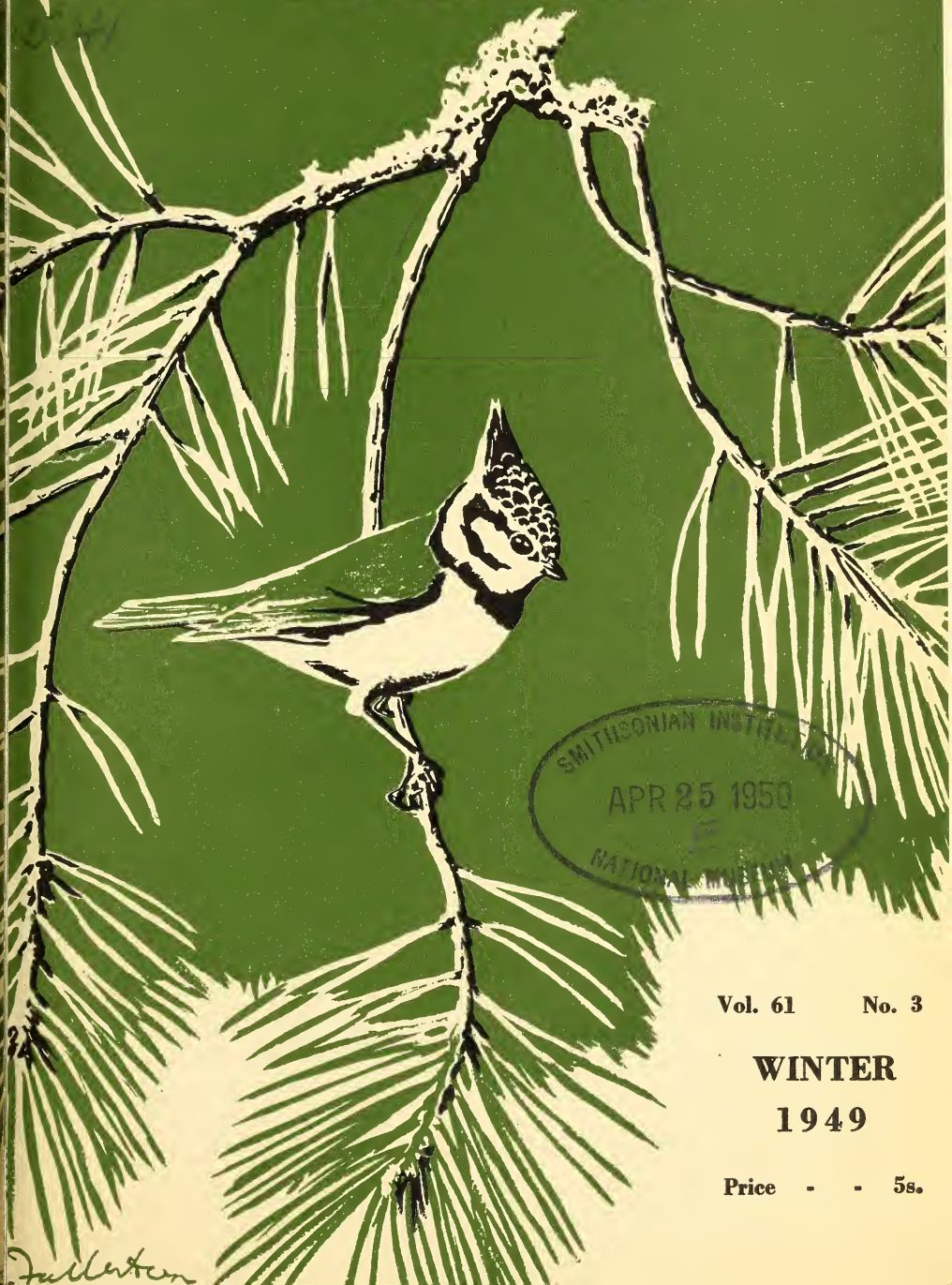

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The Scottish Naturalist

Volume 61, No. 3 **Winter 1949**

FAIR ISLE BIRD OBSERVATORY

First Report, 1948

Part II—Migration

Compiled by
Kenneth Williamson, Director

The Fair Isle Bird Observatory was open to visiting ornithologists from 25th August to the end of October in 1948, and during that period daily observations on the autumn passage were maintained. The following report summarises the "Migration Schedule" entries during that period. The notes for November and December are abstracted from the log kept by the Warden, Mr Pat Robertson.

Observers

The following observers—visitors and members of the Fair Isle community—contributed notes: Dr and Mrs R. Carrick; Messrs James Fisher, R. S. R. Fitter, Tom Hopkinson, W. Humphreys; Lt.-Col. E. G. H. Goodwin; Messrs G. Theo Kay, Ian Pitman; Mrs J. B. Priestley; Messrs James Rae, R. A. Richardson, Pat Robertson, Alex. Stout, Jun., George Stout, George Stout, Jun., James A. Stout, Jerome Stout, L. S. V. Venables, George Waterston, Kenneth Williamson, and James Wilson.

APR 25 1950

Weather Summary

On the whole, the weather during the autumn of 1948 was not favourable to the observation of migrants at Fair Isle, and there was no volume of bird movement until the second week in October. The season began promisingly enough with fair weather and moderate south-east wind on several days in late August and early September, bringing small numbers of summer visitors returning from Scandinavia. This movement was at its best between the 9th and 11th, but conditions deteriorated and there followed a spell of westerly weather (with a full gale on the 17th which took the island's fulmars out to sea) until the 24th to 26th. These three days of bright weather, with light south-east breezes, were succeeded by a four-days' gale with the wind between south and west, which brought migration temporarily to a standstill.

The wind continued in this quarter until 8th October, when a south-east gale brought a rush of redwings and a number of goldcrests, blackbirds, and other late autumn immigrants to the British Isles. From then on, apart from the 24th and the 28th to 30th (when fresh south-east winds brought in woodcocks and blackbirds), the wind varied between south-west and north-west, frequently reaching gale force. An especially severe north-west gale, gusting at nearly 100 m.p.h., destroyed the Ward Hill " Heligoland " trap on 25th October. There was another change to south-east at the beginning of November, bringing in a further " rush " of blackbirds.

Migration

Carrion Crow *Corvus corone*.

One kept company with a hoodie for several days in late July. Single birds on dates between 10th September and 16th October. One on 22nd September had the belly dark slate and may have been a hybrid *Corvus corone* × *cornix*.

Rook *Corvus frugilegus*.

Two on 16th October; 3 from 25th November for a fortnight.

Jackdaw *Corvus monedula*.

Singly in stubble, 10th, 11th and 13th October. One of two

examined at close quarters on 14th October had the dark underparts and obscure collar of *Corvus m. spermologus*.

STARLING *Sturnus vulgaris*.

Two caught at Skaddan Lighthouse on the nights of 9th-10th and 11th-12th October were considered, on the form of the bill, to be migrants of the typical race. A local *Sturnus v. zetlandicus* ringed on Fair Isle on 24th October was found dead at Cairnbulg, near Fraserburgh, Aberdeenshire, on 24th March 1949.

ROSY PASTOR *Pastor roseus*.

Adult male in worn breeding plumage, 6th August (see Part I).

GREENFINCH *Chloris chloris*.

Five in stubble, 28th October.

REDPOLL *Carduelis flammea*.

One which arrived 18th September, and another 23rd September, were *Carduelis f. rostrata*—see Part I. Redpolls were seen among twites on several dates between 21st September and 13th October, and flocks of 15 and 11 were associating with twites on 7th and 14th October. Those examined at close quarters were *Carduelis f. flammea*.

TWITE *Carduelis flavirostris*.

Fluctuating numbers during October suggested frequent passage movement.

BULLFINCH *Pyrrhula p. pyrrhula*.

The remains of an adult male, killed by a hawk or falcon, were found at the Gully trap on 29th October.

SCARLET GROSBEAK *Carpodacus erythrinus*.

Two immature birds or females in roots, 26th August, and a single bird, 30th September (see Part I).

CHAFFINCH *Fringilla coelebs*.

A male, 25th September, 7 on 27th, increasing to 15-20 on following day. A few daily to 10th October and an influx of over 50 on 11th. Most of these passed through quickly,

leaving few only until 26th, when about 70 were recorded. A few only after 29th. Several small flocks in the village area on 14th November for a few days.

BRAMBLING *Fringilla montifringilla*.

Singly, 26th and 30th September; flock of 22 on 9th October and influx of about 200 on 11th. These passed on and only single or very few birds were noted until 12 were seen on 19th, with further parties of 10 or so on 24th and 26th.

CORN and YELLOW BUNTINGS *Emberiza calandra* and *E. citrinella*.

Single birds on 10th October.

LITTLE BUNTING *Emberiza pusilla*.

Two in roots, 27th to 30th September; 2, 11th and 12th October; and 1 from 20th to 24th October (see Part I).

ORTOLAN BUNTING *Emberiza hortulana*.

Singly, 12th and 14th September.

REED BUNTING *Emberiza schoeniclus*.

Single bird, 4th September, and 2 from 10th to 14th October.

LAPLAND BUNTING *Calcarius lapponicus*.

Singly, 18th and 20th September and 15th October.

SNOW BUNTING *Plectrophenax nivalis*.

Six were seen to arrive, flying north-north-east to south-south-west over Ward Hill, 6th September. Small numbers (up to 16 on 22nd) were on the hill up to 28th, when about 30 were seen for a few days. About 50 arrived 23rd October, and there was a flock of 400 to 500 (which had decreased by half on the following day) in stubble at the South End on 26th. A flock of about 200 arrived 4th November, and there were additional large increases on 5th and 6th; they were reduced to about 60 by 8th and a few only on 10th and 11th. About 150 were in the fields, 16th November, but all had gone by 23rd. Two small lots were seen 29th November and about 100 on 1st December, with occasional birds afterwards.

SKYLARK *Alauda arvensis*.

Abundant passage-migrant in latter half of September and October.

WOODLARK *Lullula arborea*.

A flock of 15 in the village area, 11th October, and 2 on 26th.

TREE PIPIT *Anthus trivialis*.

Single bird, 25th August; a few daily from 3rd to 15th September, the most being 6 on 14th.

MEADOW PIPIT *Anthus pratensis*.

Abundant passage-migrant, August to September, dwindling to a few in early October.

ROCK PIPIT *Anthus spinoletta*.

An apparent influx was noticed on 16th September, the bird being numerous in the cropped area; a decrease was noted on 26th. Again unusually common, 15th November.

BLUE-HEADED WAGTAIL *Motacilla f. flava*.

Spring migrant reported 1st June. In autumn, single birds were seen 15th and 19th September.

WHITE WAGTAIL *Motacilla a. alba*.

Autumn passage began with 3 juveniles, 14th August, and became marked following 26th, with increases 2nd and 3rd September and a notable decrease on 9th. Few only each day subsequently until 23rd, then a single bird until 1st October (see Part I).

GREAT GREY SHRIKE *Lanius excubitor*.

One, 3rd September; 2 on 11th October, 1 of which remained and was found slain by a falcon on 14th. One, carrying a wren, 6th November (see Part I).

RED-BACKED SHRIKE *Lanius collurio*.

Two young birds trapped and ringed, 30th August and 1st September (see Part I).

SPOTTED FLYCATCHER *Muscicapa striata*.

Singly, 28th to 30th August; 3, 14th September.

PIED FLYCATCHER *Muscicapa hypoleuca*.

A few, 26th August, and 2 on 28th. About 12 on 3rd September, 7 on 4th, and one or two on 5th and 6th. None seen subsequently until 10th (3) and 11th (8) September; singly, 14th and 15th, and 2 on 25th.

GOLDCREST *Regulus regulus*.

A number arrived 9th October and a few remained next day. Two on 18th October and 2 in roots, 20th and 21st. One on 12th November.

CHIFFCHAFF *Phylloscopus collybita*.

Definitely identified: 13th August (2), 20th (3), 26th (3), 31st and 3rd September (3), 28th (2). The 3rd September birds were dark brownish above without olive tinge and whitish below with buff-washed breast and flanks, suggesting *Phylloscopus c. tristis* or *Phylloscopus c. abietinus-tristis* intergrades.

WILLOW WARBLER *Phylloscopus trochilus*.

Definitely identified; 26th August, 27th (6), and 4 each day to 30th. Singly on most days to 15th September.

LEAF WARBLERS, not certainly identified as to species, were recorded 11th August—the first of the season—and from 26th August (12) to 6th September (4), singly 8th and 23rd, and 3 on 28th.

YELLOW-BROWED WARBLER *Phylloscopus inornatus*.

Single bird in roots 27th and 28th September (see Part I).

GARDEN WARBLER *Sylvia borin*.

One trapped 26th August; noted 3rd September (3), 4th (2), and singly 9th to 11th and 13th.

BLACKCAP *Sylvia atricapilla*.

Female, 16th September; adult male trapped 6th October; male seen at a cabbage plot 12th to 15th October.

WHITETHROAT *Sylvia communis*.

Late spring migrant, 8th June. One or two, 28th to 30th August; singly 2nd, 3rd, and 13th September.

LESSER WHITETHROAT *Sylvia curruca*.

One, 28th August; one or two, 2nd to 6th September, a bird trapped on the last date being typical race. Singly, 9th and 10th September, and again, 25th to 28th.

FIELDFARE *Turdus pilaris*.

Twenty on Ward Hill, 25th October; influx of about 60 on 29th; about 20 on hill, 12th November, and 60 on 13th, and a few on 12th December.

Pat Robertson's notes contain an account of an exceptional immigration of fieldfares in late December. The wind was south-south-west (force 4) on the night of 24th-25th, and on the morning of Christmas Day flocks were scattered over the whole island, varying in strength from a few birds to over 200. Most left during that night on a south wind (5-6), and only a few small parties of half a dozen or so were seen on 26th. A further influx came during the following night (wind south by south-south-west, 8), and on 27th there was one lot of over 300 and numerous smaller flocks. Most of these departed on the night of 27th-28th (south-south-west, 8-10) and a few only were seen on 28th. The wind had veered to west by the morning of 29th, when again large numbers were about in the crofting area, and more than 500 in the vicinity of North Haven. About 100 remained in this part on the 30th (west-south-west, 8), but there were fewer than previously over the rest of the isle. There were still some numbers on 31st and on to 2nd January 1949, but these had declined by 4th January.

SONG THRUSH *Turdus ericetorum*.

One, 28th August; one or two, 22nd September to 3rd October; 7 on 13th October; 2 on 14th to 16th. Two killed at Skaddan Lighthouse were preserved and were referred by Mr A. B. Duncan to *Turdus e. philomelus*. Two trapped and ringed 29th October and compared with these skins, were greyer-olive above, especially on the rump. One or two most days from late November.

REDWING *Turdus musicus*.

A single bird, the forerunner of many hundreds which arrived on the night of 8th-9th October, was seen on 7th.

They remained abundant until the 11th, but had decreased by the following day. Additional flocks came on 21st and 25th, and a further decrease was apparent on 30th. Small numbers, 8th November, again 15th November. Of 4 caught in the Ward Hill trap at the same drive on the morning of the 9th, 2 had wings measuring 115 mm. and 120 mm. and appeared to be typical race, whilst a third had wing of 125 mm. and the clouded breast markings of *Turdus m. coburni*.

BLACKBIRD *Turdus merula*.

From one to three seen on many dates in August and September (one, perhaps two, pairs are believed to have bred in 1948). Probable early immigrants at North Haven, 23rd July and 24th August. Some arrived with redwings on 9th October; there was a steady increase on subsequent days to 20 on 13th and 30 on 16th. Birds were then few until a new influx on 25th October, with a further considerable increase on 29th and in early November. Small increase on 15th November.

RING OUZEL *Turdus torquatus*.

Singly, 18th and 29th October; 4 on 25th October.

WHEATEAR *Oenanthe oenanthe*.

Considerable movement in late July and throughout August (very marked, 23rd and 24th) and September, with no noticeable hiatus between exodus of local population and commencement of passage of northern birds. Owing to the impossibility of clearly differentiating the three intergrading forms—*Oenanthe oe. oenanthe*, *schiöleri*, and *leucorhoa*—in the field, no definite dates for passage of " Greenland Wheatear " can be given. Large birds were especially noticeable, however, on 26th August, decreasing next day, 3rd, and 15th September. Wheatears declined rapidly after the last date, and after 21st not more than 6 were counted on any day. Between 1st and 16th October only one or two were seen daily.

WHINCHAT *Saxicola rubetra*.

Eight birds, 26th August, and 7 on 27th, with a few each day until 8th September. Three on 12th September and singly on several days to 28th to 30th (2), also on 1st and 2nd October.

REDSTART *Phoenicurus phoenicurus*.

One, 27th August, 2 on 29th, and a few each day from 3rd to 9th September. Single female in roots, 13th to 15th October, later found dead in a byre. An immature male flew into wheel of a motor cycle, 31st October.

BLACK REDSTART *Phoenicurus ochrurus*.

Female trapped and ringed, 29th October. One in village area, 13th November.

BLUETHROAT *Luscinia svecica*.

Singly, 17th, 18th, 22nd, and 25th September.

ROBIN *Erithacus rubecula*.

One, 9th and 10th September, and another on 16th. One or two daily from 9th to 19th October, and from 26th on into November.

SWALLOW *Hirundo rustica*.

Spring passage continued during first week of June.

HOUSE MARTIN *Delichon urbica*.

Several at South Harbour, 7th June, and considerable north-bound passage, including two lots of 30 to 40 each, 9th June.

SWIFT *Apus apus*.

More than 50 hawking over the fields on 25th July, and a number, 26th to 28th July. Singly, 30th August, 2nd September, and 14th to 16th September.

WRYNECK *Jynx torquilla*.

Two, 26th August; singly, 4th and 25th September.

LONG-EARED OWL *Asio otus*.

One caught in an outhouse and ringed, 31st October.

SHORT-EARED OWL *Asio flammeus*.

One seen alternate days, 23rd to 30th September; 1 on Ward Hill, 9th to 15th October.

MERLIN *Falco columbarius*.

First seen 19th August, and present—sometimes 3 or 4—until 31st October (see Part I).

KESTREL *Falco tinnunculus*.

One seen alternate days, 24th to 30th August, and others on 4th, 7th and 8th, 10th (2), and 11th September. A female was seen 5th October and a single bird on 9th.

BUZZARD *Buteo buteo*.

One circling over Ward Hill, 24th June.

HERON *Ardea cinerea*.

Singly on 29th June and 1st July, and on occasions in July and August (5 on 7th August). One or more on most days in September (8 on 23rd), and singly on occasional dates in October and November.

WHOOPER SWAN *Cygnus cygnus*.

Parties of from 3 to 10 birds seen on several dates from 11th to 28th October, and 2 on 14th November.

WHITE-FRONTED GOOSE *Anser albifrons*.

A skein of about 50 was observed, 14th October, and 14 were seen on following day.

Skeins of unidentified grey geese were seen between 19th and 24th October, and a grey-lag *Anser anser* was shot on 25th.

MALLARD *Anas platyrhynchos*.

Seen regularly in small numbers (up to 12 on 30th October) throughout the autumn. Four, 30th December.

TEAL *Anas crecca*.

From one to three on occasions from late August to early October, and a drake, 25th October. One, 8th November.

WIGEON *Anas penelope*.

Five, 3rd September; singly on occasions during the month and 7 on 27th. Up to 6 present for several days in mid-October. Four flying south, 15th November.

GOLDENEYE *Bucephala clangula*.

Two (females or immatures), 27th October, and one on 31st.

LONG-TAILED DUCK *Clangula hyemalis*.

A single female, 11th October, joined by a second on 15th.

Two, 18th to 23rd October. Three small flocks were seen flying south-east between Fair Isle and Sumburgh Head (Shetland) on 29th September. Three on 3rd December.

Red-breasted Merganser *Mergus serrator*.

Odd birds, June and July, 1 on 18th September and 6 on 20th. Singly, 27th and 28th September, 13th and 19th October.

Cormorant *Phalacrocorax carbo*.

First arrivals from 10th October, with 3 on 14th and 7 on 15th.

Slavonian Grebe *Podiceps auritus*.

Two in North Haven, 28th October, and 1 on 29th and 31st.

Great Northern Diver *Colymbus immer*.

Two immature birds in South Haven, 9th July.

Red-throated Diver *Colymbus stellatus*.

Adult and immature bird in South Haven, 21st September; one off North End, 29th September.

Wood Pigeon *Columba palumbus*.

Singly, 10th and 26th October; 2 adults and 1 immature, 27th; single bird, 29th and 30th. A dozen, 15th December, 7 on 17th, and fewer on following days to 24th.

Turtle Dove *Streptopelia turtur*.

One in roots, 24th August, 1 at North Haven, 13th to 16th September, and 1 in village area on 17th. Singly, 23rd, 26th and 27th September.

Bar-tailed Godwit *Limosa lapponica*.

Despite a heavy autumn passage of this species in the south of Mainland, observed by L.S.V.V., only a single bird was recorded on Fair Isle, on 17th September.

Curlew *Numenius arquata*.

Some movement on 1st and 27th July; sporadic passage from 19th August, most noticeable 26th August to 12th September. Little migration in October, until 15th, then a few on most days to 24th. Singly, 21st November and 9th December.

WHIMBREL *Numenius phaeopus.*

Late spring passage continued until mid-June, being strong on some days in first week. Return movement slight—a few, 5th August, and from 26th to 30th; singly, 23rd and 25th September.

WOODCOCK *Scolopax rusticola.*

The earliest were 3 on 11th October. A big movement of about 300 occurred on night of 24th-25th October, and there was a further considerable passage on 29th and 30th. A dozen on Ward Hill, 12th November, about 20 on 13th, 10 on 15th, and 3 on 27th.

SNIPE *Capella gallinago.*

Three flew in from south-east at dusk, 24th August. Occasional throughout September, with 6 on 30th. Three or four most days, 10th to 16th October, and occasional birds afterwards.

JACK SNIPE *Limnocryptes minimus.*

Singly, 6th September and 29th October.

TURNSTONE *Arenaria interpres.*

Two, 11th August (adult in tortoiseshell plumage and a young bird); 10 young birds, 19th; a few adults, 23rd, and small parties of up to 25 throughout the autumn and winter.

KNOT *Calidris canutus.*

Two juveniles, 14th August; 3 juveniles, 15th; a red bird, 23rd. Singly on three dates in early September and again on 27th.

DUNLIN *Calidris alpina.*

Three, 7th June; 2 in summer dress, 10th; 2 adults, 21st July; 8 or 10 on 9th August and a few on most days from 11th, with 15 on 27th. Rather common, early September, with a few only after 12th. Singly, 8th and 10th October and 28th December.

CURLEW SANDPIPER *Calidris testacea.*

Three with dunlins, 26th September.

SANDERLING *Crocethia alba*.

Party of 5 (including 2 juveniles), 20th July; 11, 21st, and a few juveniles on most days up to end of August. Occasional throughout September until last seen on 15th (4).

RUFF *Philomachus pugnax*.

Juvenile, 11th August; adults, 26th August and 4th September.

COMMON SANDPIPER *Actitis hypoleucos*.

A few daily, 26th August to 6th September, with 5 on 3rd, then occasional up to 15th.

PURPLE SANDPIPER *Calidris maritima*.

Two, 17th September, and again 2nd October. One, 16th October, and 2 on 23rd to 25th. A dozen on South Haven beach, 21st November, and odd birds or small parties throughout the winter.

WOOD SANDPIPER *Tringa glareola*.

Two, 26th August and 3rd September; 1, 6th September.

REDSHANK *Tringa totanus*.

One, 5th July; a few almost daily in late July and August (8 on 13th and 27th); up to 6 on several occasions in September. Noticeable increase, 25th October; 9 on 6th November, 7 on 23rd, and 9 on 1st December.

GREENSHANK *Tringa nebularia*.

First heard, 12th August, and 2 on 26th.

RINGED PLOVER *Charadrius hiaticula*.

A few on most days from 21st July to end September, adults and young (see Part I), with 20 on 13th August and 15 on 27th. Singly, 3rd and 15th October.

GOLDEN PLOVER *Pluvialis apricaria*.

Four on Ward Hill, 10th July. One or two, 26th and 27th August, and again, 6th to 9th September. A dozen, 12th to 14th September, and 17 on 15th. A few in late September; 12 on 1st October and occasional birds up to 12th.

LAPWING *Vanellus vanellus*.

Eight on 20th August; 24 from 27th to 30th, and a few, 1st September. Four, 10th September and single or few birds occasionally during September and October. Thirteen on 5th November, 6 on 12th.

OYSTER-CATCHER *Haematopus ostralegus*.

After departure of breeding population in early September a single slightly injured bird remained. Occasionally there were one or more additional birds during the winter.

COMMON or ARCTIC TERN *Sterna hirundo* or *S. macrura*.

Two of one or the other species in North Haven, 29th and 30th July and 26th August; a single bird at the South Lighthouse, 4th and 5th September. Common tern in North Haven, 8th September.

BLACK-HEADED GULL *Larus ridibundus*.

Pair in North Haven, end of June and 6th July. Juvenile on Ward Hill, 20th July; adult with moulting wings, 21st. Singly 14th August and 15th September; 2, 18th to 22nd September; and 8 flying past south-west coast, 16th October.

COMMON GULL *Larus canus*.

Two, 27th August, increasing to 14 by 29th; fewer until 3rd September, when 21 were counted. Common for several days, then few only during middle of month until a large influx of over a hundred occurred on 27th. These had gone by end of the month and another hundred or so arrived 11th October but had passed on by 13th. Single bird, 27th October.

HERRING GULL *Larus argentatus*.

Unusually large number (550 on Bu Ness and similar flocks at South End and in village area) on 12th December, with decrease 13th and normal numbers only by 15th. Another influx, with many glaucous gulls, 29th December.

LESSER BLACKBACK *Larus fuscus*.

Seven (perhaps immigrants), 11th September, after departure of breeding birds. Occasional birds only afterwards, the last on 22nd September and 8th October.

GREATER BLACKBACK *Larus marinus*.

Five adults in South Haven, 2nd August. Fifty adults and immature birds on Meo Ness, 12th August, were probably on passage. Flocks of 60 to 80 noted 26th and 27th September. A large party of migrants with glaucous gulls (over 50 in all) on Bu Ness, 19th October, had gone by following day.

GLAUCOUS GULL *Larus hyperboreus*.

A single immature, 22nd September. At least 10 (9 adults, 1 immature counted) on Bu Ness with greater blackbacks, evening of 19th October, but only 1 immature seen on island next day. A number, 12th and 29th December.

LITTLE AUK *Plautus alle*.

Large numbers reported by crew of the *Good Shepherd* off Sumburgh Head in mid-December. Remains of many birds (killed and eaten by greater blackbacks ?) were scattered over Bu Ness and found even on top of Ward Hill.

MOORHEN *Gallinula chloropus*.

Singly, 28th and 31st August, also on 8th, 11th, and 13th October and 8th November.

WATER RAIL *Rallus aquaticus*.

One, 2nd October (see Part I). Others, 6th, 10th to 12th, and 25th. Three were caught and ringed on dates in early and mid-November.

QUAIL *Coturnix coturnix*.

One reported 11th September.

CORRECTION

OUR attention has been called to an error in the note on the continental song thrush in the First Report of the Fair Isle Bird Observatory (Vol. 61, p. 25). The parasitic worm *Porrocaecum ensicaudatum* is a nematode and not a tapeworm as stated.—EDITORS.

DOMINANCE IN THE GREAT TIT *PARUS MAJOR*

ANNE D. BRIAN
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WHILE watching the behaviour of birds feeding on scraps in the winter of 1948-49 on a farm in Dunbartonshire it was noticed that, in addition to the interspecific dominance described by Colquhoun (1942) and Morley (1942) whereby great tits *Parus major* dominated blue tits *P. caeruleus*, and blue tits dominated coal tits *P. ater*, the great tits appeared to have a certain dominance relationship among themselves. This was confirmed by colour ringing all the great tits that came for food and noting the reactions between individuals, when it was found that a straight line dominance order existed among the seven males, broken at one point by a triangular relationship between three of the birds. The females were very closely associated with their mates and possessed a similar dominance order. Investigating the distribution of the birds away from the feeding place, it was found that each bird could usually be found within a certain area and that the position of a bird in the dominance order corresponded with the distance of its territory from the feeding place; thus, the farther away a bird's territory, the lower its status. A similar relation between territory and dominance has been described in blue tits *P. caeruleus* by Colquhoun (1942).

Circumstances did not permit a thorough study of the question of dominance in the great tit, but the results obtained, though incomplete, are perhaps of sufficient interest for publication.

DOMINANCE

Regular observations at the feeding place began in January 1949 and were continued into the breeding season. The food usually consisted of a bone, hanging from some twigs, on which two or at most three birds could feed at the same time. Observations were made from a window six feet away at very frequent intervals. Table 1 gives the relevant information

about all the great tits that were regular visitors; unmarked great tits only very occasionally came to the food. The birds are arranged in order of dominance, the males being lettered alphabetically in italic capitals and the females having the small letter corresponding to that of their mate. When a male had more than one mate during the period of observation they have been lettered *a*1, *a*2, etc.

The relationship between any two great tits was assessed in two ways:—

1. If the dominant bird of the two happened to be feeding when the other arrived, the subdominant would wait on the twigs nearby and the dominant would either continue feeding or chase it away, the reaction probably varying according to the bird's hunger.

2. If the subdominant was on the bone first, the dominant would fly straight at it and it would leave before the dominant landed.

In cases to be mentioned later, where the order of dominance was not properly established, a particular type of posturing occurred but no neutral contacts (two birds feeding quietly side by side) unless the two were mated.

TABLE 1

Males, in order of dominance	Date ringed	Mates	Distance of territory from food (yards) [1]	Breeding on territory
A	17th Nov. 1947	*a*1, Jan. to 8th Feb. 1949 *a*2, Feb. 1949 onwards	80	Yes, 50 yards from food
B	5th Feb. 1949	*b*1 up to Mar. 1949 *b*2 (previously mated to *D*), Mar. 1949 onwards	150	Yes
C	8th Feb. 1949	Not seen	Not known	Not known
D	14th Feb. 1949	*b*2 up to Mar. 1949 (later mated to *B*)	220	No
E	16th Nov. 1947	*e*	190	Not known
F	24th Jan. 1948	Unmarked	310	Yes
G	14th Jan. 1949	Unmarked	600	Probably
H [2]	3rd Apr. 1949	Unmarked	310	Yes

[1] This is the average of all occasions on which the birds were seen away from the feeding place.

[2] Status unknown.

TABLE 2

Subdominant		Dominant: Males								Dominant: Females				
		A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*a*1	*a*2	*b*1	*b*2	*e*
Males	*A*		8	...	...	...	...	...	...	10	16	1	...	1
	B	20		...	...	...	...	...	...	...	...	14	2	...
	C	19	24		7	1	...	...	...	...	...	...	...	...
	D	14	4	1		2	...	...	...	...	...	...	2	...
	E	7	1	4	...		...	...	...	...	...	...	...	1
	F	22	17	10	3	...		...	...	...	...	...	...	...
	G	21	26	6	8	9	4		...	...	...	...	1	...
	H	2	...	...	...	...	...	...		...	...	...	...	...
Females	*a*1	...	3	...	...	...	...	5	...		...	...	...	...
	*a*2	12	9	3	6	6	7	4	...	...		1	...	...
	*b*1	18	31	5	...	...	2	7	...	1	2		...	...
	*b*2	5	5	5	6	5	1	3	...	...	10	1		...
	e	7	1	6	4	5	...	1	...	...	6	4	4	

Table 2 gives the results of all contacts observed between any two of the great tits. The vertical columns give the number of occasions on which each bird dominated others, and the horizontal columns give the number of occasions on which a bird was dominated by others. Since the birds are arranged in order of dominance, males first and then females, any contacts shown above the diagonal line represent deviations from normal relationship.

The table can be divided into three parts, as follows :—

1. Contacts of males with males (top left-hand corner).

There are two deviations here :—

(*a*) The relationship between *A* and *B* was uncertain ;

(*b*) There was a triangular relationship between *C*, *D*, and *E*, *C* being dominant to *E*, *E* to *D* and *D* to *C*.

Both these cases can be attributed to territorial considerations and will be discussed later. *H* became a regular visitor to the food too late for his position in the group to be established.

2. Contacts of females with females, bottom right-hand corner.

The figures are small here for two reasons :—

(*a*) The females very rarely visited the food unaccompanied by their mates.

(*b*) Fewer females than males used the feeding place.

F and *G*, the two most distant males, though seen with unmarked females in their territories, always came to the food alone. Possibly females do not travel as far as males.

The contacts which were observed indicated that a female dominance system existed. The exception to the normal female order, when *b*1 dominated *a*2, occurred while *a*2 was new to the feeding place and to her mate and therefore possibly uncertain of her position. *b*1 dominated *b*2 while the latter was mated to *D*, but all reactions between *b*2 and *e* were seen after *b*2 had become mated to *B*.

The female dominance order was distinct from that of the males, but complementary in that the members of a pair occupied corresponding positions, the one in the male the other in the female order. Whether the social position of a female among females is due to locality or male status cannot be determined in the case of mated females as the two factors are inextricably confounded. The behaviour of unmated females, if such could be found, might throw light on this. In the jackdaw *Corvus monedula* the female takes the social position of her mate and will threaten not only subordinate females but also subordinate males (Lorenz, 1935).

3. Contacts of males with females, bottom left and top right-hand corners.

Males nearly always dominated females. When a female did dominate a male it was her mate on all but three occasions, and of these three, two, *b*1 and *e* dominating *A*, happened while *A* was trying to acquire a new mate. Dominance of a female over a male was only shown by the male waiting while the female fed and never by the female chasing the male off.

Territory

The map shows the situation of the feeding place, the woods and hedges nearby, and the places in which the various males were seen when not at the feeding-place; *A* and *B* were seen so often that not all the records are given in their cases. It was not possible to define the boundaries of a territory, in fact these probably did not exist as fixed lines, but each bird had a certain area in which it was usually to be found and in which it sang and later (in four cases) nested. The connection between position in the dominance order and distance from territory is clear, in fact each male could be said to possess a field of influence diminishing outwards from a locus in which he was most frequently present. The discrepancies in Table 2 already mentioned can be clarified on this basis.

At the beginning of the observations *A* consistently dominated his nearest neighbour *B*; but when *A* lost his mate, *B* began to challenge his supremacy, and boundary displays, as described later, occurred whenever the two birds met. At first *B* seemed to get the better of these disputes, but later neither bird could be said to be dominant, and further contacts have not been noted in Table 1. At this time, while the food apparently occupied a position intermediate between the territories of *A* and *B*, an attempt was made to confirm the connection between dominance and territory by moving the food, a few yards at a time, first along the hedge towards *B*'s territory and then towards *A*'s. Up to 40 yards in each direction from the feeding place the same boundary displays were observed; but at greater distances the male, towards whose territory the food was being moved, chased off the other male and his mate without any posturing, and was completely dominant in each case. The transition zone between these two territories at that time was therefore about 80 yards wide.

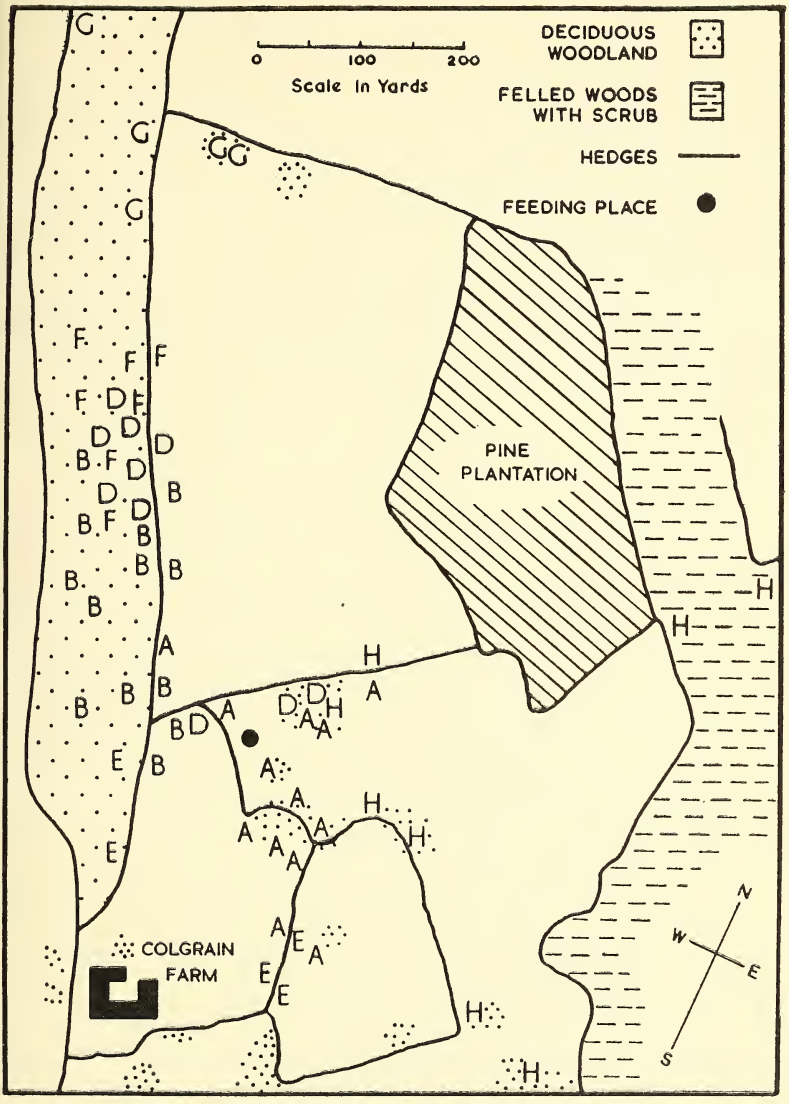

FIG. 1.—Map of woods and hedges around the feeding place and positions in which the male great tits were seen.

The triangular system existing between *C*, *D*, and *E* was probably due to the fact that their territories, though not contiguous, were equidistant from the feeding place. This was certainly the case with *D* and *E*. Unfortunately *C* was never seen away from the feeding place, but quite possibly had his territory near the farm (about 240 yards distant) where it was not possible to watch closely.

The dominance order was not firmly established between any of these three males, and posturing, as described in the next section, always preceded a definite reaction.

Conclusive proof of the connection between territory and dominance would perhaps have been afforded if permanent feeding places had been established at other places, for example, in the territory of *G*.

Display

Two types of display were used frequently by the great tits :—

1. The body was held horizontally with wings and tail spread and feathers slightly fluffed out.

2. The body was held almost vertical with the bill pointing straight upwards, thus showing off the black line down the chest. The wings were held close to the body, the tail at most only slightly spread and the feathers sleek and smooth.

The horizontal posture was seen frequently at the feeding place in the following circumstances :—

(*a*) when a great tit threatened birds of other species feeding with it, chiefly blue tits *P. caeruleus*, but also robins *Erithacus rubecula* and hedge-sparrows *Prunella modularis* ;

(*b*) when a dominant male threatened a subordinate male that happened to be recalcitrant, though status was normally well established ;

(*c*) when a female threatened another female, usually in the absence of males ;

(*d*) when a male threatened a female other than his mate. (The vertical posture would be used here too.)

The horizontal posture was not seen away from the feeding place. The vertical posture (described subsequently as " pointing ") was used at the feeding place in the following circumstances :—

(*a*) by males (and their mates if these were there) between which the peck order was not established, as on the boundary between territories (*A* and *B*) and at equal distances from territories (*D* and *E*);

(*b*) between mates, particularly in the early stages of mating;

(*c*) by females, at males other than their mates;

(*d*) by a male at a female (other than its mate)—also horizontal posture used (see (*d*) above);

(*e*) bird *A* was particularly addicted to this posture, whether because it is the usual behaviour of a male in his own territory or because of an individual idiosyncrasy is not known. He was the only male that was seen to " point " at blue tits and always " pointed " at female great tits other than his own mate.

Away from the feeding place the vertical posture was seen on a number of occasions :—

1. A female was once seen " pointing " at *G* in his territory when she tried to share some food with him.

2. A number of boundary displays were seen, as follows :—

(*a*) one between *G*, his unmarked mate and an unmarked pair 700 yards from the feeding place and probably on *G*'s western boundary;

(*b*) three times between *B* and *F* and their mates at different places from 200 to 400 yards from the feeding place in the part of the wood occupied for a time by *D*;

(*c*) twice between *A* and *H* at two places on the northern edge of *A*'s territory.

During these boundary displays the birds hopped about from branch to branch, the males uttering characteristic calls—most often a rather long-drawn-out repetition of the low note of the " see-saw " song and sometimes a half-speed version

of that song. The normal song was also used, but less frequently. The females chiefly used the scolding note, but *b*2 on one occasion gave the normal cock's song.

The usual procedure was for one male to fly up to the other, " pointing " as it landed, when the other male " pointed " in reply and both birds retreated a bit. Often one male would fly at the opposing female, to be threatened himself by her mate. Sometimes they would flutter in the air, still holding the vertical posture as far as possible. Usually it was impossible to say which pair " won," but sometimes there would be a definite retreat on one side.

Displays of this type took place several times a day between pairs *A* and *B* at the feeding place, but the males were only twice seen actually fighting, both times during the incubation period. The females usually took part in these disputes, even if they were incubating at the time. One that was watched between pairs *B* and *F* from start to finish lasted for fifteen minutes. It seems probable that if the birds nested at closer quarters and had smaller territories, these disputes might be so frequent as to interfere seriously with nesting. As it was, in this wood at any rate, the great tits were well spaced out in the breeding season, leaving suitable holes available for blue tits in between.

If the attempt is made to generalise about the conditions eliciting the two types of display, it would seem that the horizontal posture is solely a threat attitude which can be used by one great tit towards another when there is no danger of retaliation, since the threatened bird always departs at once. As a threat, too, this display has interspecific significance since it has been seen used to threaten other small passerines with which great tits came into contact when feeding on scraps off the ground. In this case, however, the threat was often observed to be mutual, and a great tit would posture either in attack against robins, hedge-sparrows and other tits, or else in retaliation against the threats of a robin or male hedge-sparrow.

The vertical posture, on the other hand, appears to be almost entirely of intraspecific significance, though blue tits have been seen to " point " occasionally in a mild way, and on one occasion a great tit, *A*, " pointed " at a blue tit which

responded in a similar manner. Between great tits this display appears to be used in several different circumstances, a common occurrence among birds; for, to quote from Armstrong (1947), "Sex recognition, individual recognition, sex stimulation, intimidation and dominance, territorial advertisement and defence—several of these functions may be served by a particular display."

This vertical display is well designed, as is usual among birds, to show off the most striking character of the great tit's plumage, the black line down the centre of the chest; and the greater width and length of this line in the male than in the female, together with the brighter plumage, may reasonably be presumed to be associated with the male's more frequent use of this posture.

It was thought at first that the dominant males at the feeding place had wider and more conspicuous black lines down their chests than the subdominants, but when the birds were held in the hand no difference was apparent and it was very hard to define the edge of the line to measure it. Probably the cause of the difference lay in the way the feathers were held, dominant birds looking very sleek and smooth, while the subdominants were rather fluffed out. As an example of this difference, *F* always looked a rather poor specimen with a narrow patchy black stripe when seen beside *B* at the feeding place, but when they were seen together in a boundary dispute near *F*'s territory there was no apparent difference between the two. Their confidence was reflected in their courage and appearance—spruce, strikingly well-groomed birds on their accustomed ground, but much duller and less tidy when away.

Pair Formation

Although pair formation was not the object of study it was of importance in determining the dominance relations between the great tits, and some notes on the subject are therefore included. It was easy to decide when a pair of birds were mated, since they were nearly always seen about together and would feed side by side on the bone with hardly any posturing, or the male would wait quietly nearby while the female was feeding.

The history of the resident male, *A*, is known from the winter of 1947-48, when he was ringed. He and his marked mate nested in an oak tree, 100 yards from the feeding place, in 1948, and were seen about together all the rest of the summer and autumn. Some time during December 1948 the female disappeared, but *A* was soon mated again. This mate, *a*1, was killed on 8th February 1949 by flying against a window, so, knowing that *A* was without a mate, a close watch was kept on his activities. He sang very frequently, and at least three unmarked females visited the food, an unusual occurrence. Contacts between *A* and one or other of these females were seen several times. *A* would fly up to a female, " pointing " as he landed near her, when the female would " point " in reply and fly off followed by *A*. This behaviour was repeated over and over again, chiefly with one of the females which gradually began to stand her ground when *A* approached, until after a day or two both birds were feeding side by side though still " pointing " as they fed. Gradually posturing died down and the pair could be called " established " after about a week. The type of behaviour described here was shown by *A* to all females at the feeding place, but when he was mated matters never proceeded beyond the initial stages, since his mate would always fly up and chase the other female off—a method of maintaining fidelity not unknown in other animals!

When on or near their own territory the members of a pair were nearly always seen together, and a number of advantages would appear to arise from this behaviour :—

1. It may aid in maintaining the pair, in view of the large size and rather ill-defined boundaries of the territory. The song of the male may also assist in this, since several times, when a male singing alone was watched, he was joined very soon by his mate ; and once when a female, sitting preening herself, was being watched a male began to sing about 50 yards away and she immediately flew towards the sound.

2. It may assist in defending the territory against other great tits, since it seemed on several occasions that an unmated male was at a disadvantage in competition with a mated pair.

Three examples may be given :—

(*a*) When *A* lost his mate in February, *B*, who had previously always behaved as a subdominant, began to " point " at *A* and even to chase him.

(*b*) When *D* lost his mate to *B* in March he never acquired a new one, though for a few weeks he was seen in his territory singing loudly; then he disappeared and *B* and *F* extended their territories into his for the nesting season.

(*c*) On one occasion when *A* and *a*2 were still in the courting stage the pair chased *B* off the bone where he was feeding alone after a short bout of " pointing." *B* returned, however, almost at once accompanied by *b*1, and after more posturing *a*2, still probably uncertain of her position, flew off and *A* very soon retreated also. In later disputes, when *a*2 was well established, she stood her ground, and it was impossible to say which pair was dominant.

3. It may be an advantage to the female in encounters with other males. For example, *a* was always chased off the bone if she was feeding alone, but when, as was usually the case, *A* was in the neighbourhood she was not interfered with.

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A LIST OF THE *TIPULINAE* (DIPTERA NEMATOCERA) OF THE SOLWAY AREA, WITH SOME NOTES ON THE HABITATS OF THE ADULTS.

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In this paper we deal in a preliminary way with the *Tipulinae* found in the Solway area and more particularly in the county of Dumfries and the Stewartry of Kirkcudbright, though records from other counties in Southern Scotland have been included.

During the seasons of 1943 and 1944 we both worked fairly intensively on the *Tipulidae* of this area and hope to deal with the so-called short-palped craneflies and other related families in future papers. Since 1944 one of us (A. B. D.) has continued to work in this area and the list is therefore the outcome of over five years' work, some of it of a fairly desultory character.

Coe, in Kloet and Hincks' *A Check List of British Insects*, 1945, whose nomenclature we have followed, lists seven genera of *Tipulinae*, and the species contained in these genera and found in Britain and in our area are:—

Genus.	British Species.	Solway Species.
Tipula	56	34
Nephrotoma . . .	15	5
Prionocera . . .	3	1
Dolichopeza . . .	1	1
Dictinidia . . .	1	0
Tanyptera . . .	2	0
Ctenophora . . .	3	0

Although further search will doubtless reveal other species in the area—it is a large one and there is no need to stress the difficulties of travel over the last few years—we are confident that the list gives a substantially whole view of the

status of the larger daddy-long-legs in our area; and the fact that three of the species here listed are new to Scotland emphasises once more the vast amount of preliminary work yet to be done before we have an adequate knowledge of even such conspicuous and attractive insects as those composing this group.

Tipula fulvipennis Degeer. 72, 73, 74, 75, 76, 100 (Bute).[1]

A widespread and very common species with a very long season (records extend unbroken from 3rd June to 5th September); found in most types of habitat and particularly common in woods, where the combination of its peculiar wing-pattern and rapid jerky flight make it very difficult to follow on the wing, particularly the male. Its predilection for shady places may be correlated with these characters to give it a selective advantage, but it is also found in more open habitats such as bracken-covered hillsides. The above status and length of season are in agreement with what is recorded for the Glasgow district by Henderson (1901).

Tipula maxima Poda. 72, 73.

This fine insect is locally common from late May to early July; it seems most at home in marshy ground in woods or open pasture, though it was common in a very dry glen at Newlands (72) on 20th May 1944. A female was observed ovipositing on 29th May 1943; she hovered over wet ground in a shady wood thrusting her abdomen into the soil at intervals. While working its haunts one sometimes puts up three or four males at once, and search at the spot whence they rise is likely to reveal a female.

Tipula vittata Meigen. 72, 73.

This handsome species has a short and very early season; Audcent states that it is found in damp woods in April, but in the Dumfries district it appeared first on 26th April and was found as late as 20th May, none being seen after this date, although favourable localities were worked during the

[1] The numbers 72, 73, 74, 75, 76, 79, 80, 100 refer to the vice-counties Dumfries, Kirkcudbright, Wigtown, Ayr, Renfrew, Selkirk, Roxburgh, Clyde Isles, respectively.

following ten days. While it affects damp places it is by no means confined to woods, and was found in plenty beside an exposed ditch where the current was sluggish and the banks grassy, and beside lochs, one of which was again unshaded. A female was seen ovipositing in damp moss on rocks beside a rapid river, in a damp shady wood on 20th May 1944.

Tipula variicornis Schummel. 72.

This distinctive insect was found in late May and June in Dumfriesshire, where it was local, though quite common at Tynron in damp woods and shady places beside burns. The mated pairs have a predilection for sitting on bracken fronds. Henderson (1901) records this insect from the Glasgow area under the name of *Pachyrrhina lunulicornis* Meigen.

Tipula rubripes Schummel. 72.

This apparently rare species turned up only at Tynron; here it is not uncommon in woods, usually but not always damp ones, in June. Several, including two pairs *in cop.*, were taken on walls of outbuildings at Lannhall. A female ovipositing on 3rd June 1944 repeatedly thrust her abdomen down vertically through dry leaves on dry ground in an oak wood.

Tipula scripta Meigen. 72, 73.

This is perhaps the commonest woodland species in summer and has a long season; our records extend from 12th May (a female gravid with eggs) to 12th August. Henderson (1901) records it for September, which is interesting, as Audcent also states that it is an autumn species.

Tipula variipennis Meigen. 72, 73.

Very common in late May and early June, chiefly in damp woods and shady places by water, but also on open hillsides and rough, damp fields. One was taken on the very summit of Lamachan in the Glen Trool area at a height of 2,349 feet. Cuthbertson (1926) states that the larvæ live on mosses growing on rocks and stone dykes, usually near water. The locality in which we found the adult most abundant in this area was

a stream-side with a certain amount of shade and coarse grass near Dumfries; here several mated pairs were observed on 23rd May 1944, but there were no rocks nor stone dykes nearby. A similar area at the Cluden Water on 29th May 1944 also held a strong population. A pair were found mating here under extraordinary circumstances, the male being alive, and the female dead and in process of being eaten by a Cordylurid fly; it may have been victimised while *in cop.*

A point of interest in this species is the variation in the colour of the basal antennal segments. Typically the first is grey and the second yellowish (according to Audcent), the flagellum being dark grey; the form with the antennæ all black has been called *Tipula nigricornis* MacQ., distinguished by some authors as a separate species; the difference between the type and *nigricornis*, therefore, depends mainly upon the colour of the second antennal segment. Sufficient material has been examined for us to be able to state that in the area under review both forms occur, with a probably continuous range of variation in between. Details of some specimens are:—

17th May 1944.—Tynron, 2 males with second antennal segment almost black.

22nd May 1944.—Cluden Water (73), 1 female with second antennal segment black.

23rd May 1944.—Barony (72), 8 males and 2 females all, save 1, with all-black antennæ.

3rd June 1944.—Tynron, 1 male with second antennal segment yellow.

13th June 1944.—Langholm (72), common, specimens tended towards the type, but the second antennal segment was by no means clear yellow; in one pair *in cop.* both had this segment more or less black, but in the male it was definitely darker than in the female.

17th-18th June 1944.—Glen Trool district, common, all with second antennal segment black.

It is clear, therefore, that there is a more or less continuous variation in this character, and that in this district the type

is rare and the bias of variation is towards the *nigricornis* end of the range. There does not appear any good reason for using the name *nigricornis* for a mere colour variety, particularly as the variation affects a part of the anatomy where the colour is very variable in the *Tipulidae*.

Regarding other variation in this species, one male was found where the discal cell was open on one wing, which must be rare in this genus; also one female in which the vein R2 reached the costa on one wing only, and another in which it reached the costa in both wings.

Tipula hortulana Meigen. 72, 73.

Fairly common in shady places in May and early June. Variation was found in the extent of R2 in the wing. Audcent states that it does not reach the costa in this species, but in females there is a tendency for it to do so, and in one example it attained it completely. Reliance should not, therefore, be put on this character except possibly in the male.

Tipula rufina Meigen. 72, 73, 75.

This common species occurs freely on walls of buildings and woods in spring and autumn; it was particularly partial to the black-painted corrugated iron roofs of ammunition shelters. The spring and autumn broods were more completely and definitely separated than those of any other species of the genus; in 1944 it was found from mid-April till 15th May, and there was then a complete hiatus until 28th July.

Tipula unca Wiedmann. 72, 73.

A very common species in shady places by rivers and burns, and also on open marshy ground from late May to late July.

Tipula macrocera Zetterstedt. 72.

Found sparingly in meadows of upland valleys in April.

Tipula cheethami Edwards. 73.

A single example only has been taken, by the Cluden Water near Dumfries. It is surprising that this typically

mountain species has not yet been taken here at high altitudes, and that the only one so far taken was from a lowland locality.

Tipula marmorata Meigen. 72, 73, 74, 79.

Common in late August and September, chiefly on open hillsides and dry heaths. This is one of the species that has a predilection for sitting on houses and buildings.

Tipula alpium Bergroth. 72, 73.

In the Glen Trool area it was locally common at altitudes from 1,000 to 2,000 feet in June, in which month a single male was taken on a window at Lannhall, Tynron.

Tipula staegeri Nielsen. 72.

Found at Tynron in late September and October, to a large extent in the immediate vicinity of conifers, but also in deciduous woods.

Tipula signata Staeger. 72.

Found quite commonly in late September and October, but so far always in association with either Norway or Sitka spruce from the branches of which trees they are easily disturbed by beating.

Tipula pabulina Meigen. 72, 73.

Found, not very commonly, in woods in June; although it has been got in both dry and damp deciduous woods, it seems to be most common in dry oak woods on hillsides.

Tipula oleracea Linnaeus. 72, 73, 74, 75, 76, 80.

Widespread and fairly common but never abundant. Audcent (1932) states that it is double-brooded (May to June and September to October). This may be partly true, but in the Solway area it was found more or less continuously from early May to early September (records in 1944 were: May 11, 12, 13, 17, 24, 27; June 7, 13, 17, 24, 27; July 6, 8, 13, 17, 20, 24, 26, 31; August 10, 12, 21, 27; September 3). It was probably most numerous in the latter half of May and in June, being largely replaced by *T. paludosa* in early July; it was generally found in open pasture, especially in damp

places, and in smaller numbers in woodland. It is one of the few species taken on salt marshes, and here the individuals tend to be smaller.

Tipula czizeki de Jong. 72.

On 9th October 1949 this species was found in a boggy field at Tynron. This insect is very distinctive in the field having the cobby and rather coarse appearance of *paludosa* rather than the finely made build of *oleracea*: so distinct indeed is its appearance that the first one seen was recognised at a distance of several yards although never seen previously save in the cabinet. The small colony provided examples until 16th October but by 23rd October no more were to be seen. This appears to be the first published record of the species in Scotland although E.S.B. has taken the species in the Pentlands previously.

Tipula paludosa Meigen. 72, 73.

Probably the most abundant cranefly of pastures, especially damp permanent ones, throughout the area. It is a late summer and early autumn species, being most abundant in July and August. In 1944, when practically continuous records of craneflies were maintained throughout the season, it was first found on 29th May, a single female. No further examples were seen till 21st June, and it began to be really common in the first few days of July. It appears that both *T. paludosa* and *T. oleracea* have rather long seasons, the emphasis in the former species being in the later and of the latter in the early part. A female was seen ovipositing in a gravel path over which it hovered and plunged its ovipositor rhythmically into the hard surface. In the Glen Trool district the species was found up to at least 1,000 feet and possibly higher.

A number of females were found on 2nd August 1944 by the Cluden Water near Dumfries, their legs clasped round grass stems or other vegetation and their abdomina swollen and whitish, as though infested with an internal fungus. Similar observations have been made repeatedly since, usually in wettish weather, and this disease can no doubt account for a large number of casualties in a dense population such as frequently obtains in *paludosa*.

Tipula vernalis Meigen. 72, 73.

Found commonly in May and early June on dry pastures and by roadsides. It is one of the few species which is apparently quite independent of dampness in its habitat, and was the only one of the genus found on temporary leys.

Tipula subnodicornis Zetterstedt. 72, 73, 74.

Very plentiful locally in boggy heath and marshy areas in pasture, especially the former. Audcent states that it is plentiful only in bogs where *Eriophorum* grows, and this is found to be generally true, though whether the correlation is a direct one is doubtful. It has an early season and was found most commonly from mid-April until the end of May, odd specimens being found up to 18th June 1944. There is some evidence that it reaches its peak earlier at low altitudes than on mountain heaths, where it was abundant at the end of May.

Tipula solstitialis Westhoff. 72, 73.

This insect does not appear to have been found in Scotland before. It was abundant at the marshy and rather muddy margin of a small loch near Dumfries—Callochan Loch—on 14th May 1944, the males far outnumbering the females at that date. Single males were subsequently found at the Murder Loch near Parkgate (72) on 18th June 1944, and at a large peaty loch on the Lochar Moss on 24th July 1944. It is not unlikely that it has been overlooked in the past as *T. lateralis* or *T. montium*, but the ochreous colour of the pale abdominal markings is distinctive.

Tipula couckei Tonnoir. 72, 73, 80.

Very local; fairly common at the margin of the Cluden Water near Dumfries, in late May and early June in company with *T. montium*. Other localities for *couckei* were among the hills at Langholm and Faldonside Loch (80). Cuthbertson (1926) mentions the larva of a *Tipula* sp. (*lateralis* group) which is " strictly aquatic, living in sand and gravel in rivers and swift-flowing streams." Since he places the larva of *montium* also in this category, and since *couckei* and *montium* were found together by the Cluden Water, which is exactly

such a habitat, it is suggested that Cuthertson's larva is probably *couckei*.

Tipula lateralis Meigen. 72, 73, 75, 76, 100 (Bute).

A common and widespread species in damp and marshy places with coarse grass and other rough vegetation in exposed situations. A favourite habitat is the boggy ground caused by the spreading of a burn in pasture. Found in unbroken season from early May till late September. Ovipositing was observed—a female hovering over a burn's edge and periodically stabbing the mud with the tip of her abdomen.

Tipula montium Egger. 72, 73.

A very common insect in marshy tracts by burns and rivers (it was particularly common by the Cluden Water near Dumfries). It has a fairly long season, records extending from 17th May to 1st September. It occurs with *T. lateralis*, but by the Cluden at least its season was earlier; females are not always easy to distinguish from that species, though they can usually be separated by the milky white stripe behind the Cu in *lateralis*, which is absent in *montium*, but this character is variable. Females of *montium* sometimes attain a very large size, and large females can fairly safely be assigned to this species. Ovipositing was observed on 10th August 1943, the insect thrusting her ovipositor rhythmically into muddy ground in open pasture.

Tipula pruinosa Wiedemann. 72.

Apparently local, being taken only at Tynron, where, however, it is not at all scarce in marshy ground in open pasture, and beside the Shinnel in late June and early July.

Tipula luteipennis Meigen. 72.

A late autumn species and apparently local, having only been noted at the margin of a thickly vegetated pond near Penpont in late August, and in a *Juncus* bog at Tynron, where it swarms in September and October in numbers reminiscent of *T. subnodicornis* or *T. paludosa*. The brachypterous females are somewhat inconspicuous except during sunny periods, when they climb to the tops of rush stems.

Tipula pagana Meigen. 72, 73.

Very common locally in autumn; our earliest record is for 31st August and its main season is September. It was particularly abundant in wettish patches on a dry hillside at Tynron in early September 1944. The males appear to be much more abundant than the females, but this may be due to the brachypterous and flightless condition of the female. At Tynron on 10th September 1944 a male was seen flying rapidly in a direct line towards a bracken frond, and on arrival immediately commenced copulation with a female that was at rest there. If he was guided by scent, and it is hard to conceive of any other explanation, the accuracy of his aim and the speed with which consummation of his object was achieved were remarkable. In both 1943 and 1944 many pairs were found *in cop.* on the front walls of Lannhall. As the females are unable to fly they must have walked at least 20 yards across gravel, unless they flew *in cop.*, and repeated attempts to make copulating pairs fly in the daytime were unsuccessful.

Tipula flaveolineata Meigen. 72.

Apparently rare and local, having been found only twice in late June at Tynron in 1944 and 1949. On both occasions a single female only was taken in a damp wood beside the Shinnel.

Tipula luna Westhoff. 72, 73.

Locally common, usually in marshy ground in open pasture, with coarse grasses, *Juncus*, etc., and by lowland lochs and streams. It appears to have a rather short season from late May to late June; though Barnes (1926) records it for early July in Carnarvonshire, Henderson (1901) gives May to July, and Audcent (1932) "whole summer." Regarding the size of this species, Audcent (*loc. cit.*) gives the length as 19 to 21 mm., which is longer than any found in the Solway area, where they range from males 12 to 16 mm. and females 13 to 21 mm.

Tipula fascipennis Meigen. 72, 73.

Common in woods and shady places from late June to early August. At Irongray Church it had replaced the related

T. lunata, which has an earlier season, on 30th June 1944, but by 2nd August only a single example could be found, and it was not noted after 6th August.

Tipula cava Riedel. 72.

Found in two localities only: a rocky hillside with heather, etc., at Tynron and a small area of birch heath on the Lochar Moss from 8th to 24th July, one male being recently emerged on that date. These localities are not in accordance with Audcent's statement that it occurs in woodland, nor presumably with Barnes' record from the summit of Mynydd Doulyn in Carnarvon.

Tipula lunata Linnaeus. 72, 73.

An early fly with a short season in late May and early June, found in shady places by the Cluden Water near Dumfries, Tynron, and Keir Mill near Thornhill.

Nephrotoma dorsalis (Fabricius). 72, 73.

This well-defined species was taken sparingly among nettles and coarse vegetation in shady places beside the Cluden Water near Dumfries; it was found in two small areas only, about half a mile apart on both sides of the river. This appears to be the first Scottish record for this species. Audcent says, "rare; Yorks, Carnarvon, Devon." The only examples taken were: 28th May 1944, two males; 30th May 1944, three males and one female (including one pair *in cop.*). These were on the Dumfriesshire side of the river in a place where no more were found although search was made; the species turned up, however, about half a mile away on the Kirkcudbrightshire side of the river, where two females were found on 30th June 1944 and one male on 7th July 1944.

Nephrotoma flavipalpis (Meigen). 72, 73.

An apparently rare species; a female was taken in an oak wood at Drumpark near Dumfries (73) and another female at Tynron on 29th July 1944. These records are insufficient to state an opinion about habitat preferences.

Nephrotoma scurra (Meigen). 72.

Audcent describes it as occurring "on sandy commons," and true to this statement it was found in Corncockle Quarry,

a large bare sandstone quarry in Dumfriesshire, on 18th July 1944, when four males were taken. On 2nd August 1944, however, a male and female were captured in a very different locality—a shady place on the Dumfriesshire bank of the Cluden Water at Irongray Church near Dumfries. These were the only two places where it was found. This species on the wing has very much the appearance of a *Tipula* rather than a *Nephrotoma*.

Nephrotoma flavescens (Linnaeus). 72, 73, 80.

A very common fly in the area; often found on dry, bracken-covered slopes in, or at the margins of woods, and on cultivated ground and rotational grass. Records extend from 9th June to 31st July; mating was observed on 26th June 1944, and a female taken on 24th July 1943 laid a number of black eggs in captivity.

Nephrotoma quadrifaria (Meigen). 72, 73.

Probably the commonest and most widely distributed species of the genus in the area. It was found from early June until late July in shady places, particularly among nettles and tall growing vegetation in woods. In 1944 it showed a marked tendency to enter houses after mid-July, but this may have been due to the extremely wet weather. A female taken on 7th July 1943 laid a number of black eggs in captivity.

One or two examples were taken in which the down-turned anterior end of the lateral stripes of the præscutum were evanescent to a greater or lesser degree; in extreme cases this leaves only the straight part of these stripes, and the insect runs to *N. lunulicornis* Schummel in Audcent's key. This caused some confusion at first, but in the male the error can be rectified by examination of the genitalia; teneral examples are most likely to show variation in this manner.

Prionocera turcica (Fabricius). 72, 73.

Rather local, but often numerous where it occurs, this insect was found in every instance at the boggy margin of lochs or large bog pools, bearing out Cuthbertson's observations of larval habitats (1926). It is recorded by Henderson as rare in the Glasgow area under the name *Tipula diana* Meig. Our records extend from 14th May to 16th August, when a

teneral example was noted; a female taken on 16th August 1943 laid a number of black eggs in captivity. The second antennal segment was sometimes dark as in the male of *P. pubescens* Loew, but the rostrum was always reddish at the sides, so our careful watch for *pubescens* is still unrewarded.

Dolichopeza albipes (Stroem, H.). 72, 73.

Encountered often in May and early June, never in numbers but in a variety of habitats always close to water. The favourite was a shady place close to swift-running streams, but we also noted it beside exposed hill burns, in a marsh in open pasture and beside a pond. Cuthbertson (1926) says that the larva lives in wet moss, moist soil, and patches of liverwort, while Audcent (1932) states that it is found under moss on tree trunks; all the localities where we found it had one or other of these habitats at hand. Both sexes have often been seen flying erratically over the swift waters of the Shinnel, and the female repeatedly dipping her abdomen into the water while in flight as if ovipositing into the water.

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WOODLAND INTO PASTURE

URSULA K. DUNCAN, F.L.S.
Arbroath

DURING the spring and summer of 1949 some observations were made on the effect of heavy grazing by cattle in a wood near Arbroath in Angus. This wood, measuring 6·84 acres, rises in a gradual slope facing north-north-west from 140 to 205 feet above sea level. Its original growth of pine and larch was felled during the war (winter, 1944-1945) but the hard wood was spared. Since the date of felling, the former ground vegetation of heather, *Goodyera repens*, *Pyrola minor*, woodland grasses and moss, gradually gave way to a much more varied flora in which the original species were much reduced and even (as in the case of *Goodyera*) threatened with extinction, the main increase consisting in perennial grasses, self-sown birch seedlings, and rose-bay willowherb (the latter non-existent previous to the felling).

On 28th February 1949 a portion of the wood covering approximately 6 acres was fenced in, and 16 heavy Irish bullocks were introduced. On 9th March an additional 4 were put in, and on the following day the number was increased to 43. These remained in the wood until 24th March, when they were replaced by 4 heifers. On 1st April all the cattle were withdrawn for the rest of the season.

After the introduction of the bullocks, periodical visits were made to the wood for the purpose of observing the effect of the short period of heavy grazing on the natural vegetation, and the following notes were made.

15th March 1949. Temperature 39° at 11 A.M. All young shoots of birch, beech, rowan, willow, and broom nibbled off below a height of 5 feet, the tougher branches remaining untouched. Only bushes neglected by the cattle are blackberry and gorse (the latter now covered with flower-buds). Last year's tufts of dead grass have been eaten down, also the tops of the dead heather stems and the young fronds, not yet expanded, of the broad shield-fern *Dryopteris dilatata*.

Throughout the whole of the wood the ground has been trampled up, disclosing the thick black peat formed by hundreds of years' accumulation of heather, pine-needles, and moss. The damp portion of the central cart-track which traverses the wood from end to end has been trodden into a slough, also the ground in front of the drinking troughs and in the vicinity of the boundary ditch. The mosses, *Dicranum scoparium*, *Brachythecium purum*, *Plagiothecium undulatum*, and *Hypnum schreberi*, seem to have suffered most, having become detached from the surface. Above the reach of the cattle, male and female catkins are forming on *Salix caprea*.

23rd March. Temperature 50° at 11 A.M. The mild spell has brought on the growth. Gorse now beginning to flower. *Salix caprea* in full bloom, much fancied by the cattle which have stripped off every branch within reach. No further damage to the broom. The heather is considerably reduced by trampling, and is covered by a thin layer of straw which has been dumped in cart-loads for the cattle to eat. There are also the remains of some half-eaten turnips. *Goodyera* and *Pyrola* are much trampled but still survive. The tops of *Juncus communis* by the damp part of the track have been bitten off but not eaten right down—apparently not very appetising. On the other hand the ferns have provided a tasty bite, and every vestige of green has been devoured. The cattle have in some cases edged their roots out from the soil so that they are blowing about loose like balls of brown chaffy scales. Much of the loose brushwood lying about the wood has been broken up into small sticks and is in process of being trodden into the ground.

31st March. Temperature 42° at 11 A.M. Growth checked by cold dry spell. A few plants of *Goodyera* are still surviving, protected by branches or on the bank under the barbed-wire fence. No fresh leaf or blade of grass so far visible.

9th April. A day of rain and sleet has brought on the growth a little, but temperature still too low for much improvement. Gorse not fully out yet. Broom now coming into flower. *Salix caprea* in full bloom and much frequented by bees. Green shoots on blackberry and raspberry. Young plants of *Epilobium angustifolium* now making their appearance amongst the grass. Woodland grasses *Festuca*

and *Agrostis* showing signs of new growth, but there is a marked difference between the scanty green inside the wire fence where grass has been closely cropped, and outside where it is coming on rapidly.

17th April. A few beech seedlings have just appeared in the lower part of the wood. The warm dry spell has brought out the young leaves on some of the birches; even the self-sown trees much eaten by the cattle are budding freely, but have a " clipped " appearance. The two hawthorns are covered with young expanding green leaves; also the female sallows. The male willows are beginning to drop their catkins. Gorse now in full bloom. Grass still very backward, needing rain, and the thin covering of straw shows no sign of decomposing yet. *Epilobium angustifolium* has put on 4 to 6 inches since my last visit.

6th May. Weather cold and dry. Gorse just beginning to go over. Sallow in fruit and full leaf. Birch also in full leaf. Beech and sycamore with foliage half out. Numerous beech seedlings in lower part of the wood under trees where the ground is bare; also a few sycamore and birch seedlings. Fronds of *Dryopteris dilatata* rapidly uncurling but fewer in number than last year. *Viola riviniana* in flower, but also seems scarcer than in previous summers. Heather still brown and showing no signs of life; I look in vain for *Listera cordata* in its old habitat among the roots. Birch trees already recovering from their damage, with new shoots growing out beyond the cropped twigs.

13th May. A few days of warmth have brought on the foliage. All trees in full leaf except beech and oak. Broom, in flower, seems to have suffered little except for a few dead branches, and isolated bushes which were killed by being trampled on. Grass still short, but shows plenty of fresh growth.

22nd May. *Potentilla erecta*, *Luzula campestris*, *Carex pilulifera*, and *Anthoxanthum odoratum* in bloom, all reduced in quantity since last year. Broom in full flower, filling the wood with waves of scent. Beech and sycamore seedlings have acquired their first pair of (true) leaves. All trees in full foliage with the exception of oak. It is noticeable that the leaves on the cropped twigs on the birches are half as

large again as those on the boughs beyond the reach of the cattle. *Dryopteris dilatata* is now seen to have suffered as much as anything; fronds very scarce, sometimes only two from each root, and in some cases there are " stools " of brown roots without a single vestige of green. The grass, on the other hand, has benefited considerably, being much less rank than in previous years. The heather has produced a few green shoots coming up from the roots.

3rd June. All foliage in full luxuriance. Rowan trees in flower; also *Galium saxatile*, *Rumex acetosella*, and *Poa pratensis*. All rough grasses and most of the annual weeds which sprang up in great luxuriance when the wood was felled seem eliminated. Young trees of sycamore, birch, and rowan now show no signs of their cropping unless closely examined; there are scores of them about 3 feet high, very bushy. The lateral shoots of the sycamores, in particular, have already overtopped the truncated main stems.

19th June. The pasture (of which *Festuca tenuifolia*, now in flower, forms a fairly large part) now extends over about half the wood. Other plants in flower are *Rubus idaeus*, *Rumex acetosa*, and *Erica cinerea* (very scarce). Also *Stellaria media*, *Spergula arvensis*, *Cerastium vulgatum*, and *Poa annua*, the only survivors of the original mass of annual weeds. *Pyrola minor* seems to be little the worse for its trampling and is covered with flowering spikes in bud. *Juncus squarrosus* and *Juncus bufonius* are also in flower by the damp portion of the track.

9th July. *Pyrola minor* in good show, just beginning to go over flower. Only two flowering spikes of *Goodyera* detected under the barbed-wire fence and so protected from the cattle. *Epilobium angustifolium* coming into flower, showing a considerable increase since last year. The scanty flowers of *Erica cinerea* form a marked contrast to the vivid splashes of magenta in previous summers. Other plants in flower are *Rubus fruticosus*, *Hieracium murorum*, *Poa trivialis*, and *Holcus lanatus*. A few plants of *Avena sativa*, scattered about the wood, are no doubt relics of the oat straw imported for the cattle; they are unlikely to persist. Gorse now heavy with ripe seed " cracking " in the hot sunshine.

16th July. Growth now at its height. *Goodyera* full out (two flowering spikes only); it is fortunate that it is increasing in a neighbouring wood. *Agrostis tenuis*, *Deschampsia flexuosa*, and *Arrhenatherum elatius* are the last of the grasses to come into flower. A few clumps of *Juncus communis* are also flowering in the damper parts of the wood. *Rubus idaeus* in fruit.

1st August. No further signs of growth. Broom seed partly ripe. Rowan berries growing red.

15th August. A few plants of *Calluna vulgaris* are in flower among last year's dead stems. Green fruit beginning to form on the blackberry bushes. Broom seed and rowan berries now ripe.

A final survey of the wood shows that the grass has improved in quality and quantity since last year, but there is a considerable decrease in *Goodyera*, heather, fern, and moss, and *Listera cordata* has disappeared altogether. The straw is rapidly decomposing and the dung becoming scattered to enrich the soil. The young trees are blemished from a forester's point of view, but otherwise not unsightly. . . . The wood is ready to shelter the cattle again this winter.

ZOOLOGICAL NOTES

Occurrence of the Amphipod *Talorchestia brito* on the Kincardineshire Coast.—During a visit on the 29th August 1949 to the sands at St Cyrus, about five miles north of Montrose, small piles of cast-up sand were noticed scattered about on the banks of dryish sand lying along the region of high water mark from St Cyrus cliffs to the mouth of the North Esk. On investigation these proved to be associated with an amphipod which Dr I. Gordon of the British Museum (Natural History) has named *Talorchestia brito*.

This amphipod was first described by Stebbing in 1891 from the North Devon coast (*Ann. Mag. Nat. Hist.* (6) 8, 324). Since then it has been recorded from scattered points on the Continent from the eastern English Channel to the western Mediterranean. Dr Gordon informs me she collected specimens on the 15th August 1947 near Palling, Norfolk. It was recorded in 1948 near Blyth in Northumberland (D. I. Williamson, *Nature* 162, 295) in a similar situation to those taken at St Cyrus.

The St Cyrus record would appear to be the first from Scotland.—A. C. Stephen, Royal Scottish Museum.

Coenagrion hastulatum in Central Perthshire.—On 18th June 1949 I visited a small marsh a few miles from Pitlochry to look for *Aeshna caerulea* and *Somatochlora arctica*, but I saw neither. On approaching the marsh, however, I saw a small dragonfly over the heather, but I failed to capture it. It looked too small to be *Enallagma cyathigerum*, and the greenish colour of the head and thorax excited my curiosity. On reaching the marsh I was not long in seeing another, and this time I caught it. It was a male *Coenagrion hastulatum*. My nephew was with me, and together we saw nearly forty specimens. Quite one-third were females, but all were no doubt somewhat teneral because we saw none connected *per col.* and it was only the second day of the heat-wave. I captured several of both sexes, but released all except two males and a female.

On 27th June I again visited the marsh and saw, but did not capture, two specimens of *A. caerulea*. *Hastulatum*, however, was there in plenty and connected *per col.* I took four couples, which I handed alive the following day to Miss Cynthia Longfield at Aviemore. I had, some time ago, arranged to show her the marshes in that district where I had previously taken the insect. In past years at Aviemore I had found the female to be exceedingly scarce—about

1 per cent. of the males—but this year the numbers were about even. I witnessed the female ovipositing at the Perthshire station. The male and female remained connected *per col.* and the eggs were deposited in very shallow water on liquid peaty mud. Sometimes the insects were in flight but more frequently resting on a short grass stem so that the tip of the female's abdomen reached the surface of the water. It seemed to me that she was placing the egg on the grass stem just under the water level.—G. G. Blackwood, Pitlochry.

Coenagrion pulchellum in Scotland.—The appearance of Miss Longfield's article (*Scot. Nat.*, 60, 65-73) on Scottish dragonflies prompts me to put on record the capture of a male *Coenagrion pulchellum* in Dumfriesshire on 30th June 1934. It was on the banks of the Cluden Water at Irongray Church, shortly before it runs into the River Nith, and on the Dumfriesshire side of the river. Miss Longfield states that it is rare or possibly extinct (p. 72), but evidently it still survives. It was a lone individual, and there was no evidence of breeding, and I never saw another during two years in the Solway district, although travelling much and keeping a keen look-out for dragonflies.—E. S. Brown, Hertford.

Aeshna caerulea in Kirkcudbrightshire.—On 20th June 1949 I captured an immature male of *Aeshna caerulea* at rest on heather near a small loch situated in an area of desolate peat bogs in the north of Kirkcudbrightshire. A few minutes later I disturbed another male which had been resting on a stone wall. The following day I caught a newly emerged female of the same species on some very extensive " flow ground " a few miles away and in the same county. This indicates that the species breeds in the area, and very probably it has done so for a considerable time.

I understand that in Britain this insect has never previously been recorded south of the Highlands.—D. A. Ratcliffe, Carlisle.

Orange-tip Butterfly in Aberdeenshire.—In response to Mr F. W. Smith's request, in his article on the Macrolepidoptera in the 1948 winter number of *The Scottish Naturalist*, for information regarding the status in Scotland of the orange-tip butterfly *E. cardamines*, I can offer the following isolated record. On 8th May 1946, a fine warm sunny day, I came across a small colony of orange-tips on the road flanking the River Gairn about two and a half miles west of Ballater. Five or six of the butterflies were counted along a thirty-yard stretch of the roadside bank. Regrettably I have no note of the plants from which they were feeding or any other details

of their behaviour. I watched them for some time, and they were still at the same spot when I returned along the road in the late afternoon of the same day.

I may say that although my status as an amateur entomologist can only be given as a rare abnormal vagrant, I am certain of my identification, having become " acquaint " with the orange-tip in England and abroad.—G. F. Raeburn, Ellon.

On 9th May 1948 we took a male specimen of the orange-tip at Leith Hall, Kennethmont, Aberdeenshire (v.-c. 93).—Editors.

The Chequered Skipper *C. palaemon* in West Inverness.—In his paper " On our Knowledge of the Distribution of the Macro-lepidoptera in Scotland " (*Scot. Nat.*, 1948, 60, 192), Mr F. W. Smith refers to this little butterfly having " so long remained undiscovered in the Fort William area." It may therefore be worth while to draw attention to the fact that I took it near Loch Lochy in June 1939, and it is recorded in my paper on " ' Neuroptera ' and some Lepidoptera from Argyll and West Inverness," in the summer number of this magazine for 1949.—C. Ethel Evans, Edinburgh.

Long-eared Bat *Plecotus auritus* in Central Perthshire.—I have up till now been under the impression that the bats inhabiting my attics and outhouses (near Pitlochry) were Daubenton's bat, but a specimen I picked up dead and sent to the Royal Scottish Museum early in June this year turned out to be the long-eared bat.—G. G. Blackwood, Pitlochry.

This species is also present at Strathtay, Central Perthshire, where we have found live specimens.—Editors.

Carrion Crows Attacking in Flight.—On 20th January 1949, at the mouth of the River North Esk, I witnessed an unusual form of attack by a pair of carrion crows *Corvus corone* upon a redshank *Tringa totanus*.

A pair of carrion crows flew in from the sand dunes over the mud flats where some redshanks were feeding. Swooping down towards the redshanks the crows put the waders to flight. One, a little slower than the rest, was headed off by the crows. The redshank alighted on grass and the crows alighted on opposite sides of it at about 5 feet distance. One crow advanced until it was within about 2 feet. The redshank took wing and the other crow gave chase. With extended claws the crow swooped down on the redshank, knocking out a cloud of feathers, but failed to gain purchase. The redshank

alighted, the crows closed in, and the performance was repeated to a further loss of feathers from the redshank's back.

The crows flew away, and the redshank after a few minutes joined its fellows on the mud flats.—Dr A. F. MacBean, Edzell, Angus.

Cases of Albinism in Jackdaw and other Species.—An albino jackdaw *Corvus monedula* was present in the Aberfeldy area from October 1948 to January 1949 and probably later. This bird was completely white except for a tinge of pale grey noticeable on the back when seen at close quarters. Its bill and legs were pale yellow. It was hoped that the presence of this bird in the jackdaw flock might be helpful in attempts to trace the movements of the birds. For what it is worth, I may say that I have not seen the bird, nor heard of it being seen, since spring. This might indicate that it was one of a flock of winter immigrants, though it is equally likely that it has been killed, or has moved to another district for the breeding season. Though there was nothing abnormal in the habits of this jackdaw as an individual, its relationship with the rest of the flock, and more especially with the closely intermingled rooks, was obviously affected. When seen feeding, on the ground, the albino was usually either by itself or on the edge of the main party. In flight it was constantly pursued by rooks, up to six at a time. On one occasion it was flying near the head of the long procession of both species heading out to the fields in the early morning, when three or four rooks flew at it and drove it right back towards the wood from which the flock had come.

Two other partial albinos I have come across recently were in wooded gardens in Edinburgh. One was also a jackdaw, with wing and tail feathers largely white (January 1949). The other was a cock blackbird, seen in June 1949, with the whole plumage white with black blotches.

Besides these records of my own, other cases of albinism in lapwing and starling have been recorded in the press in 1949. From this it seems possible that, whatever the reason, albinism has been more prevalent than usual.—Colin C. I. Murdoch, Aberfeldy.

We saw a white jackdaw, probably the same bird, near Aberfeldy on 3rd March 1949.—Editors.

Mimicry by Jays.—Mimicry of the calls or songs of other species is well known among a number of British species of birds. The starling *Sturnus vulgaris* is, of course, the most obvious example, but the marsh warbler *Acrocephalus palustris*, sedge warbler *A. schoenobaenus*, and robin *Erithacus rubecula* in particular, are other capable mimics. Whether such mimicry has any particular value

may well be doubted. It has been suggested, but not, I think, backed by any worth-while evidence, that the mimetic song of the red-backed shrike *Lanius collurio* may have the effect of attracting individual small passerines whose song is mimicked within the predatory range of the singer.

An experience with a jay *Garrulus glandarius* in June 1948 suggested to me that mimetic calls in that species, even if not purposive, may well have survival value. In the oak woods near Pitlochry I found a brood of fledgling jays which had recently left the nest and were still very much dependent on their parents for the supply of food. As I watched, one of the parents arrived with food. Noticing me, it promptly uttered a series of the harsh raucous alarm cries characteristic of the species. I remained quite still, whereupon the parent jay delivered a perfect rendering of the calls of the carrion crow *Corvus corone*, swiftly followed by an equally flawless rendering of the hoot of the tawny owl *Strix aluco*. For the next five minutes jay calls, carrion crow calls, and tawny owl calls alternated with bewildering rapidity, and had the author of these calls not been within view I should have had no doubt that both of the mimicked species were also present and scolding.

The inference was almost irresistible that the jay, finding itself unable to deter the trespasser by its own alarm calls, adopted the calls of two larger and more powerful species with a view to intimidation. To accept such an inference we must credit the jay with purposive thinking, and that, I think, few of us would be prepared to do. This much may surely be admitted, that a weaker predator than man, even though impervious to " jay " threats, might have been deterred by the apparent presence of two more powerful predators. —G. F. Raeburn, Ellon.

Increase of Goldfinch, Chiffchaff, and Great Spotted Woodpecker in East Renfrewshire.—It seems desirable to place on record the increase of the goldfinch *Carduelis carduelis* in east Renfrewshire. McWilliam (*The Birds of the Firth of Clyde*, 1936, p. 32), gives details of its breeding (after Robertson) at Giffnock in 1905 and 1918. There is now (1949) a thriving colony in the Clarkston-Busby district. I have observed family parties in the breeding season in other localities of east Renfrewshire, and the species certainly seems to be increasing quite rapidly. McWilliam, *loc. cit.*, p. 49, implies that the chiffchaff *Phylloscopus collybita* is rare in east Renfrewshire. This was the correct status of the species in 1935, but it would seem that the chiffchaff has substantially increased as a breeding bird in the past thirteen years or so. In the spring of 1948 I paid particular attention to the species and recorded it from

a great many favourable localities in the valley of the White Cart. These remarks also apply to west Lanarkshire. The great spotted woodpecker *Dendrocopos major*, first recorded as a breeding species in Renfrewshire in 1931 (*vide* McWilliam, *loc. cit.*, p. 69), is now well established as a resident in east Renfrewshire. It nests regularly at Busby and other suitable spots, including Cathcart. It now breeds quite generally in parts of west Lanarkshire.—P. A. Clancey, Glasgow.

North-west Spread of Sedge Warbler *Acrocephalus schoenobaenus*.—In *The Handbook* (1920, Vol. 1, 348) the sedge warbler is described as " very rare (in the) north-west (of Scotland)." In *The Scottish Naturalist* (1949, 61, 120) Mr P. A. Rayfield reported it present, and apparently breeding, at Aultbea in Wester Ross, 16 miles to the south-west of my home. I have lived in Coigach since 1941 and did not hear or see the bird until 11th June 1947. This was an apparently solitary male, singing intermittently amongst dense rushes a quarter-mile from here. I did not see this bird again. On 27th June 1948 I heard and saw one singing in a reed-bed close to my house, and on 1st July I watched it with James Fisher. It was there till 22nd July, but I saw no sign of the feeding of young, and repeated search revealed no nest. It was back again on 1st June 1949, and on 5th June I found the uncompleted nest in a dense tuft of dead rushes at the margin of the reed-bed. On 10th June there were two eggs in the nest. I left for Switzerland, returning 11th July to find the young flown. Since then I have often watched the young birds. I have just learned through Mr Peter Norwell (*vide* Mr George Waterston) that a pair bred this year at Altnacealagh just within the southern border of Sutherland and 16 miles east of this place. This seems to be a case of definite immigration into new territory, and extension of the range northwards.—T. G. Longstaff, Achiltibuie, Wester Ross.

Garden Warblers in Upper Deeside.—As published information on the present status of the garden warbler *Sylvia borin* in north-east Scotland appears to be scanty, the following seems worth recording. On 12th May 1949 I heard a garden warbler singing in a belt of dense, scrubby, woodland beside the Dee at Aboyne. I heard the song many times till I left the district two days later. On my return in mid-June I found that a pair were present in this same copse, the male singing constantly from then (15th June) till the last few days of the month, by which time the volume of its song had diminished to mere snatches, heard only a few times in the day. I heard no song at all on the last day of June nor on the 1st and 2nd

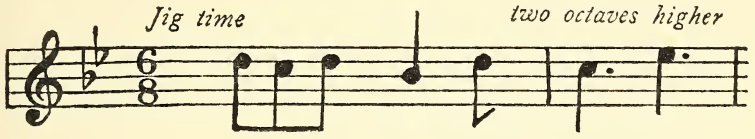
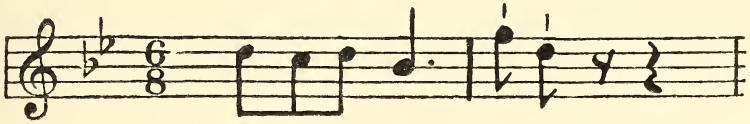
July, when I again left Aberdeenshire. Though no nest was found, I had a good view of the pair on several occasions and had little doubt that they were nesting in this wood. The nature of the wood was similar to several regular haunts of this species on the banks of the Tay in the Aberfeldy area, it being a close-growing natural mixture of sycamore, ash, oak, alder, and other broad-leaved trees, more than half of which were small and growing as rough coppice, with dense undergrowth of whin, wild rose, and luxuriant grass. Here, at the Tay, I also look for this bird's arrival and song about 12th May.—Colin C. I. Murdoch, Aberfeldy.

Blackcaps in West Inverness.—In view of the Editors' appeal for further records of the blackcap *Sylvia atricapilla* in the Highlands, it may be of interest to state that in June 1939 I had the pleasure of listening to this delightful singer on several occasions. Its usual perch was on the under branches of a giant laurel in the woods near Achnacarry, where it sat in the green half-light undisturbed and let me watch it for a quarter of an hour at a time.—C. Ethel Evans, Edinburgh.

Lesser Whitethroat *Sylvia curruca* in Coigach.—The *Handbook* (1920, vol. 1, 374) has "not common on the west side (of Scotland)." I am very familiar with this bird as a breeding species in Surrey. The common whitethroat *Sylvia communis* we see here annually, and on 29th July 1949 I handled a juvenile which had entered the house. On 7th and 8th August 1949 I watched through glasses two lesser whitethroats, one a bird of the year, on and creeping through the netting over raspberry bushes here. My identification was based mainly on small size, posture, and movements, which were quite different from those of a common whitethroat: instead of perching in the open they remained most of the time creeping about rather low down amongst the leaves.—T. G. Longstaff, Achiltibuie, Wester Ross.

Nesting of Mistle-thrushes.—In April 1949 I saw in Drumsheugh Gardens, Edinburgh, *two* mistle-thrushes *Turdus viscivorus* collecting nesting material. Both were employed in carrying small pieces of paper which a strong west wind was blowing across the grass; they looked like thin leaves from a note book. Thinking it unusual for a cock mistle-thrush to assist in nest-building, I looked up Witherby's *Handbook* and found that only one such case is recorded. Incidentally the birds stopped the construction of the nest when half-completed and transferred much of the material, including a blue

ribbon, to a fresh site (20 yards distant) which afforded better protection. In May I saw them feeding well-grown young ones.—J. Murray Thomson, Edinburgh.

A Blackbird's Song.—There is a blackbird now on Canna which sings continually (two octaves higher)—

varied by the phrase—

The time of the first phrase is not always quite regular, and the E flat at the end is sometimes a little sharp.

When his song was played back to him on a bamboo pipe, the bird showed decided signs of irritation!

A whole jig tune could easily be composed on the basis of the first phrase: which permits the possibility of speculation upon the connection between bird-song and folk-music.—J. L. Campbell, Isle of Canna.

Blackbird Feeding Young Wagtails.—At Monikie, Angus, on 16th May 1949, I was shown a nest of a pied wagtail *Motacilla alba* containing six young fully a week old. The nest was situated about 6 feet from the ground in stacked cut logs. I was informed that that morning a hen blackbird *Turdus merula* had been observed brooding the young wagtails and that she had been feeding them regularly all day. After ringing the young, we retired to a shed which had a window 15 feet from the nest. After a few minutes the hen blackbird appeared with her beak full of food. As she made her way along the adjacent wall and across the stack of logs, she was mobbed by the two parent wagtails until she reached within 2 or 3 feet of the nest. The wagtails then sat on the wall watching while the hen blackbird fed the young. When she had finished all three flew off together. Before long the parent wagtails returned one after the other and fed the young, after which they again flew off. After a further interval of a few minutes the hen blackbird returned with

some food, accompanied by the wagtails who mobbed her until she had almost reached the nest. This complete chain of events was repeated several times while we watched.

Jays and magpies are common in the vicinity, and a possible explanation is that the blackbird had had young which had been taken by a jay or magpie and that, being at that stage of her brooding cycle where the urge to feed young was dominant, she had " adopted " the young wagtails. On a later visit I was informed that the hen blackbird had continued to assist in the feeding of the young wagtails until they were fledged and left the nest.—Alexander Cross, Dundee.

Stonechats in West Sutherland.—Whilst on holiday at Lochinver, West Sutherland, in August 1948, I was told by the head gamekeeper that, although he had not seen any stonechats *Saxicola torquata* recently, he had seen them nesting in the spring, and if I cared he thought he could show me a nest. Next day, about a mile from Lochinver on the Inchnadamph road, he kept his word and found a stonechat's nest in a small spruce tree about a foot from the ground, containing one intact but naturally cold egg.

A few days later, about 4 miles from Lochinver on the Stoer road, my wife and I watched a pair of very lively and healthy looking stonechats.—R. S. Weir, Dunfermline.

Great Spotted Woodpecker in North Sutherland.—On 29th May 1949 I saw two great spotted woodpeckers *Dendrocopos major* and found a nest-hole in the birch wood on the south side of Loch Naver. This is north of Berriedale, from where Dr Kennedy of Thurso received a specimen a few years ago, and is almost certainly the most northerly breeding place so far reached.—I. D. Pennie, Tongue.

On the Extinct Scottish Great Spotted Woodpecker and Capercailzie, with a Suggestion for Systematic Treatment.—Miss E. V. Baxter, in " A Century's Changes in Scottish Ornithology " (*Scot. Nat.*, 1948, 60, 13), states that " the great spotted woodpecker *Dryobates major anglicus* recolonised the country. They inhabited the old Caledonian forest, as is evident from the old records and from the nesting holes found in some of the veteran trees which had survived the felling; but by the middle of the nineteenth century the birds had died out or almost so. In 1887 the first breeding was recorded at Duns in Berwickshire, and the species spread from the south till it reached right up to Caithness." Under the same race precisely similar information is given by Witherby (*The Handbook of British Birds*, Vol. 2, 1938, 286).

The continued use of the name *Dendrocopos major anglicus* (Hartert), 1900: Horsham, Sussex, England, for the extinct autochthonous great spotted woodpecker of Scotland is clearly not supported by any factual evidence. I have been quite unable to locate any preserved example of a breeding Scottish great spotted woodpecker taken in the first half of the nineteenth century or earlier, and none was known to the late Sir Hugh S. Gladstone. Judging by prevalence of well-defined races in Scottish bird species it is considered most likely that these extinct *D. major* populations belonged to an undescribed race—probably smaller and darker than *D. m. anglicus* —which was unable to withstand the destruction of the pristine Caledonian forests. It may have preferred a coniferous biotope and been less catholic in its taste than *D. m. anglicus*.

As no specimens apparently exist, there must always be considerable doubt as to the correct racial status of the extinct great spotted woodpecker of Scotland, and in future faunistic treatments of Scottish birds the species should be dealt with as follows:—

1. † *DENDROCOPOS MAJOR ? RACE.*
   Formerly resident in the Caledonian forests. Extinct.
2. *DENDROCOPOS MAJOR ANGLICUS* (Hartert).
   Resident. First bred 1887. Extending and consolidating its distribution.
3. *DENDROCOPOS MAJOR MAJOR* (Linnaeus).
   Irregular winter visitor, more general in Northern Isles.

Miss Baxter, *loc. cit.*, p. 17, follows Witherby and others when she states "The capercailzie *Tetrao urogallus urogallus* became extinct in Scotland about 1760, was reintroduced in Perthshire in 1837, and in other places subsequently, and has spread widely." I can trace no specimens of the extinct autochthonous Scots capercailzie, and it is extremely unlikely that any now exist in museums or private collections. I consider it most likely that the capercailzie, which once ranged over much of Great Britain and Ireland and finally died out in Scotland *circa* 1760, was subspecifically separable from the nomenotypical race. Certainly there is no factual basis for the very general assumption that it was *Tetrao urogallus urogallus* Linnaeus, 1758: Sweden. The classification of Scottish *T. urogallus* should be as follows:—

1. † *TETRAO UROGALLUS ? RACE.*
   Formerly resident in the Caledonian forests. Extinct.
2. *TETRAO UROGALLUS UROGALLUS* (Linnaeus).
   Resident. Introduced 1837 from Scandinavia.

—P. A. Clancey, Glasgow.

Whether or not any preserved specimens of the extinct indigenous Scottish bird are still in existence was discussed in an article by Sir Hugh Gladstone in *The Scottish Naturalist*, 1921, 169-177. Gladstone accepted the Tunstall specimen in the Hancock Museum at Newcastle as being authentic, though the evidence is not entirely conclusive.—EDITORS.

GARGANEY IN AYRSHIRE.—The appearance of the garganey *Anas querquedula* in Ayrshire is sufficiently rare to merit comment. On 28th May 1949, at a small loch on the outskirts of Kilmarnock, Mr J. Taylor and I, using binoculars ×6, saw a drake garganey at a range of about 30 yards. It was with a teal drake, and they eventually flew off and pitched together. The garganey had left the area by the 31st.—F. D. E. WALLS, Kilmarnock.

There appears to be no previous record for Ayrshire.—EDITORS.

SHOVELER NESTING IN AYRSHIRE.—According to *The Handbook* the shoveler *Spatula clypeata* has not been recorded as having nested in Ayrshire. On 21st May 1949 I saw a shoveler drake on a small loch on the outskirts of Kilmarnock. The duck was seen on the 24th by Mr J. Taylor of London, and on the 27th he found the nest, containing six eggs, in a clump of growing grass on dry ground about 20 yards from water. I saw the nest on the 28th, when it contained seven eggs, and had an excellent view of the duck as she left the nest and joined the drake. The down in the nest was brown with light centres. Unfortunately, the nest had been destroyed and the birds were gone by the 31st.—F. D. E. WALLS, Kilmarnock.

A previous, though unsuccessful, nesting in Ayrshire was recorded by Mr J. A. Anderson in *British Birds*, 38, 77 (1944).—EDITORS.

EARLY BREEDING OF WOOD PIGEON IN ABERDEENSHIRE.—The mid-winter months of 1948-49 were so unusually mild and open in Aberdeenshire that early breeding records of certain species of birds were to be anticipated. On 6th February 1949 I flushed a wood pigeon *Columba palumbus* from a nest in a spruce at Ellon. The nest proved to contain a single egg, and on 26th February, when I next visited the nest, the bird was incubating her clutch of two, although in the interim there had been some rather wintry cold weather. A week of snow, sleet, and blizzards followed, and by 5th March the nest was palpably deserted. The pigeons continued, however, to haunt the little copse containing the nest tree, and on 12th March, after further arctic weather, the two eggs were still *in situ*, although, of course, quite cold. On 19th March I decided to explore the copse thoroughly to see whether the pair had started another breeding

attempt, and was surprised to flush one of them from the original nest. I was considerably more surprised on climbing the tree to find that the nest now contained a clutch of four eggs. I therefore have pleasure in endorsing the *Handbook's* statement that wood pigeon clutches of this number are due to two layings.—G. F. Raeburn, Ellon.

Turtle Dove in Ayrshire.—On 22nd May 1949 I saw a bird near Ballantrae, south Ayrshire, which I identified as a turtle dove *Streptopelia turtur*. A good view was obtained through a pair of 6 × 30 binoculars at a distance of about 15 yards.—Scott Nelson, Ballantrae, Ayrshire.

The turtle dove is an occasional visitor to Ayrshire.—Editors.

Black-tailed Godwits at Gladhouse, Midlothian.—On 24th April 1949, during the taking of the International Wildfowl Census at Gladhouse reservoir, a pair of black-tailed godwits *Limosa limosa* were seen on the stony shore at the eastern end of the loch. At our approach they rose, giving us a good view of the black band on the white tail. Later the birds were watched from 60 yards with a strong glass preening in the sun on a small island; both were in summer plumage, the underparts of the male showing a much richer "chestnut" colour than the altogether paler female. They allowed approach within 30 yards before flying off, revealing the pure white on the wing and tail and the jet-black bar. Subsequent visits were made to the loch on 1st and 15th May, but no further sign of the birds was seen.

There do not appear to be many inland records of this wader in the south-east of Scotland, although it is not uncommon in the estuary of the Forth in spring and autumn.—Michael C. Maw and Stewart Kirkaldy, Edinburgh.

White Oyster-catcher: A Twelve-year Record.—In 1937, when I was in Africa, a home-letter gave the news that a white oyster-catcher *Haematopus ostralegus* had been seen by my family in a little glen "somewhere in Scotland." I was "sweating on leave," but by the time I got home the season was over and the birds gone from their breeding haunts.

Early in May in the following year we began to visit the glen, and on the second visit we were rewarded. I shall never forget my first sight of the bird. I was driving very slowly on a moorland road beside a beautiful little burn when the white bird got up and flew off slowly. With Africa fresh in memory I said involuntarily, "An egret, what is it doing here?"

The nesting site was a patch of shingle beside the burn, and after some careful watching the three eggs were located. Everything went normally; the young hatched and quickly took to the heather and rough grass, where they were extraordinarily difficult to find.

Next year (1939) we arranged with a keen photographer to build a hide, photograph the nest, and, if possible, the white bird. We were not sure of the sex, as we had seen both birds (the other a perfectly normal oyster-catcher) at various times sitting on the eggs.

Diary of Observations.—1939: 3rd May, first observation of nest; three eggs; white bird sitting (11 A.M.). 4th May, black bird sitting; white bird feeding near (evening). 8th May, hide prepared; black bird on nest; no sign of white (evening). 10th May, black bird on nest; no sign of white; black bird returned to nest six minutes after arrival of our car (evening). 15th and 17th May, black bird sitting; no sign of white (9 P.M.). 20th May, white bird sitting, and remained near nest when disturbed, but black bird returned to nest; photographs taken from hide (afternoon). 24th May, young hatch out.

1940-46: Our plans for further observations and photography were shattered, like so many others, by the war. We did see the white bird in 1940 at the same nesting site, but the years 1941-46 were blank except for reports from the keeper that the bird had been back each year until 1944. In each year a pair had nested and brought out the young, but there had been no sign of any strange colouring in any of the chicks. There was no report for 1945 or 1946, and I feared that that was the end of the story.

1947: At the end of April my family and I, now reunited and returned to near our old haunts, were motoring back from an abortive fishing expedition. It was a terrible day! Rain was tearing down, so that it was impossible to see any distance over the moor. As we approached the entrance to the little glen, I decided to make no mention of the white oyster-catcher, lest my enthusiastic family should clamour to go and have a look—it was raining in torrents. To my utter amazement a white bird rose from the roadside only a few yards in front of the car, flew slowly off, and alighted—quite one of the most amazing happenings in all my experience of birds.

Of course an expedition was planned, and on a lovely day we visited the old site to find it changed beyond recognition. A cloud-burst had caused a terrific flood in 1945, so we learned from a visit to the keeper, who told us that the birds had merely shifted a little more than half a mile down-stream to a strip of shingle where we had found oyster-catchers nesting before the war. There, after a thrilling

stalk, we located the white bird sitting (though the keeper is certain " he " is a male) and two eggs in the nest.

1948, 30th May: Seen on same nesting site, but alas! owing to petrol restrictions it was impossible to pay any more visits.—W. P. Young, Gordonstoun, Elgin.

Mr Young informs us that the keeper has seen a white bird at the same site in May 1949.—Editors.

Aggressive Display by Guillemot.—At a part of the foreshore a little to the north of Barrassie, Ayrshire, on 13th November 1948 we witnessed what was, to us, an unusual display of aggressiveness on the part of a guillemot *Uria aalge*.

When we first observed the bird it was sitting on the beach about 20 yards from the sea and, as it was preening vigorously, we assumed that it must be badly oiled. On closer examination, the bird remaining immobile, we discovered what appeared to be a small clot of oil on its breast feathers, but that otherwise it seemed in good condition. It was in winter plumage, the face being white with the exception of a dark streak through the eye to the cheek, while there was a thin line of dark feathers round the throat.

Thinking that it would be safer in the water we attempted to shepherd it in that direction, but after fluttering a few yards it turned, faced us, and, catching hold of one of our coats with its beak, behaved in a thoroughly belligerent manner.

On being picked up and placed in the water it made no attempt to fly, but it could swim and dive in a normal way, and after submerging for a short interval it made out to sea.

We continued northwards along the sand, and about fifteen minutes later were surprised to see the same bird, recognisable by the dark patch on its breast, come close inshore, leave the water, and commence preening.

On our approach it once more adopted a menacing attitude and came towards us with opened beak. It showed no inclination to return to the sea, and as we moved away it settled down to preen.—Geo. A. Johnson and L. G. Hodgkinson, Glasgow.

Little Auk in Perthshire.—Early February 1940 brought a particularly severe north-east blizzard to the eastern counties of Scotland. At that time I was living in Glenalmond, Perthshire.

On 2nd February 1940 the head keeper on the neighbouring estate brought me a bird which had been retrieved from a snow-drift on the doorstep of the shooting lodge and which the keepers had been

unable to identify. I identified the bird as a little auk *Plautus alle*—an adult.

The bird was in a rather exhausted and lethargic state, but after taking it indoors and putting it in a bath full of water, the auk became quite active, and my wife was able to make some sketches of it.

Unable, however, to provide the little auk with the special plankton on which it feeds, it survived only a day. I sent the bird to a friend at the War Office who specialised in parasites of birds and who confirmed my identification. He reported there were still many Mallophaga on it.

How it came to be so far inland is, of course, difficult to say, but I imagine it was blown inland some distance and made its way up the rivers Tay and Almond, a distance of some 45 miles from the lightship at the river Tay entrance.

At least one other little auk was picked up near Perth during the same storm.—James F. Anton, Bridge of Cally, Perthshire.

Water Rails at Duddingston Loch.—For a number of years the water rail *Rallus aquaticus* has been a frequent visitor to Duddingston Loch in the winter months. On 23rd January 1945, during a spell of hard frost, one was flushed from the reeds at the curling pond. Throughout February 1947 two were seen feeding regularly on the marshy ground at the west end of the sanctuary, and on the 13th of the month three were observed at the same place. On 27th December 1948 one was seen in rather an unusual place. It was sitting on a floating piece of wood in the boathouse, while another was feeding at a small spring at the east end of the loch close to the public road. During the hard weather in January 1949 there were at least five in the reed bed. On the 4th four were watched at close quarters from behind the boundary wall, and on the same date the bird at the east end of the loch was again seen.

The only previous records I can find are 28th January and 3rd February 1917, when one was reported by the late Mr John Currie, whose notes on the birds of Edinburgh are in my possession.—D. R. Anderson, Edinburgh.

Water Rail in Edinburgh.—On 27th November 1948 I surprised a water rail *Rallus aquaticus* in a marshy corner at Lochend pond, Edinburgh. It was crouching quite in the open behind railings only about 8 feet from the path. It appeared not to notice me at first, but suddenly rose to its feet and began to walk jerkily along the water's edge. I had an excellent view of it and noticed especially its long red bill, barred flanks, grey breast, and white on its upturned

tail. I left it and returned a few minutes later with another observer, when we had a short glimpse of it before it took flight and alighted in a patch of thick reeds. It was not seen again.

Other interesting occurrences at Lochend recently include a heron *Ardea cinerea* on 8th October, and fifty-two scaup *Nyroca marila*, nineteen wigeon *Anas penelope*, and two little grebes *Podiceps ruficollis*, on 7th November 1948.—KEITH S. MACGREGOR, Edinburgh.

BOOK REVIEWS

A Guide to the Smaller British Lepidoptera. By L. T. Ford. Pp. 230. London: South London Entomological and Natural History Society, 1949. 15*s*.

Mr L. T. Ford and his eight collaborators are to be congratulated on a volume which deals with the life histories and foods of upwards of 1370 species of our smaller moths with indices of the foods and of the insects with cross references. The book is a useful contribution to entomological literature and it points out the numerous gaps in our knowledge of most species of small moths, but it is complementary to a systematic account of the smaller Lepidoptera and depends on Meyrick's *Handbook of British Lepidoptera*, published in 1928. A copy of Meyrick is difficult to procure, and it does not include all the species mentioned by Ford. We hope that the authors will soon publish for all the smaller British moths keys, illustrations, bionomial notes, geographical distribution in the British Isles, with references to the more important literature on each species, as they have so ably done for some groups in recent volumes of the *Proceedings and Transactions of the South London Entomological and Natural History Society*.

G. D. Morison.

A Key to the British Fresh and Brackish-water Gastropods with Notes on their Ecology. By T. T. Macan. Pp. 45. Freshwater Biological Association, Scientific Publication No. 13, 1949. 2*s*.

This booklet should prove to be of considerable value in the identification of pond-snails. The key is simple, practical, and concise, and the ecological notes provide a good introduction to an important aspect of the subject. A notable feature is the many large and excellent illustrations by R. Douglas Cooper, and these, along with the clear and straightforward nature of the text, are likely not only to render the book useful to biologists but to encourage anyone interested in aquatic Natural History to learn more about these remarkable and even beautiful animals.

A. F.

NOTICE

The Irish Ordnance Survey Office has recently produced official maps showing the recognised divisions of Ireland into sub-provinces, counties, and vice-counties, for use in biological work.

The larger map (10 miles to 1 inch) costs 4s. or 4s. 6d. (folded and covered). The smaller outline map (50 miles to 1 inch) costs 3d.

These maps are obtainable either from the Ordnance Survey of Ireland, Phoenix Park, Dublin, or from any bookseller.

CORRESPONDENCE

To the Editor of *The Scottish Naturalist*

SIR,

DISTRIBUTION OF SCOTTISH MACROLEPIDOPTERA

I read Dr F. W. Smith's article on this matter with much interest. I have been interested in Lepidoptera since my early school-days. At that time the attitude in Scotland appeared to be that, as the farther south one went the more species there were to collect, there was no point in going *north* to look for Lepidoptera, except perhaps to Rannoch for the few species that are peculiar to that district.

That attitude to Scottish entomology is changing, but the change might very well be expedited if Scottish museums and authors were to arrange and describe their collections from a Scottish instead of a British point of view. There ought to be, at one of our museums at least, a representative collection of *Scottish* Lepidoptera; but where can such a thing be seen ? I was once informed by a capable entomologist who formerly worked in a certain Scottish museum that when he began his work there the collection of Lepidoptera consisted of types of " British " moths and butterflies mostly collected in localities like the New Forest. It is to be hoped that things are different now; but is it too much to expect that Lepidoptera in Scottish museums should be represented by Scottish specimens to the fullest extent possible, and that southern specimens should be shown, not as " types " but simply for purposes of comparison ?

I am,

Yours truly,

J. L. CAMPBELL.

WOODSIDE,
BEITH,
AYRSHIRE.

To the Editor of *The Scottish Naturalist*

SIR,

BEWICK'S SWANS

During the last few years Bewick's swans, which were formerly fairly common in a few suitable localities, appear to have become very scarce.

The Scottish Ornithologists' Club have asked me to conduct an inquiry into the present status of the species as compared with former years and, if possible, discover the cause of the change.

If any of your readers could give me any information which would be of value to this inquiry, I should be grateful if they would write to me at the above address. Special cards have been printed and I shall be glad to send them to anyone who makes application.

I am, etc.,

J. A. Anderson.

Department of Zoology,
The University,
Reading.

To the Editor of *The Scottish Naturalist*

Sir,

Wildfowl and Leeches

I am engaged in research upon the habits and distribution of the duck leech *Protoclepsis tessellata*, and I would be most grateful if Scottish Naturalists could assist me in obtaining specimens and information.

This leech lives most of the year in lakes, ponds, and streams, attached to sticks, stones, or vegetation. At certain periods, however, it attaches itself to the beak of a water bird, enters a nostril, takes a meal of blood, and then drops back into the water.

It has been found in the nostrils of domestic ducks, wild ducks, geese, grebes, and other birds. On a Berkshire farm this summer about forty ducklings died as a result of leech infections. One observer in the west of England recently found *Protoclepsis* in the nostrils of every wild duck examined. It seems possible that the leech is a serious pest of water birds, but much more information is required concerning its distribution.

I would therefore appeal to anyone who has the opportunity of examining the head of a water bird, either dead or alive, to send me a report on the presence or absence of leeches, or to send me the bird's head for examination. Persons engaged in duck shooting could render invaluable assistance by sending me the heads as they are taken, and I would gladly defray expenses.

Yours truly,

K. H. Mann.

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