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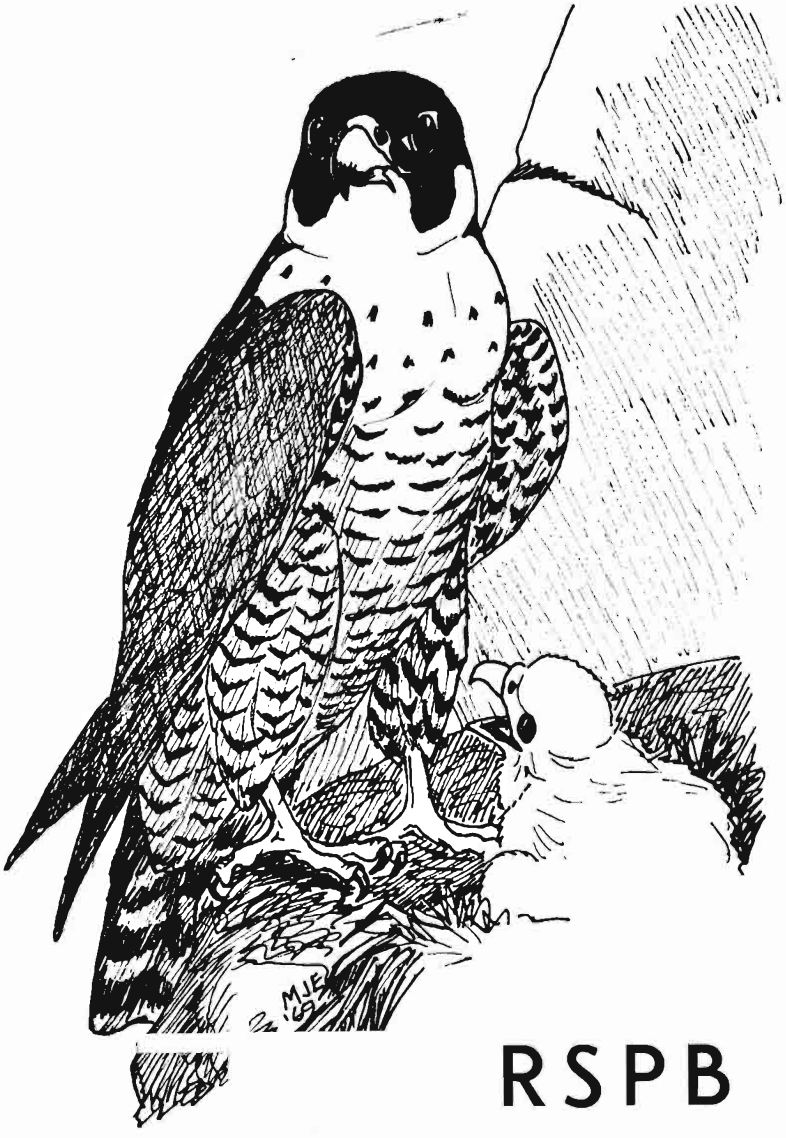

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Contents of Volume 5, Number 8, Winter 1969

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SCOTTISH BIRDS

THE JOURNAL OF THE SCOTTISH ORNITHOLOGISTS' CLUB

Vol. 5 No. 8 **Winter 1969**

Edited by A. T. Macmillan, assisted by D. G. Andrew

Editorial

New Fair Isle Bird Observatory. We have already reported on the building of a new bird observatory on Fair Isle and commended the appeal for funds to support the project.

On 18th October 1969 a light aeroplane shuttled to and from Sumburgh with official guests for the opening ceremony, performed by Lord Wemyss, Chairman of the National Trust for Scotland. Thereafter the fog came down and stranded them on the island, as if to prove that air travel is not always the most convenient, even if it is now quite a feature of life on the island, with Loganair making nearly 100 flights in and out this summer. Inscribed pewter tankards were presented to the warden, Roy Dennis, and his wife Marina to mark this important event.

The new buildings stand ready to receive you. There are four single and four double bedrooms, and two six-berth dormitories for the young at heart. Bedding is provided, and meals on a self-service basis; all you have to do is make your bed, tidy your room (no dishwashing) and enjoy yourself. You can charter an aeroplane and travel in comfort. So book now for 1970.

Some pictures are included in this issue (plates 28-31), and the latest brochure may be had from 21 Regent Terrace, Edinburgh.

Seabird deaths. As we write this towards the end of October there has been a great deal of publicity in the press and on radio and television about a wreck of seabirds on the west coast. The largest numbers have been in Ayrshire, but there are reports from as far apart as Inverness-shire, north Wales, the Isle of Man and Northern Ireland. A total approaching 10,000 is mentioned, 60% Guillemots, with smaller numbers of Cormorants, Shags, Puffins, Gannets, Razorbills and other species. The birds mainly came ashore with gales in the last week of September 1969 and were in a weak and emaciated condition. Oil pollution was responsible for only some

of the deaths, and the underlying causes of the wreck are being sought now. Moult, gales and food shortage have been suggested, but analyses have revealed startling residues of a possible new environmental pollutant in bodies from Ayrshire and north Wales. This is a widely used group of industrial chemicals called polychlorinated biphenyls (PCBs for short) of which we may well be hearing more. All records and information about the wreck are urgently required and should be sent to A. G. Stewart, Branahuie, 31 St Andrew's Avenue, Prestwick, Ayrshire.

ECY 1970. Natural history organisations all over the country are completing their plans for European Conservation Year 1970. Readers in the Edinburgh area will be interested in a series of films on the general theme of "Nature and Man." These are being shown by Chris Mylne, Publicity Officer of the Scottish Wildlife Trust, in association with the Edinburgh Film Guild, at 3 Randolph Crescent, Edinburgh. Admission is by ticket (less than 20/- for the series) from the Film Guild. The titles are "Man the Despoiler" (12 Feb), "Man the Preserver" (26 Feb), "Scottish Wildlife Problems" (12 Mar), "Water and Wildlife" (26 Mar), "The Forest Habitat" (9 Apr), and "Man's World" (23 Apr).

Scottish Bird Report 1969. There can be no need to remind contributors that all notes for the first ten months of 1969 should by now be in the hands of local recorders; those for November and December should follow very early in January. Please try not to be the one who holds thing up by sending his notes late; there is all too little time to process them anyway. And if you also double-check the dates of your observations you will indeed be doubly blessed.

There is one change in the list of local recorders, John Edelsten having now taken on Nairn, Moray and Banff, and the full list is:

Shetland (except Fair Isle) R. J. Tulloch, Reafirth, Mid Yell, Shetland.
Fair Isle R. H. Dennis, Bird Observatory, Fair Isle, Shetland.
Orkney E. Balfour, Isbister House, Rendall, Orkney.
Outer Hebrides (except St Kilda) W. A. J. Cunningham, Aros, 10 Barony Square, Stornoway, Isle of Lewis.
St Kilda Dr I. D. Pennie, Bonhard Place, Bo'ness, West Lothian.
Caithness D. M. Stark, 2 Harland Road, Castletown, Thurso, Caithness.
Sutherland, Ross-shire (except Black Isle) D. Macdonald, Elmbank, Dornoch, Sutherland.
Inverness-shire (within 18 miles of Inverness), Ross-shire (Black Isle only) Dr Maeve Rusk, Arniston, 51 Old Edinburgh Road, Inverness.
Inverness-shire (mainland more than 18 miles from Inverness) Hon. D. N. Weir, English Charlie's, Rothiemurchus, Aviemore, Inverness-shire.
Nairnshire, Morayshire, Banffshire J. Edelsten, 14 South High Street, Portsoy, Banffshire.
Aberdeenshire, North Kincardineshire N. Picozzi, Nature Conservancy,

Blackhall, Banchory, Kincardineshire, AB3 3PS, and W. Murray, Culterty Field Station, Newburgh, Aberdeenshire, AB4 OAA.
South Kincardineshire, Angus G. M. Crighton, 23 Church Street, Brechin, Angus.
Perthshire Miss V. M. Thom, 19 Braeside Gardens, Perth.
Kinross-shire J. H. Swan, Vane Farm Reserve, Kinross.
Isle of May Miss N. J. Gordon, Nature Conservancy, 12 Hope Terrace, Edinburgh EH9 2AS.
Fife (east of A90) D. W. Oliver, 4 Lawview Cottages, Abercrombie, St Monance, Fife.
Fife (west of A90), Clackmannanshire, East Stirlingshire T. D. H. Merrie, West Faerwood, Stirling Road, Dollar, Clackmannanshire.
West Lothian Dr T. C. Smout, 19 South Gillsland Road, Edinburgh EH10 5DE.
Forth Islands (except May), Midlothian R. W. J. Smith, 33 Hunter Terrace, Loanhead, Midlothian.
East Lothian, Berwickshire K. S. Macgregor, 16 Merchiston Avenue, Edinburgh EH10 4NY.
Peeblesshire, Roxburghshire, Selkirkshire A. J. Smith, Glenview, Selkirk.
Clyde faunal area, North Argyllshire, Skye, Inner Hebrides Prof. M. F. M. Meiklejohn, 16 Athole Gardens, Glasgow W2.
Dumfriesshire J. G. Young, Benvannoch, Glencaple, Dumfriesshire.
Kirkcudbrightshire, Wigtownshire A. D. Watson, Barone, Dalry, Castle Douglas, Kirkcudbrightshire.

Boundaries are shown in 'The Birds of Scotland'. Note that Skye and the Hebrides are treated separately from the counties in which they lie.

Brain drain. We are indeed sorry to lose another fine assistant editor down the high road to England. It is little more than a year since we welcomed Mike Everett to *Scottish Birds* but in that time his advice and assistance, particularly with Short Notes, have been most welcome and valuable. We send him our good wishes in his new RSPB job as assistant reserves manager.

Index Ornithologorum. The editor of *The Ring* is planning to publish an index of the professional and amateur ornithologists of the world. Entries, in English, should be sent to him at the Laboratory of Ornithology, Sienkiewicza 21, Wroclaw, Poland, with an International Postal Reply Coupon, giving surname, other names, year of birth (optional), title, positions held (including editorships, memberships), principal interest in ornithology, address, titles of your most important ornithological publications if you are an author, and saying whether you will buy a copy of the index at a reasonable price. The editor is anxious that the index should embrace as many ornithologists as possible.

Current literature. Recent Scottish material includes:

Preliminary counts of birds in central Highland pine woods. A. Watson, 1969. *Bird Study* 16: 158-163.
Little Gulls in Scotland. J. R. Furse, 1967. *Sea Swallow* 19: 18-26.

BTO Ornithological Atlas 1968-72

By the time of the SOC Annual Conference at Dunblane it was clear that the promise of a nationwide contribution during 1969 had been fulfilled. Out of a total of just under 1100 10-km squares in Scotland and the Islands, we got good cover for about 200 in 1968 and for over 320 more by the end of October 1969. The true figure for 1969 will be much higher when late cards are all in, including records from two major counties not available for Dunblane. In addition a great deal has been added for squares partly covered in 1968, and much work has been done on little-visited islands and remote coastlines during Operation Seafarer. The real achievement in 1969 is significantly higher than could be shown at Dunblane under the description "square cover good."

This has been done by all sorts of people, by enthusiasts from the Northern and Western Isles to remotest Galloway and the Borders, and by local effort from Skye to the populated and more closely organised areas of Central and Eastern Scotland, as well as by visitors from south of the Border. All these contributions, and the amount of work done in the field and in writing up records, are deeply appreciated.

With the experience gained during 1969 it will be found comparatively easy to get a lot more done in coming seasons with little more use of time and effort, as those who started in 1967 (pilot scheme) and 1968, in Scotland and elsewhere, will know. Time will be needed in 1972, and preferably 1971, to record difficult species and to cover remoter areas (even in one's home square). With so many common species to deal with we must aim to record all these, at least in home squares, during 1970. This will allow time during the winter 1970/71 to assess the gaps in coverage, and species difficult to record, so that the information can be passed back before the summer of 1971. This may appear to be an ambitious target for 1970, but it seems quite realistic to those aware of the full picture.

The sheer number of records makes a good deal of paperwork for Regional Organisers and Recorders. This can be cut to the minimum if people look a little harder, walk a little further, or even wait a few minutes longer to record proved breeding behaviour rather than "present in possible breeding habitat." This expression of "regard for your next astern," and sending in records promptly at the end of the summer, will make a lot of difference to those who have taken on responsibilities for recording or organising cover on a regional basis.

Foulis Mains, Evanton, Ross-shire. C. G. HEADLAM.

Wintering duck in Scotland 1962-68

VALERIE M. THOM

Introduction

Regular counts of wildfowl in Britain were started in 1948 to assess the status and distribution of the various species and to determine whether any were in need of protection. Much of the material collected by 1962 was used in the Nature Conservancy Monograph *Wildfowl in Great Britain*, the first comprehensive review to be based on recorded figures. Earlier publications, of which Berry's *Status and Distribution of Wild Geese and Wild Duck in Scotland* and Baxter & Rintoul's *Birds of Scotland* are the most important, had depended, in the absence of factual information, on subjective assessments of numbers.

Wildfowl in Great Britain consisted largely of detailed reports on individual waters. It is not proposed to repeat these here but rather to review present knowledge of wintering duck in Scotland and to draw attention to those areas and species which most require further investigation. The data obtained during 1962-68 have therefore been used (1) to determine the distribution of the different species, (2) to follow the variations in numbers which occur both within the winter season and from year to year, and (3) as a basis for ecological discussion.

This paper is of necessity based on *recorded* facts and figures. Many Scottish ornithologists will have data which supplement or contradict some of the statements made. It is hoped that these people will be encouraged to make such information available so that it may be put on permanent record and used to fill in further details in the picture of Scotland's wintering duck.

Material, methods and limitations

The Wildfowl Count Scheme is based on regular mid-monthly counts, from September to March, on a wide range of waters. Additional counts, at irregular intervals, are also made at less important or less accessible sites. Within the scheme, attention is concentrated, through a system of 'priority counts', on those waters known to carry large numbers of duck (more than 500 Mallard, 750 Wigeon, 300 Teal, 200 Tufted Duck or 200 Pochard). Since 1967 all January counts have been included in the International Wildfowl Censuses and a special effort has been made to ensure widespread observer-cover during January.

In the period 1962-68 regular counts were made on more

Table 1. Distribution of Wildfowl Counts in Scotland 1962-68

	Counted regularly (at least two seasons)		Counted occasionally		
	Fresh waters	Tidal waters	Fresh waters	Tidal waters	Total
Solway	19	7	6	3	35
Border	3	0	31	0	34
Clyde	22	12	38	13	85
Tay-Forth	60	12	71	19	162
North	18	21	34	10	83
Orkney-Shetland	15	2	6	9	32
	137	54	186	54	431

Summary

Counted regularly 191, occasionally 240
Freshwater 323, tidal 108

than 190 Scottish waters (fresh and tidal) and occasional counts on a further 240 (table 1). The first section of this paper is based largely on these counts but also includes records published in *Scottish Birds* and elsewhere. Reference to earlier records is made only where no recent information is available or where conditions have changed markedly. The figures used for examining seasonal and annual changes are drawn mainly from the priority count waters, while the ecological discussion uses both priority count and International Census data. The priority count data have previously been used only to examine annual changes in numbers, and as yet no detailed analysis of the International Census data has been published.

The validity of any survey of status and distribution depends upon the adequacy of observer-cover throughout the area under review. In Scotland considerable variations in coverage occur and these are discussed below in relation to the geographical regions. The reliability of the actual counts varies between observers and species (Atkinson-Willes 1963, p. 5) and also between habitats (*e.g.* small waters are more accurately counted than large ones, and open waters than those surrounded by marsh). Sea ducks present particular problems, since satisfactory counts can only be made when there is good light, a calm sea and preferably a high tide—a combination which is unlikely to occur on very many of the 'official' count dates. Even when these conditions do exist, estimates of large flocks well offshore may be very inaccurate (Milne 1965). These considerations, together with the fact that many sea ducks frequent the more inaccessible coasts and islands of the north and west, result in the information for this group being much less complete than for other species.

Although the main periods of immigration, passage and emigration are covered by the Wildfowl Count season, some arrivals take place before September and some departures after mid March. Since counts made outwith the winter are rarely reported these movements are inadequately documented and cannot be included in an examination of seasonal changes in numbers.

In Scotland, wintering flocks of some species include both native and foreign birds, and passage migrants may also occur. As it is not possible to distinguish between these groups, the counts indicate only the relative numbers of a species present at different times and do not reflect changes in the proportion of native to immigrant birds. The interpretation of annual fluctuations in numbers is consequently very difficult, if not impossible.

Scottish wildfowl habitats

In section 1 of this paper, species distribution is discussed in relation to the geographical regions shown in fig. 1. The regions, most of which include two or more faunal areas, are those used by the Wildfowl Trust in analysis of the International Census data. The principal habitats, the extent of observer-cover in 1962-68, and the species for which each region was important during this period are described below.

Solway. The tidal waters of the Solway Firth provide the most important habitat in this region, which has few fresh waters carrying large numbers of duck. Numerous small wetlands exist in both agricultural and moorland areas and most of these probably hold Mallard and Teal. The proportion of these species counted is therefore likely to be lower in Solway than in eastern Scotland, where small resorts are relatively less important. Observer-cover in Solway has improved in recent years but is still far from complete. This region holds the largest Pintail flock in Scotland and is also important for Teal, Wigeon and Shelduck.

Border. There are no estuaries and few major freshwater sites in this region, which consequently holds comparatively few duck. Regular observer-cover is confined to one site, and some wetlands of local importance are not at present counted.

Clyde. Although there are numerous lochs and reservoirs in Clyde, many are situated in moorland or mountainous districts and comparatively few are known to hold large numbers of duck. The river itself is of only minor importance, possibly owing to heavy industrial pollution and a limited shallow-water area. This region has not been well covered by observers in the past and additional counts made during the International Censuses have already drawn attention to

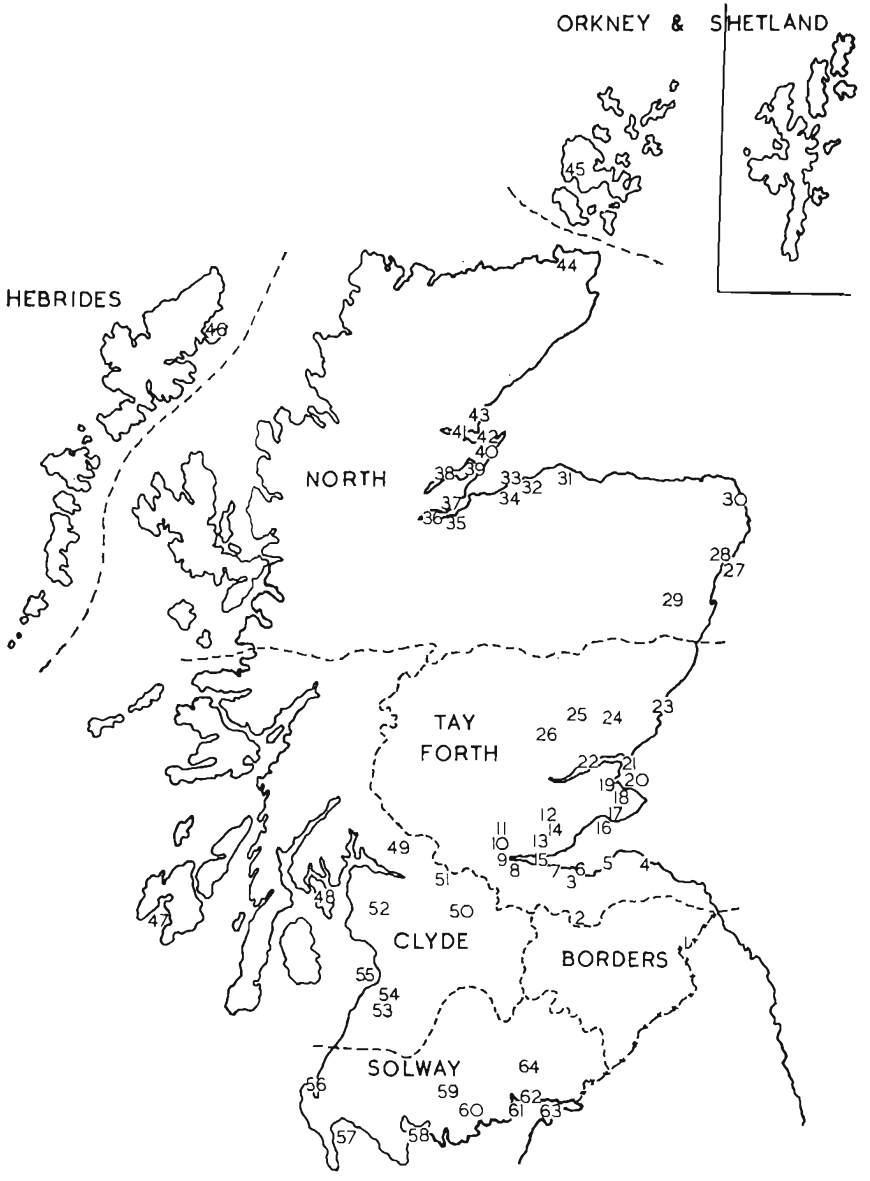

FIG. 1. Wildfowl count regions and sites in Scotland. In the key opposite 'priority count' sites are denoted by capitals.

several locally important sites which had previously been overlooked. During the period under review no wildfowl concentrations of national importance were recorded in Clyde.

Tay-Forth. This region contains a large proportion of Scotland's best wildfowl habitats—shallow, eutrophic lochs, tidal mudflats and estuarine waters with abundant animal life—and the greatest density of wildfowl. Regular counts are made at nearly all major sites and many minor ones. Important concentrations of Mallard, Teal, Pintail, Shoveler, Scaup, Tufted Duck, Pochard, Goldeneye, Velvet and Common Scoter, Eider, Red-breasted Merganser and Shelduck occur there, the assemblies of Scaup, Pochard and Eider being the largest in Britain.

North. Much of the country north of the Highland Line is mountainous, with lochs which, because they are either very

---

1 HIRSEL
2 MOORFOOT RESERVOIRS (Gladhouse-Rosebery-Edgelaw-Portmore)
3 DUDDINGSTON and LOCHEND
4 TYNINGHAME ESTUARY
5 ABERLADY BAY
6 SEAFIELD
7 ALMOND ESTUARY
8 LINLITHGOW LOCH
9 GRANGEMOUTH-KINCARDINE BRIDGE
10 TULLIBODY-KENNET PANS
11 GARTMORN DAM
12 LOCH LEVEN
13 LOCH FITTY and Town Loch
14 LOCH ORE
15 CULTNESS
16 Largo Bay
17 KILCONQUHAR LOCH
18 CAMERON RESERVOIR
19 EDEN ESTUARY
20 St Andrews Bay
21 Mouth of R. Tay
22 INVERGOWRIE BAY
23 MONTROSE BASIN
24 FORFAR LOCHS (Forfar-Rescobie-Balgavies)
25 LINTRATHEN and KINNORDY
26 BLAIRGOWRIE LOCHS (Stormont-Marlee-Clunie)
27 YTHAN ESTUARY
28 SLAINS LOCHS
29 LOCH OF SKENE
30 LOCH OF STRATHBEG
31 LOCH SPYNIE
32 FINDHORN BAY
33 Culbin Bar
34 LOCHS LOY and CRAN
35 LONGMAN BAY
36 SOUTH BEAULY FIRTH
37 Munlochy Bay
38 Cromarty Firth
39 Nigg Bay
40 LOCH EYE
41 SKIBO ESTUARY
42 WHITENESS
43 LOCH FLEET
44 LOCHS HEILEN and ST JOHNS
45 LOCHS HARRAY, STENNESS and BOARDHOUSE
46 Broad Bay
47 Loch Indaal
48 LOCHS ASCOG, GREENAN and 'AMBRISBEG'
49 ENDRICK MOUTH
50 HAMILTON LOW PARKS
51 LENZIE LOCH
52 CASTLE SEMPLE and BARR LOCHS
53 SHANKSTON, BARNSHEAN and CROOT
54 MARTNAHAM, SNIPE and FERGUS
55 Ayr Bay
56 Loch Ryan
57 Luce Bay
58 WIGTOWN BAY
59 LOCH KEN
60 CARLINGWARK
61 Carse Bay
62 CAERLAVEROCK
63 Priestside Bank
64 CASTLE, HIGHTAE and KIRK LOCHS

large and deep, or shallow and acid, are little used by wildfowl. Large gatherings of duck are therefore confined to the coastal belt, especially the farmland of east Aberdeenshire and the shores of the Moray Firth. Observer-cover in this region has improved recently but there are still many stretches of the north and west coasts about which little is known. The area holds important gatherings of Mallard, Wigeon (in autumn), Pintail, Goldeneye, Red-breasted Merganser and Goosander.

Orkney and Shetland. Many of Orkney's freshwater and brackish lochs are surrounded by farmland and carry substantial numbers of duck. In contrast, much of Shetland is peat-covered and barren, with few fresh waters of importance. Little information is available on the wintering sea ducks of either island group but the region is probably important for Long-tailed Duck and Eider.

Outer Hebrides. This region includes large areas of both fresh and tidal water but since virtually no counts have been made for many years little is known about the current wildfowl situation.

Section 1. Species status and distribution

The locations of the Scottish priority count waters, and of some other large concentrations of duck, are shown in fig. 1, and a general picture of species distribution *in midwinter* is given by the results of the 1968 January census summarised in table 2. It must however be emphasised that these figures are greatly influenced by the adequacy, or otherwise, of observer-cover. This is particularly so with the sea ducks, as is apparent from the small number of Eiders recorded in Orkney and Shetland. The Solway duck population is also under-represented (owing to foot-and-mouth-disease restrictions in force at the time), while the absence of any figures for the Outer Hebrides reflects a dearth of counters rather than ducks. Despite these limitations it is clear that the Tay-Forth region is the most important for both dabbling and diving ducks—a situation reflected by the density of priority count points in the area (fig. 1).

It is not possible at present to estimate total numbers of the commoner species, but some assessment of the relative abundance of the dabbling and diving ducks can be made, and a range, or maximum, for the less common species can be suggested. Mallard and Wigeon are the most abundant dabbling ducks, with Teal third, appreciably less numerous. Pintail and Shoveler maxima are probably 3000-4000 and 2000 respectively, while Gadwall seldom exceed 150-200. Diving ducks are less numerous as a group than the dabblers, and Scaup is by far the most abundant diving species. Tufted

Table 2. Numbers and distribution of duck counted in Scotland mid-January 1968

The number of sites counted in each region is given in parenthesis

	Solway (23)	Border (25)	Clyde (81)	Tay-Forth (124)	North (75)	Orkney-Shetland (18)	Total (346)
Dabbling Ducks							
Mallard	2807	1032	6095	27827	10689	1417	49867
Teal	652	219	1188	1033	2471	172	5735
Gadwall	2	—	—	1	2	—	5
Wigeon	4430	70	2563	6141	15372	1910	30486
Pintail	427	2	14	250	469	—	1162
Shoveler	18	4	19	10	4	—	55
	8336	1327	9879	35262	29007	3499	87310
Diving Ducks							
Scaup	711	—	129	21223	78	111	22252
Tufted Duck	117	26	1346	3680	818	572	6559
Pochard	50	23	575	6066	275	567	7556
Goldeneye	112	50	860	2963	661	174	4820
	990	99	2910	33932	1832	1424	41187
Sea Ducks							
Long-tailed	—	—	—	360	65	69	494
Velvet Scoter	—	—	—	2623	321	5	2949
Common Scoter	14	—	16	3666	595	—	4291
Eider	—	—	1457	4974	2014	21	8466
	14	—	1473	11623	2995	95	16200
Sawbills							
Merganser	31	—	161	298	48	6	544
Goosander	23	8	29	38	102	—	200
Smew	2	—	1	1	—	—	4
	56	8	191	337	150	6	748
Shelduck	343	—	618	2113	596	—	3670

Duck, Pochard and Goldeneye numbers are much smaller and of roughly similar size. Data on the sawbills and sea ducks are too incomplete to allow a worthwhile assessment to be made.

In the summaries of species distribution which follow, the statements regarding the origin of foreign birds are based on the ringing evidence tabulated in appendix 1.

Mallard *Anas platyrhynchos.*

Wintering flocks of Mallard include native birds, in substantial numbers, and immigrants from Scandinavia, the Continent and Iceland. This species occurs on a larger proportion of Scottish waters, and in a greater variety of habitats,

than any other, and is numerically the most abundant. There are comparatively few very large concentrations, however, and widely scattered smaller flocks contribute largely to the total.

The eastern half of the country holds most of the wintering Mallard and the five inland sites known to carry more than 1000 for several consecutive months all lie within 30 miles of the east coast. The most important resort is the Loch of Strathbeg, which has often held 2000-4000 Mallard (with a peak of 6500 in December 1965). Lintrathen Reservoir carries between 2000 and 3500 (with a peak of 4000 in January 1966), and the limited information for Loch Leven suggests a winter level of 1500-3500. The only other fresh waters where more than 1000 Mallard are recorded regularly are the Gladhouse-Rosebery-Edgelaw-Portmore group of reservoirs and the Forfar-Rescobie-Balgavies lochs. Sites which occasionally carry this number include, in the east, Kilconquhar Loch, Cameron Reservoir, Loch of Skene, Carsebreck and Drummond Pond; in the north, Lochs Harray, Stenness, Heilen and St John's, Watten and Eye; and in the west, the Bute lochs—both Loch Greenan and the "Ambrisbeg" complex of Quien, Fad and Dhu. Counts of Mallard on mainland lochs in western Scotland have seldom exceeded 500.

Less information is available for estuarine and coastal waters than for inland resorts. Estuaries are important in hard weather, and maximum numbers were generally recorded between December and February (at many inland sites, numbers reach their peak in October or, more often, November). Flocks of over 1000 Mallard occur in most seasons at Invergowrie Bay, the Eden Estuary and the Almond Estuary, and occasionally on the Carron-Avon foreshore of the River Forth. Large flocks formerly visited the Grangemouth-Alloa stretch further upstream, but numbers there have decreased progressively since 1963 (see section 3). Counts from other estuarine sites (Aberlady Bay, Tyninghame Estuary, Montrose Basin, Ythan Estuary, Beauly, Cromarty and Dornoch Firths, and several points on the Solway) are generally of less than 500 birds, though totals of over 1000 sometimes occur.

Flocks of Mallard seen off rocky coasts are presumably roosting or resting. Counts are not often made at such sites (since they are frequently difficult or unrewarding) but they can be useful in indicating the numbers which feed in adjoining landward areas, and are probably most worthwhile in districts where safe inland roosts are scarce in relation to available feeding grounds. Such conditions occur in Aberdeenshire, Angus, East Lothian and Fife (where 1700 Mallard were recorded off Boarhills and 2500 off Methil in January

1968), and contrast with the situation in southwest Scotland, where the many seldom-disturbed pools and bogs provide both feeding and resting grounds for numerous small flocks of Mallard and Teal.

Teal *Anas crecca*

Both native birds and visitors, from Iceland, Scandinavia and the Continent, are represented in the wintering flocks of this species, which shows a marked onward passage, to the south and west, in midwinter. Teal are probably the least accurately counted of the dabbling ducks, owing to their liking for cover and their tendency to occur in small parties on minor wetlands. In Scotland, flocks of less than 250 birds make up the bulk of the counted population, and large gatherings are recorded only occasionally, in most cases when drought, or frost, has driven the Teal into an exposed situation.

Large flocks formerly visited the Tullibody Island-Kennet Pans stretch of the Forth, but numbers there have dwindled from a peak of 4390 in November 1962 to a maximum of less than 300 in 1967-68 (see section 3). The only other resort where a flock of over 1000 Teal has been recorded during the last six seasons is Caerlaverock in the southwest (1700 in January 1967).

In the north, counts of 250-500 are frequently recorded from the shores of the various firths, and from the larger freshwater lochs. Flocks of this size occur less often in the Tay-Forth region, where, except for Loch Leven (500-1000) and the upper Forth (300-550), counts rarely exceed 250. In Clyde too, large flocks are uncommon and are regularly recorded only at the Endrick mouth; in Solway numbers are probably substantial but flocks are generally small; in Shetland Teal are scarce; and in Orkney the lochs of Harray and Stenness are the only waters where more than 100 are noted at all frequently.

Gadwall *Anas strepera*

This species, which breeds at Loch Leven (25-40 pairs) and occasionally elsewhere, is the scarcest of the dabbling ducks. No foreign-ringed birds have yet been recorded in Scotland.

In 1962-68 Gadwall occurred frequently at Cameron Reservoir, Kilconquhar Loch and Loch Ore, and less often on Lochs Gelly and Fitty (all in Fife), suggesting that birds disperse in various directions from the Loch Leven colony. Elsewhere on the mainland this species is scarce and irregular, and few have been recorded recently in Kincardineshire and Kirkcudbrightshire, where small numbers formerly occurred regularly. There are some records from the Outer Hebrides and these may involve either local breeders or Icelandic birds (some of which have been recovered in Ireland).

Wigeon *Anas penelope*

Wintering flocks of Wigeon consist largely of immigrants, many of Icelandic origin but also including birds from Scandinavia and the USSR. The native population is comparatively small. In contrast to Mallard and Teal, a large proportion of the Wigeon occur in comparatively few large flocks mainly on the northern estuaries.

Flocks of 3000-5000 Wigeon have been recorded in many of the bays around the Cromarty, Beauly and Moray Firths, and in autumn 15,000-18,000 probably frequent the Cromarty Firth alone. Substantial numbers also occur on Lochs Eye, Spynie and Strathbeg, and on the Slains group near Newburgh, at all of which flocks occasionally exceeded 1000.

Wigeon are much scarcer in Tay-Forth, where the Eden Estuary (maximum 750) and Montrose Basin (maximum 2000) are the only tidal waters of importance. In this region fresh waters hold a larger proportion of the birds than elsewhere, with Loch Leven and Lintrathen Reservoir carrying about 1000 and several other inland sites around 500.

In Solway, tidal resorts again hold the biggest numbers of Wigeon, and flocks of more than 1000 are recorded at Caerlaverock, Wigtown Bay and Loch Ryan. Flocks of this size also occur, though less regularly, on Lochs Ken, Kinder, Soulseat and Magillie. Smaller flocks are usual in Clyde, Loch Greenan in Bute and a stretch of the Ayrshire coast near Hunterston being the only areas where more than 1000 have been counted. In Orkney, at Lochs Harray, Stenness and Tankerness, flocks generally contain less than 500 birds, while in Shetland only small numbers are recorded.

Pintail *Anas acuta*

Virtually all wintering Pintail are immigrants, since only scattered pairs breed in Scotland. Ringing evidence suggests that many of the visitors come from Iceland.

All the important Scottish Pintail waters are estuaries, with extensive mudflats exposed at low tide and covered by shallow water at high tide. Many fresh waters are visited occasionally by small groups of Pintail but not many are used either regularly or by more than a few birds. Exceptions include Loch Ken (25-50 regularly and a maximum of 170 in December 1967), Hamilton Low Parks (maximum 45) and the Bute lochs (20-30). A record of 256 on Lochs Soulseat and Magillie presumably refers to birds from the nearby Luce Bay.

By far the largest gatherings of Pintail occur in the Solway Firth (maximum recorded 2300 in November 1967), where Carse Bay and Southerness, Wigtown Bay and Luce Bay are particularly favoured spots. The flocks move regularly about

the estuary, and only coordinated counts along extensive stretches of shore can produce reliable estimates of the numbers present.

Substantial flocks of Pintail are also recorded on the Grangemouth-Tullibody Island stretch of the Forth (maximum 440 in December 1963) and in the Moray Firth area, where numbers have reached 340 at Longman Bay, and 380 at Nigg Bay and Edderton Sands in Cromarty. Other tidal resorts used regularly by this species are Montrose Basin (maximum 150) and the Eden Estuary. Flocks of up to 100 Pintail occurred on the Eden in the 1950s but recent counts there have not exceeded 40.

Shoveler *Spatula clypeata*

The numbers of native Shoveler are small, and wintering flocks consist largely of immigrants from the Continent, and possibly also from Scandinavia. This species, which shows a strong preference for shallow, eutrophic waters, has a limited distribution in Scotland, where it is mainly an autumn passage migrant. Fewer than 20 of the counted waters are visited regularly by any number of Shoveler, and flocks seldom exceed 100.

Strathbeg, with a September-October maximum of 140 in 1967, is the only important resort in the north. In Tay the Forfar lochs, Kinnordy, Stormont and Morton Lochs are all regular haunts, and small numbers of Shoveler sometimes overwinter on these waters. A substantial late-summer influx has been recorded recently at Kilconquhar Loch (maximum 250 in August 1964) and large autumn flocks have also occurred at Loch Leven (maximum 400 in October 1966). Numbers on Cameron Reservoir and Duddingston Loch rarely exceed 50, while the flocks which used the Eden Estuary in the 1950s have apparently ceased to visit the area.

In the west during 1962-68, regular counts of more than 25 Shoveler were made only on Lochs Lomond, Castle Semple and Barr, and Ken. There is an isolated record of 100 on Loch Rutton in October 1962, but there have been no recent reports of any numbers in Wigtown Bay or Hamilton Low Parks, where flocks of over 100 were recorded in the 1950s.

Scaup *Aythya marila*

The Scaup wintering off Scottish coasts are largely, perhaps entirely, of Icelandic origin, apart from the few native birds.

The assembly at Seafield, in the Firth of Forth, which has increased substantially in recent years, greatly outnumbers the smaller flocks recorded elsewhere. In the six seasons under review, peak counts at Seafield were 6000, 8500, 9500, 9500, 11,000 and 15,500 respectively, and it was estimated that 30,000 were present in December 1968. Small parties of Scaup

occur occasionally as far upriver as Grangemouth and, more frequently, off the Almond Estuary.

Recent counts from the Eden and Tay Estuaries have seldom exceeded 200-300, though there is an isolated report of 2500 in St Andrews Bay in January 1966. Few Scaup move any distance up the Tay, and 150 at Broughty Ferry early in 1963 was an unusually large number there. At the Ythan Estuary and in Findhorn Bay, Scaup occur regularly, but only in small parties, while in the Cromarty Firth slightly larger flocks have been noted (maximum 500). The brackish Loch of Stenness holds 200-400, but this species is only casual on freshwater lochs in Orkney, as elsewhere.

Reports from the Solway refer to flocks of 2200 near Southerness in February 1965, and an estimated 3000 in the Firth in 1966. Loch Ryan and the upper Firth were the most favoured areas. Records from the Clyde are sparse, but some 170 Scaup were counted at Langbank and the Helensburgh-Cardross stretch in January 1968. Little recent information is available for Islay, where flocks of up to 1500 formerly occurred, but there are reports of 800 there in November 1963, and 600 in November 1968. Elsewhere around the coast, records refer only to small numbers or irregular visitations.

Tufted Duck *Aythya fuligula*

Native birds make a substantial contribution to the wintering flocks of Tufted Duck, which also include immigrants from Iceland, Scandinavia and the Continent. In contrast to Scaup and Pochard this species occurs mainly in small to medium-sized flocks and seldom in large concentrations. Most lowland fresh waters hold Tufted Duck during at least part of the season but gatherings of over 1000 birds are rare, and flocks of 500-1000 uncommon. The largest counts are made during hard weather, when flocks of up to 2300 have been recorded on the upper Forth.

All the waters where large numbers of Tufted Duck are known to appear regularly lie on the eastern side of the country, and most are in Tay-Forth. Surprisingly the wintering population on Loch Leven, the most important breeding site for Tufted Duck in Scotland, is small. The dispersal of the large autumn population takes place in October and November (only three Tufted Ducks remained on the loch on 15th November 1967) and, since much of Loch Leven is shallow and freezes readily, midwinter numbers are controlled mainly by the weather. Recovery to the breeding-season level of about 1000 birds apparently does not start until late March or early April. Ringing and wing-tagging of Loch Leven Tufted Ducks has shown that though they disperse in all directions their main movement is a southwesterly one to N. Ireland.

In 1962-68 flocks of 200-300 Tufted Duck occurred commonly on many lochs in Tay-Forth, and at some, such as Kilconquhar Loch and Gartmorn Dam, numbers sometimes exceeded 700. When driven off fresh waters by ice, Tufted Duck gather on the Forth at Kennet Pans and on the Tay near Dundee.

In the north the lochs of Skene and Strathbeg hold the largest flocks, with numbers occasionally exceeding 750, while counts elsewhere are generally under 200. Both Harray and Stenness Lochs in Orkney carry substantial numbers of Tufted Duck, but there has been some decrease at Harray in recent years. In Clyde and Solway this species is comparatively scarce and most counts are of under 150 birds, although numbers on some of the reservoirs in Renfrewshire and Dunbartonshire occasionally reach 300-400.

Pochard *Aythya ferina*

Few Pochard breed in Scotland, and wintering flocks consist almost entirely of immigrants from the Continent. The distribution of this species has changed markedly since *Wildfowl in Great Britain* was published, and this change has centred on Duddingston Loch. Up to 1962 the peak count recorded at Duddingston was 2500; since then it has increased progressively to reach 8000 in December 1967. No comparable increase has taken place elsewhere in the country, and numbers in Orkney appear to be decreasing.

The build-up of the Duddingston flock is of particular interest, since Pochard do not feed there and are apparently attracted to the loch solely as an undisturbed roost. The birds leave the loch each night after dark, so that location of their nocturnal feeding grounds is difficult, but since their flight line is to the northeast perhaps they feed on the Forth. By day, flocks of several hundred have been recorded at Seafield and off the Fife coast, at Methil and Largo Bay. Pochard are generally described as vegetarian, resorting to brackish or salt water only when driven from fresh waters by ice, so this large flock, apparently feeding by choice on tidal water, deserves further study.

Even without the Duddingston flock, Tay-Forth is the most important region for Pochard in Scotland. Most lochs in the area hold Pochard at least occasionally, and flocks of more than 1000 have been recorded on Dunfermline's Town Loch, Kilconquhar and Loch Leven, while numbers have reached 250-500 on Linlithgow, Fitty, Gelly, Kinghorn and Rescobie. The possibility of movement to and fro across the Forth is suggested by the marked fluctuations in Pochard numbers which occur on Kilconquhar Loch and some of the lochs and reservoirs around Cowdenbeath, Dunfermline and Kirkcaldy. For example, in December 1967 there were 8000 Pochard on Duddingston and only 276 on the Town Loch, Dunfermline:

by January 1968 the Duddingston count was down to 2100, but 2800 were present on the Town Loch.

Substantial numbers of Pochard are found in Orkney, where they have been recorded on most of the waters counted, except Stenness, which is brackish. The largest flocks are on Harray, but numbers there have decreased from an annual peak of over 1000 in the early 1960s to a maximum of 510 in 1965-68. Flocks of more than 250 have also occurred on Boardhouse and Kirkibister Lochs, and of more than 100 on Skaill, Echnaloch and Tankerness.

In the north, only Lochs Heilen and St John's in Caithness, Loch Eye in Easter Ross, and Lochs Skene and Strathbeg in Aberdeenshire, hold large numbers of Pochard. During the period under review Strathbeg was the most important of these five, with an autumn peak of more than 1500 in four of the last five seasons, and a maximum count of 2764 in November 1965.

Castle Semple Loch, the only Clyde water known to hold regularly a Pochard flock of any size, has seldom given counts exceeding 100 in recent years. A flock of 295 was recorded, however, on Castlehill Reservoir (also in Renfrewshire) in January 1968, and more Pochard may occur in this region on waters which are not regularly visited.

In Solway and the Borders, Pochard are not plentiful and flocks rarely contain more than 50 birds. The highest counts made recently in the south of Scotland have been on Loch Milton (up to 120) and Loch Ken (up to 85), where numbers have increased over the past few winters.

Goldeneye *Bucephala clangula*

Wintering flocks of this species, which does not breed in Britain, originate in northern Scandinavia. Although Goldeneye are widely distributed on the lochs and rivers of Scotland, all the large concentrations occur on tidal waters, generally near sewer outfalls or distilleries.

On the Forth at Seafield, and in the Cromarty Firth at Invergordon, numbers have regularly reached 1000-1500, and a peak of 2500 was recorded at Seafield in 1963-64. Further up the Forth numbers are influenced by weather, and in severe winters have sometimes reached 500-700 on the Kennet Pans-Tullibody Island stretch. Flocks of over 500 birds also occur occasionally off Methil, Fife, and between Stannergate and Monifieth on the Tay, while smaller groups, of 100-200 birds, have been noted in Invergowrie Bay, off Buddonness, and in Peterhead Bay. Numbers are usually small in the Beauly Firth, and in Clyde and Solway, but larger flocks, of 200-300 birds, frequent Ayr Bay.

On most fresh waters Goldeneye numbers are small, often

less than 25 birds, and few lochs regularly hold many of this species. Sizeable populations occur on Gladhouse Reservoir (over 100); Loch Leven (150-250 and occasionally more); the lochs of Skene (200-300) and Strathbeg; Heilen, Stenness, Harray, Tankerness and Ken, and the Bute lochs (100-200). At Kilconquhar numbers during much of the season are under 50, but in most years there has been an increase in February and March to give peak counts of 200 or more.

Long-tailed Duck *Clangula hyemalis*

All wintering birds of this species are immigrants, but as no ringed birds have yet been recovered in this country their origin is not known with any certainty. Long-tailed Ducks occur mainly in small flocks scattered around the coast, from the Forth north to Shetland and among the western isles. Although essentially a marine species in winter, odd individuals sometimes occur on inland waters.

Most records of Long-tailed Ducks refer to parties of less than 50, and many to under 15 birds. Larger flocks have been recorded off Aberlady Point (100 in March 1963), Joppa-Seafield (762 in March and 370 in April 1964), Methil (423 in March 1967 and 300 in January 1968), Tentsmuir (200 in November 1967), the Ythan Estuary (208 in December 1967), Rattray Head (240 in November 1967), Nairn (60 in February 1963), Loch Fleet (200 in January 1965), on the Loch of Stenness (which carries a regular wintering flock of 50-150), and off Lewis (about 500 in December 1964).

Long-tailed Ducks appear to be scarcest in Clyde and Solway, the only records of more than a few birds from these areas being from Ayr Bay, where up to 41 have been counted.

Velvet Scoter *Melanitta fusca*

Wintering flocks of Velvet Scoter consist entirely of immigrants, most of which probably come from Scandinavia. The status of this species, which occurs only on salt water, is difficult to assess. Most reports refer to groups of less than 50 birds, but much larger flocks are occasionally recorded. The difficulty of distinguishing between Velvet and Common Scoters in mixed flocks and at long range might be partly responsible for these variations.

Velvet Scoters are seen more often off the east coast, from the Forth to Orkney, than in the west. They are recorded most regularly from the Findhorn Bay-Culbin Bar area (peak counts of 170 in February 1965 and 320 in January 1968), and St Andrews Bay (a maximum of 2600 in January 1968). Numbers in the Forth are generally small, but there is a report of "hundreds" passing Aberlady Point in late March 1963. Records from elsewhere refer only to small numbers.

Common Scoter *Melanitta nigra*

A few Common Scoters breed in Scotland but most of the wintering birds are immigrants. There is no ringing evidence of their source but it is probable that they come mainly from Iceland.

Common Scoters are more widely distributed than the last species, but the most regular reports, and the largest counts, are again from east coast waters. St Andrews Bay is the most important resort known, with large flocks occurring regularly and a peak count of 6000 in January 1966. Numbers are variable in the Forth, up to 500 being recorded at Seafield in some seasons and very few in others. Flocks of up to 500 are also occasionally noted off Methil. Lower down the Firth, at Aberlady and Tyninghame, numbers are usually under 200, but there are records of more than 5000 off Gullane on 17th March 1963, and "thousands" at Aberlady six days later.

Further north, flocks are smaller, with counts of 200 off Montrose (September 1965), 568 at the Culbin Bar (January 1968) and 1000 off Loch Fleet (January 1965). Small parties of Common Scoter are occasionally noted in Ayr Bay, but the only regular west-coast flock is in Solway, where up to 200 have been counted in Luce Bay, and a further 200-300 off Southerness.

Eider *Somateria mollissima*

British Eiders are resident and there is no evidence to suggest that any immigration occurs. Some movement into the Forth of birds from northeast England does however take place in winter.

The most important wintering ground in Scotland is at the mouth of the Tay. Accurate counting is difficult, but numbers there have been estimated at 10,000. Few Eiders move far up the Tay, and numbers in St Andrews Bay have not exceeded 750 in recent years. Flocks of 100-200 occur at various places off the Fife coast, and in the lower Firth of Forth at Tyninghame and Aberlady, where August counts have reached over 4000. At Seafield the peak count (maximum 2800 in February 1966) generally falls between December and February. The records for the Forth area as a whole suggest a gradual autumn movement into the Firth as far as Seafield, and a corresponding reverse movement in early spring. Ringing returns have shown that Eiders from the Farne Islands, as well as Scottish birds, take part in these movements.

Further north, scattered flocks of several hundred birds are recorded at Montrose, the Bay of Nigg, Aberdeen Harbour, and the Ythan Estuary, where the midwinter population (generally 700-1000) is appreciably lower than the September-October peak. Many of the Eiders from this

stretch of coast winter at the mouth of the Tay.

There are a number of records from Peterhead, the Caithness, Sutherland and Argyll coasts, and the northern isles. In the Loch Fleet area up to 600 have been counted, but the other reports all refer to parties of less than 100 birds. Few Eiders appear to winter in the Moray Firth.

In Clyde numbers are slightly higher, with counts of 440 between Helensburgh and Cardross, 422 in Loch Fyne, and 150 in Campbeltown Loch (all in January 1968), and up to 500 around Bute. The flock of Eiders which moults off the Ayrshire coast reaches its peak in early autumn (1260 off Hunterston in September 1965), and midwinter totals there are much smaller. There have been no recent winter records of more than a few Eiders in Solway.

Red-breasted Merganser *Mergus serrator*

Wintering flocks of this species include both native and Icelandic birds. Although frequently breeding on fresh water, Red-breasted Mergansers are almost entirely marine in midwinter. In many areas the largest flocks are seen in July-September, and numbers are smaller during the wildfowl count season.

The only areas where large flocks are known to winter regularly are the Forth and the Beauly Firth. In the Forth numbers are highest west of Bo'ness, where flocks of 200-300 have often been recorded. Red-breasted Mergansers were much more numerous than usual there late in 1968, when 1700 were counted off Grangemouth on 17th November, and 1500-1750 (probably the same flock) between Longannet and Culross on 21st December. Further down-river counts have only occasionally exceeded 100.

No regular counts have been made recently on the north side of the Beauly Firth, but there is a report of more than 630 Red-breasted Mergansers there in November 1962. Along the south shore the count has exceeded 100 on only one occasion during 1962-68.

Elsewhere on the east coast, winter numbers are generally small, though larger flocks are sometimes seen (*e.g.* 400 off Tentsmuir in October 1963 and 400 off Montrose in September 1967). In the northern isles and the north mainland, most reports refer to parties of less than 20 birds, but larger flocks occur occasionally in Orkney, where up to 100 have been counted in Echnaloch Bay. A flock of 216 noted in Broad Bay, Lewis, in September 1964, is the only recent record from the Western Isles. Many of the west-coast sea lochs probably carry flocks of 10-50 Red-breasted Mergansers, judging by reports from the Oban area.

Information from Clyde is sparse, but there is a report

of 400 Red-breasted Mergansers flying past Ardmore Point in November 1962. In Bute, totals of 25-75 have been noted, but the few other records all refer to small parties, the biggest count being 28 between Otter Ferry and Inveraray, on Loch Fyne, in January 1968. Only small numbers of this species winter off the Ayrshire coast, where flocks have rarely exceeded 30 birds, and it seems to be even scarcer in Solway.

Goosander *Mergus merganser*

Both native and Scandinavian birds are represented in wintering flocks of this species. In Scotland, Goosanders are most frequently seen on fresh water, both lochs and rivers, where they generally occur in very small parties, but the one site where large numbers are known to congregate regularly is the tidal Beauly Firth. In recent years flocks of 350-550 Goosanders have been counted there, with a maximum of 800 in February 1965. Sizeable flocks also occur occasionally in the Cromarty and Dornoch Firths (*e.g.* 400 in Dingwall Bay in December 1967 and 100 in Tain Bay in October 1966).

Inland, numbers are very variable, even on those waters where Goosanders are recorded most regularly, and only three reports in the last six seasons refer to more than 50 birds (53 on Castle Loch, Dumfriesshire, in February 1964; a moulting flock of 56 on Loch of Lowes, Perthshire, in September 1965; and 65 on Strathbeg in September 1967).

Goosanders appear to occur more often in Dumfriesshire, Kirkcudbrightshire and Perthshire than elsewhere, and to be scarce on fresh waters north of the Moray Firth.

Smew *Mergus albellus*

This species is a scarce and irregular visitor to Scotland. Records seldom refer to more than single birds; adult males are very much in the minority; and some seasons produce many more reports than others. Most recent records have been detailed in *Scottish Birds.*

Shelduck *Tadorna tadorna*

Winter flocks of this species are believed to consist entirely of native birds, many of which make a late-summer moult migration to the Heligoland Bight. The Shelduck's distribution in Scotland is determined by the limited availability of its preferred habitat (soft intertidal mud containing snails), and in midwinter the bulk of the population is concentrated at a few specially favoured sites. In January the birds start dispersing slowly to the breeding areas, and by March Shelduck are much more widely distributed than in midwinter. Most of the adults leave for the moulting grounds during

June and July, but the birds of the year may remain near the breeding sites until September-October when, presumably, they move to the main wintering areas and join the returning adults.

Shelduck are sometimes seen on fresh water in winter (they breed at several inland sites), but generally only in small groups. Some of the inland records may perhaps represent birds resting during a coast-to-coast flight.

The biggest winter concentrations of Shelduck occur in east-central Scotland, especially on the upper Forth. In 1962-68 January numbers in the Grangemouth area generally exceeded 1000, and reached 1600 in 1968. Other important resorts in this region are the Eden Estuary (400-700 between January and March, and a maximum of 1200 in February 1963), and the Montrose Basin (200-400 regularly and 414 in February 1963). At many summer sites, such as Aberlady and Invergowrie Bays and the Tyninghame and Ythan Estuaries, Shelduck are scarce or absent in midwinter.

In Solway the wintering flock, which is usually concentrated in the Priestside-Caerlaverock area, appears to reach peak numbers later than does the Forth flock. Data are still rather sparse, however, and more coordinated counts, similar to the one which produced a total of 1740 in February 1967, are needed to confirm this impression.

Information for Clyde is patchy but a report of 533 Shelduck between Cardross and Helensburgh in January 1968 suggests that this may be the main wintering site in the region. Few Shelduck are recorded on the Ayrshire coast in early winter, but after January numbers increase both there and northwards into Argyll.

In the north of Scotland the largest winter flocks recorded are in Munlochy Bay (250-350 and a maximum of 600 in March 1967), Nigg Bay (100-240), Alness Bay (100-150), and Longman Bay (usually about 100 but a peak of 225 in January 1964). Numbers at Munlochy sometimes remain high until March, but at the other three resorts dispersal starts in February. At this time Shelduck reappear or increase in other areas, such as the Nairn Bar, Beauly Firth, Tain and Dalmore Bays, Edderton Sands, Skibo Estuary and Loch Fleet. Winter records from Orkney are few, and all refer to parties of less than six birds.

Other species

The following species have occurred in Scotland as vagrants or casual visitors in the period September 1962 to March 1968. Full details of these records have already been published in *Scottish Birds*.

Garganey *Anas querquedula*. Two March records (from Fife and Kirkcudbright), two in September (Islay and Shetland), two in October (Fife and Dumfriesshire) and several 'summer' records (April-August).

Green-winged Teal *Anas crecca carolinensis*. Winter records from Inverness-shire, Renfrewshire and Lanarkshire/Dunbartonshire.

Blue-winged Teal *Anas discors*. One report from Orkney in November 1966.

American Wigeon *Anas americana*. Records from Inverness-shire and Shetland, including one of a Canadian-ringed bird shot in Shetland in October 1966.

Red-crested Pochard *Netta rufina*. Reports from Aberdeenshire, Midlothian and Perthshire.

Ring-necked Duck *Aythya collaris*. The first Scottish record—in Inverness-shire in 1963.

Surf Scoter *Melanitta perspicillata*. Reports from Orkney, Lewis, the Moray Firth, Fife, Kirkcudbrightshire and Wigtownshire.

Harlequin Duck *Histrionicus histrionicus*. Reports, possibly referring to the same pair, from Shetland and Caithness early in 1965.

King Eider *Somateria spectabilis*. Several Shetland records and one from Aberdeenshire.

The possibility that some of these birds (especially the *Anas* species and *Netta rufina*) had escaped from collections cannot be entirely ruled out. A Ruddy Duck *Oxyura jamaicensis* reported in Fife in 1965 was undoubtedly an escape.

A small feral flock of Mandarin Duck *Aix galericulata* is established on the River Tay at Perth.

Section 2. Numerical variations

In this section an attempt is made to elucidate the two types of numerical variation occurring among Scottish wintering ducks: seasonal fluctuations, dependent largely on the timing of the arrival and departure of winter visitors; and year-to-year changes in numbers, influenced in some species by breeding success in this country as well as by the size of the immigrant influx.

Seasonal fluctuations

In examining monthly variations in numbers, only data from waters with a complete run of counts from October to March can be used, and one must hope that these reflect trends over Scotland as a whole. With the commoner species (Mallard, Teal, Wigeon, Tufted Duck and Pochard) a reason-

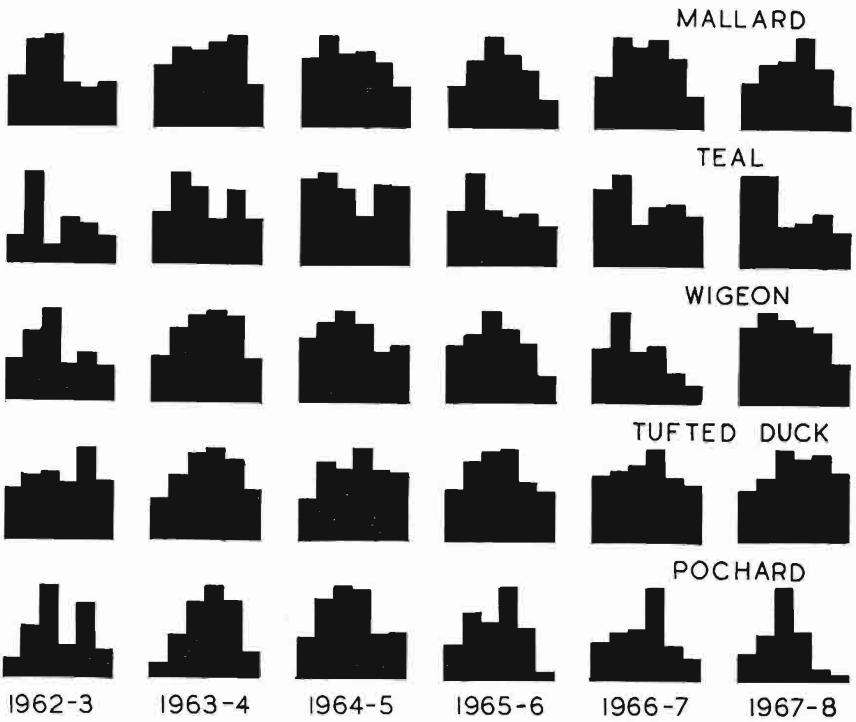

FIG. 2. Fluctuations in duck numbers from October to March (based largely on priority count figures). Each column represents one month, with October on the left. The peak count for each species each season is taken as 100 and the other monthly totals are expressed as percentages of the peak. The table below gives the peak counts (upper figures) and the number of sites involved (lower figures):

1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
					Mallard
9007	13731	11471	15839	22148	17057
19	25	22	25	29	24
					Teal
5610	2579	1856	1986	1938	2462
10	14	11	16	15	14
					Wigeon
8003	6643	9103	9393	31684	10788
18	21	21	21	30	22
					Tufted Duck
2983	2909	3502	4838	2804	2842
11	15	16	18	19	16
					Pochard
3773	3878	5023	7984	7226	10299
7	8	10	14	14	12

ably large sample of such waters exists for each of the last six seasons but, since these waters vary in number and identity from year to year, the annual totals of each species counted differ widely, and direct comparisons between seasons are therefore unsatisfactory. These differences in totals have been levelled-out by considering the peak count (total for all waters in the sample) in each season as 100 and expressing the other monthly totals as a percentage of the peak (fig. 2). This allows between-year and between-species comparisons of the seasonal trends in numbers. Fig. 3 shows that the seasonal fluctuations of a species are not necessarily synchronous throughout the country; maximum Pochard numbers are generally reached one to two months earlier in the north than in central Scotland. Wigeon also reach their peak earlier in the Moray Firth than further south. Variations in other species are less clear-cut. Some northern waters are included in the calculations for all the fig. 2 histograms.

The counts of Scaup and Goldeneye at Seafield, the most important site for both species, have been used in a direct comparison of actual numbers, and contrasted with those for some of the smaller, more northern resorts (fig. 4). Data for the remaining species are not sufficiently complete to justify detailed comparisons and only general comments on seasonal variations can be made.

Mallard, Teal and Wigeon. The histograms of fig. 2 show that the seasonal fluctuations of these three species differ considerably. Mallard show the least consistency, with peak numbers in different years occurring in every month from November to February. One can only speculate as to the reason

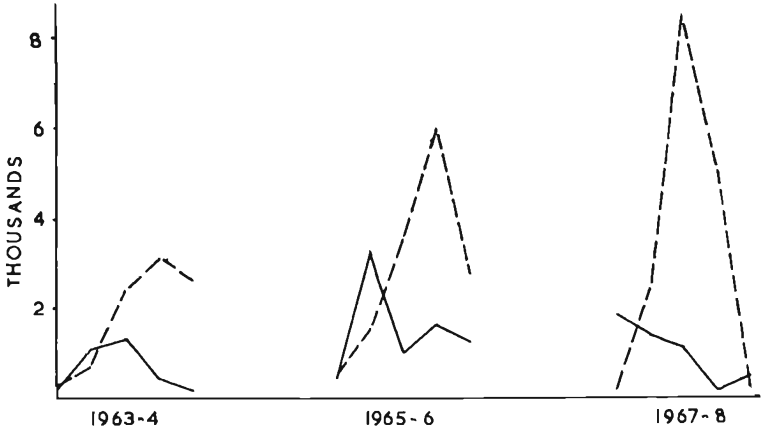

FIG. 3. Pochard numbers, from October to February, at Strathbeg and Harray (solid line) and at Duddingston, Kilconquhar and Town Loch (broken line).

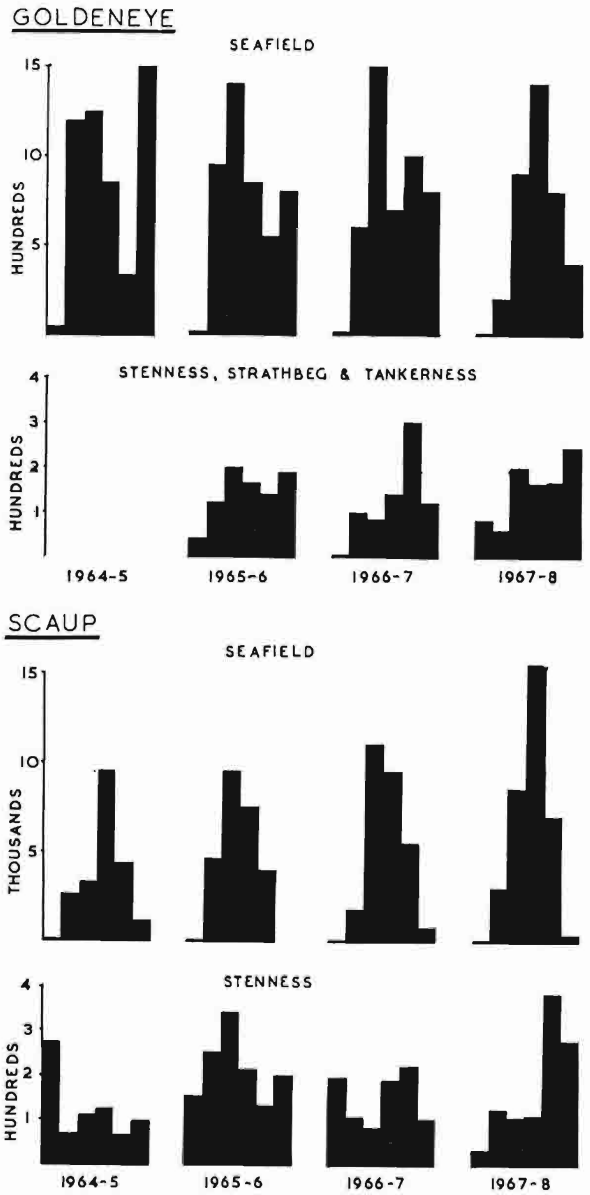

FIG. 4. Monthly fluctuations, from October to March, in numbers of Goldeneye and Scaup at Seafield and in the north.

for this variability, but, since ringing recoveries have shown that Scottish wintering birds may originate from points as far apart as Iceland and the USSR, it may be due to birds from one of these areas failing to reach this country in some seasons. Teal show a marked autumn peak, a midwinter drop attributable to the onward passage known to take place (westwards to Ireland and/or south to France), and then some recovery in numbers prior to the March decrease. The sources of Teal and Wigeon wintering in this country are as widespread as those of Mallard, but the limited ringing evidence available suggests that a larger proportion of our immigrant stocks of these two species originates in Iceland than is the case with Mallard. Wigeon show a fairly regular seasonal pattern, with a steady build-up in autumn to a peak in November or December. The important Cromarty Firth area, however, is represented only in the 1966-67 histogram, since a complete run of counts is available only for that season. The inclusion of the Cromarty figures would almost certainly bring the Wigeon peak forward from December to November in each year and would probably also increase the height of the peak above the other monthly levels (as in 1966).

The timing and size of immigrant duck movements are presumably influenced more by weather conditions in the area of origin that by those prevailing in Scotland at the time of arrival. For most species variations in midwinter frost intensity in this country are likely to affect only local distribution, unless conditions become exceptionally severe. The timing and rate of the spring dispersal on the other hand are affected by the weather here in February and March. Two major deviations from the 'average' winter occurred in the last six seasons (see appendix 2) and both are reflected in the corresponding histograms. During January and February 1963 continuous frost and snow cover resulted in a marked abnormal decrease in the numbers of Mallard and Wigeon recorded in comparison with other years. In early March 1965 an unusually cold spell delayed the dispersal of all species except Mallard (the earliest nester), with Teal numbers remaining almost constant from February to March while Wigeon actually increased instead of declining.

Scaup, Tufted Duck, Pochard and Goldeneye. These four species reach peak numbers during December-January (figs. 2 & 4). The rapid autumn build-up to the midwinter maximum, and equally rapid decline in February-March, are particularly distinct in Pochard and the Seafield flock of Scaup. The Pochard peak depends on the date of the maximum count at Duddingston and the apparent drops in January 1963 and December 1965 are almost certainly due to local

movements to unrecorded waters and not to departure from the area.

The Seafield Goldeneye also increase very rapidly from the minimal numbers present in October. Their subsequent decrease, however, is much slower than that of the Scaup and in three of the last four years there has been a distinct end-of-season increase (in many areas Goldeneye are present well into April but, as mentioned earlier, no recent counts are available to illustrate this point). The regularity of the annual fluctuations in the Seafield Scaup flock, and to a lesser extent the Seafield Goldeneye, is in marked contrast to the irregular variations on some of the smaller northern resorts (fig. 4).

The similarities between the seasonal fluctuations of these three species are interesting, as the birds apparently originate from separate breeding grounds. All ringed Scaup recovered in Scotland have been Icelandic birds; all Goldeneye recoveries are of birds ringed in Sweden; while the only three foreign-marked Pochard recorded here so far (none of them in Forth) had been ringed in Denmark (2) and Lithuania.

Unlike the other diving species, Tufted Ducks breed in this country in considerable numbers (the numbers of Pochard and Scaup breeding here are very small, and Goldeneye do not breed at all in Britain) and native birds probably form a substantial part of the wintering flocks, which also include immigrants from Iceland, Scandinavia and the USSR. The much less marked seasonal fluctuations shown by Tufted Duck in comparison with the previous species are presumably due to the relatively large numbers of native birds present at the beginning and end of the season.

The severe weather of early 1963 does not appear to have driven many of the diving ducks further south. In fact Tufted Duck reached a high peak in February 1963, when 2300 were counted on the Kennet Pans stretch of the Forth, the tidal water to which many of the Tufted Duck in east-central Scotland apparently resort when the lochs and reservoirs freeze over. The late spring of 1965 on the other hand delayed the dispersal of Tufted Duck, Pochard and Goldeneye but not of Scaup.

Other species. The mobility of Pintail flocks within the main wintering areas makes accurate assessment of seasonal changes difficult. Only small numbers of Pintail breed in Scotland and many of the immigrant birds probably come from Iceland. The main influx generally occurs in November and numbers then remain fairly constant until February and sometimes into March.

Shoveler show a marked early-autumn passage through Scotland with a much earlier peak than any other species.

Numbers are at their maximum in September-October and drop rapidly as soon as frost sets in. In most of the years under review this drop occurred between the November and December counts, but in 1965, when there was an unusually cold spell early in November, a big decrease took place between the October and November counts. Few Shoveler overwinter in Scotland, and although there is some return movement in February-March this is insignificant compared with the autumn passage (in complete contrast to the situation in England, where maximum numbers are present in March). An appreciable strengthening of this autumn passage has been apparent (mainly in the northeast and east of the country) in the last three to four years, and this may be related to the recent increase of Shoveler as a breeding species in Scandinavia. As yet, however, there is no ringing evidence to support this theory, the few Shoveler recoveries suggesting a USSR or W. German origin for birds passing through southwest Scotland, and a southward movement of the small numbers of Scottish-bred birds as far as Spain.

The sparse information available for Long-tailed Duck suggests that the main arrival is from October onwards and that birds are still present in considerable numbers in March. No ringed Long-tailed Ducks have been recovered in Scotland, but the view has been expressed (Boyd in Atkinson-Willes 1963) that British-wintering birds are more likely to come from Siberia, and possibly Spitsbergen, than from Iceland or Greenland.

The largest recent counts of Velvet Scoter have been made in December-January but the records are so erratic that no satisfactory picture of seasonal movements can be deduced. There is a single record of a Velvet Scoter ringed as a juvenile in Norway and recovered in Dumfriesshire.

Substantial flocks of moulting Common Scoter occur off the east coast in late summer but it is not known whether these same birds form the wintering flocks. At the main resort, in St Andrews Bay, numbers are generally small in October, increase rapidly in November and remain fairly high until March. There are no ringing recoveries for Scotland but it is thought that many of the Common Scoter wintering in this country probably come from Iceland.

Eiders are resident in Scotland and the wintering population, so far as is known, consists entirely of native birds. Studies on the east coast have shown that sizeable movements take place to and from distinct moulting and wintering grounds, and these, as well as breeding season changes, produce marked seasonal variations in numbers at the principal resorts (Milne 1965).

The available data for Red-breasted Merganser and Goos-

ander are few and no pattern of seasonal fluctuations is apparent. Both species breed in Scotland, while ringing recoveries have shown that Red-breasted Mergansers from Iceland (6 records) and Goosanders from Sweden (1 record) occur here as winter visitors.

The movements of Scottish Shelduck have already been outlined in section 1. Numbers are probably at their lowest in October-November before the adults return from the moulting grounds around the Weser Estuary in northwest Germany.

Year-to-year changes in numbers

To speak of 'population' changes implies that the birds referred to form a distinct and identifiable unit whose numbers are controlled solely by variations in breeding success and mortality. Only two species wintering in Scotland, Eider and Shelduck, conform to this description and even for these the data are insufficient to allow population changes to be measured accurately. Wintering flocks of most other species consist either of immigrants from more than one source, or of British and foreign birds in unknown proportions. In neither case can these be described as closed populations. True population changes will only become measurable when much more information has been assembled regarding the breeding areas, migration routes and final wintering grounds of the various species. Much of this information should eventually become available through the International Wildfowl Research Bureau's plan for studying European wildfowl, throughout their entire range, by a combination of midwinter censuses, ringing programmes and breeding distribution surveys. Meantime much remains to be learned about the breeding numbers and distribution of native species. Information has been accumulating slowly through the Wildfowl Trust's Summer Breeding Survey, but it is disappointing that after four years so much of the country remains a blank. More data on distribution will be obtained from the British Trust for Ornithology's Atlas of Breeding Birds, but since this involves no record of numbers it will be of little help in estimating the size of Scottish breeding populations.

To avoid any suggestion that discrete populations are being considered the description 'wintering flocks' will be used in the discussion which follows in preference to 'populations.'

Annual changes in the size of Scottish-wintering duck flocks composed partly or entirely of immigrant birds presumably depend mainly on (1) variations in breeding success in the areas(s) of origin (including Scotland when native birds constitute part of the flock), and (2) variations in the proportion of foreign populations visiting Scotland. Once the species

has reached this country the availability of its preferred habitat determines whether it remains or moves on, and regulates its local distribution.

Ideally, between-year comparisons of wintering numbers should be based on regular counts on a constant sample of the most important waters for each species. With such strict selection, however, the sample will be limited, because of occasional missed counts on most waters, to a small and inadequately representative group. The system of indices of relative abundance' developed by the Wildfowl Trust (see appendix 2) uses most of the records from priority waters, even though some of these waters are not counted regularly every month.

The extent to which the counts on selected waters reflect numerical changes in wintering flocks over the country as a whole depends upon (1) the size and constancy of the sample in relation to the total wintering flock, (2) the consistency with which the larger gatherings frequent the priority waters, and (3) the adequacy with which hard-weather resorts, as well as preferred habitats, are represented.

It is obviously impossible to measure accurately the first of these factors since this would involve counting, on several occasions, every member of a species present in the country. The International Census results, however, provide a means of making some assessment of inter-specific variations in sample size and constancy. Table 3 shows, for the five commonest species, the proportion of total counts carried by priority waters at the 1967 and 1968 censuses. The higher the proportion of birds counted on priority waters, and the more

Table 3. Proportion of birds counted on priority waters at January 1967 and 1968 censuses

	Mallard	Teal	Wigeon	Tufted	Pochard
Priority waters	60	30	50	39	18
Priority waters counted					
1967	56	27	44	37	17
1968	53	26	45	33	18
Birds on these waters					
1967	27330	4040	13563	2809	7299
1968	23150	2030	13818	2726	2777
Total birds counted					
1967 (307 sites)	52455	6961	38668	6819	9498
1968 (346 sites)	49867	5735	30486	6559	7556
Percentage on priority waters					
1967	52	58	35	41	77
1968	46	35	45	42	37

PLATE 28. Fair Isle on a fine sunny day, showing the magnificent cliffs at the north end and the crofting area in the south

Photographs by John Topham Ltd

PLATE 29. Fair Isle, looking over North Haven to Sheep Rock, showing the old bird observatory huts and the site of the new buildings in the hollow between the two roads; and the founders of the observatory (left to right), Ian Pitman, Sir Arthur Duncan and George Waterston, still active in their original roles of treasurer, chairman and secretary, respectively.

Photographs by Dennis Coutts

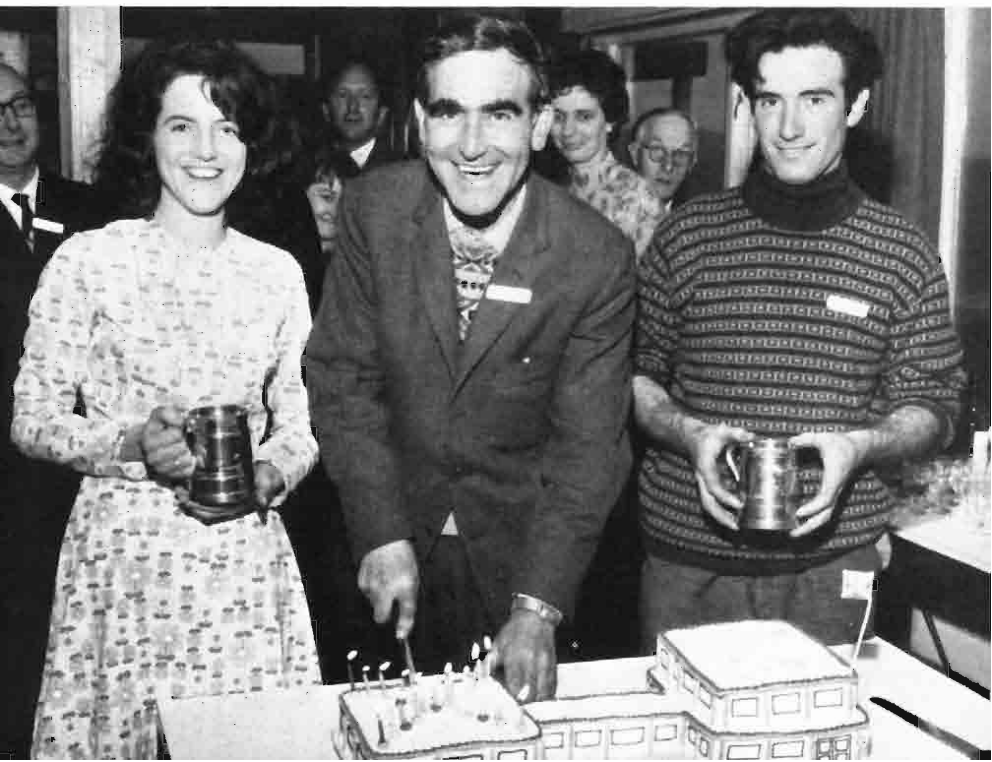

PLATE 30. Aerial view of Fair Isle, looking over the observatory site, with the airstrip on the hill behind; and George Waterston cutting the 21st birthday cake, in the shape of the new buildings, watched by the warden Roy Dennis and his wife Marina, holding the tankards presented to them to mark the opening of the new observatory.

Photographs by Aerofilms Ltd (top) and Dennis Coutts

PLATE 31. The new Fair Isle Bird Observatory buildings completed in 1969, with the warden's quarters on the right, on an overcast autumn day; and a Wryneck being examined and measured in the laboratory.

Photographs by Joe Horrock (top) and John Topham Ltd

constant this figure from year to year, the more reliable should be the indices (appreciably fewer sites were counted in 1967 than in 1968, so a slight decrease in the 'priority percentages' would be expected in the latter year). The figures shown in the table suggest that the Mallard indices are more reliable than those for Wigeon, which in turn are more reliable than those for Teal, while the Tufted Duck figures are much more consistent than those for Pochard.

The constancy of these 'priority percentages' is controlled largely by the second factor, consistency in the usage of priority waters. This in turn is influenced by whether the species under consideration tends (1) to remain for long periods at one resort or to move freely around the country, and (2) to form a few large flocks or be scattered in relatively small parties on many different waters. Where a species occurs principally in large flocks (see section 3), and also makes irregular mass movements from one site to another, it is important that the alternative resorts should be fully covered. Since the criterion for selecting priority waters was that they should carry *each season* the stated minimum for the species concerned, waters which are used only sporadically have tended to be disregarded. A striking example of the consequences of this occurs in the records for Pochard (the species which shows the biggest difference between 1967 and 1968 priority percentages). The Town Loch at Dunfermline, used only irregularly by large numbers of Pochard, is not included in the priority list for this species. In January 1967 only 66 Pochard were on the loch but in January 1968 there were 2800 (700 more than on Duddingston). The inclusion of these records with the priority counts would bring the 1967 and 1968 figures in table 3 to 79% and 74% respectively and would make the Pochard indices appreciably more reliable than any of the others.

The third factor, adequate representation of hard-weather resorts, has also been restricted by the regular-usage criterion. Failure here must lead to disproportionately low indices in severe winters, suggesting that onward migration has occurred when the birds have probably made only local movements. As suggested earlier, the diving species are not driven out of Scotland even by continuous hard weather, though they may be forced to leave freshwater lochs. Tufted Duck are most reluctant to move to tidal water (see section 3) and, since such waters are used only occasionally, none are included in the priority list for this species. There are, however, several tidal areas where Tufted Duck gather during prolonged spells of frost. By far the most important of these is Kennet Pans, where few Tufted Duck occur in open seasons

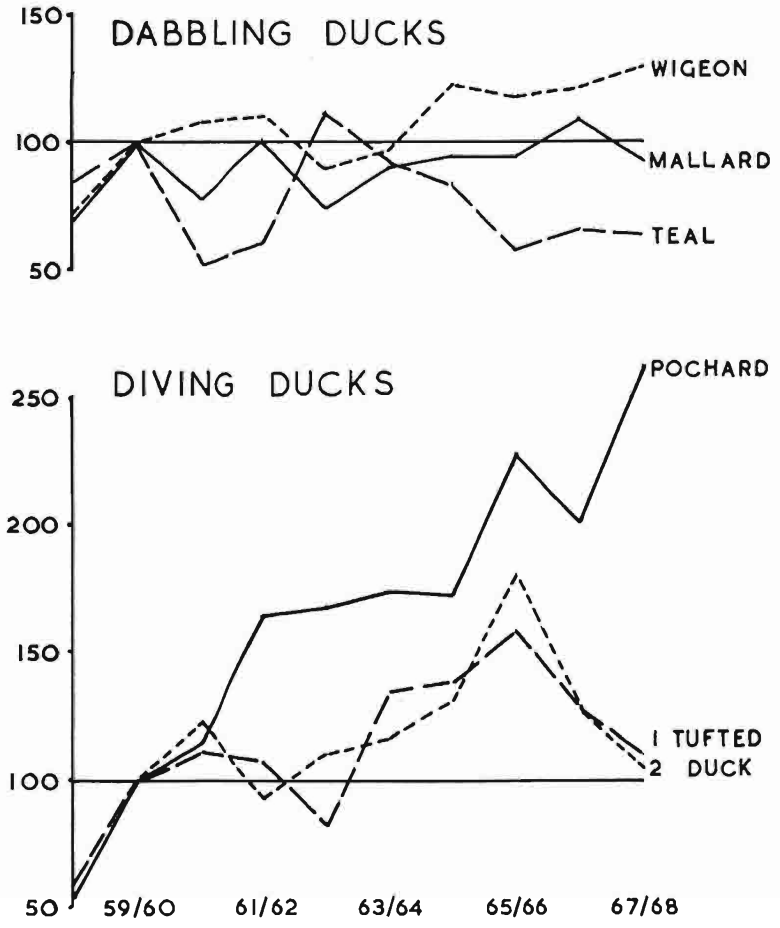

FIG. 5. Scottish 'Indices of Relative Abundance' (see appendix 2) for five common species. For the Tufted Duck graph 1 excludes and graph 2 includes Kennet Pans counts.

but 2000 sometimes assemble in severe weather (table 4). The inclusion of the figures for this site completely alters the pattern of the indices for this species (fig. 5).

Another limitation of the present system is that only waters counted in the master year (1959-60) can be used in calculating the indices. This excludes some important areas (such as the Cromarty Firth) where counts have been made only during the last few years. However, a 'new master' series, based on 5-year averages, is being calculated at Slimbridge, and if satisfactory will permit the inclusion of many more waters. This, if combined with a more flexible and com-

Table 4. Monthly counts of Tufted Duck on the Kennet Pans stretch of the Forth

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
Oct	0	0	0	0	0	0
Nov	0	6	0	2	8	0
Dec	0	0	0	2300	820	160
Jan	1800	0	485	1900	850	330
Feb	2300	0	720	450	0	390
Mar	382	0	0	0	0	0

Note Severe frost was experienced in 1962-63 (from mid December to early March) and in 1965-66 (from early November to late January); 1963-64 was a very mild season; the remaining three winters were intermediate (see appendix 3).

prehensive selection of priority waters, should make the indices more reliable measures of change in the size of wintering flocks.

It will be apparent from the foregoing remarks that some caution must be exercised in interpreting the indices of relative abundance shown in fig. 5. Where the graph shows a continuous and pronounced trend in one direction, as with Pochard, the wintering numbers probably have changed; since the Scottish breeding stock of Pochard is negligible, an increase in this species must be due to the arrival of greater numbers of immigrants.

The other four species fluctuate irregularly, and interpretation is complicated by the lack of knowledge of the relative contributions of native and immigrant stocks to the total wintering numbers. Clearly, however, considerable annual variations occur in the numbers of Mallard, Teal, Wigeon, Tufted Duck and Pochard wintering in Scotland. These fluctuations probably result mainly from variations in the strength of immigration rather than in the breeding success of native birds. To summarise, wintering Pochard have probably increased in recent years, but the other four common species show no consistent trends.

The Seafield Scaup flock, and hence probably the Scottish total, has also increased recently, but information for other wintering species is still insufficient to justify any attempt to assess trends and status.

Section 3. Ecological considerations

As stated earlier, one of the aims of the Wildfowl Count Scheme is to determine whether any species is in need of special protection. Records of numbers alone are insufficient for this purpose; knowledge of the ecology of the various species, and of the threats to which they may be exposed, is also required. The scheme's records obviously contain a wealth of information on wildfowl ecology, but a full analysis

would have needed more time than the author had available. It seemed possible, however, that a study of selected data might provide information of value for conservation. In this section, therefore, an attempt is made to assess interspecific differences in gregariousness, and to examine the effects of varying winter severity on the distribution of the commoner species. The section concludes with a discussion of habitat changes which have occurred recently, are at present in progress or may be expected to take place.

Flock size

Highly gregarious species, occurring in large flocks and at a limited number of places, are more vulnerable than those which are widely dispersed in smaller flocks and a variety of habitats. The records collected at the 1968 mid-January Census, which include data from 346 sites, representing a wide range of habitats, have been used to examine differences between species distribution and flock size (table 5). In January the numbers of Mallard and Wigeon are declining, Teal are at their midwinter minimum, Pintail are probably near their maximum (the January 1968 count was incomplete in Solway), and all the diving species are near their winter peak (see section 2). Since the mean temperatures for the 1967-68 winter were the nearest of the last six seasons' figures to the 30-year average (appendix 3) the distribution in January 1968 seems likely to be representative of the average mid-winter situation.

Table 5 illustrates the differences in flock size and dispersion of eight species. Mallard, occurring on some 73% of the waters visited, were the most widely dispersed. Although several large gatherings were recorded, nearly 60% were in flocks of under 1000. Wigeon and Teal occurred on similar numbers of waters but, whereas half the Wigeon were in flocks of 1000 or more, over 70% of the Teal were in groups of under 250. All three species showed a wide scatter, in both flock size and location, so could presumably adjust to localised habitat changes without suffering serious reduction in numbers.

Pintail presented a complete contrast, with four flocks holding 90% of the birds, and these all at sites which are to some extent endangered—Solway, Forth, Beauly and Cromarty. If the projected developments in these areas are carried out (see below), almost the entire Scottish-wintering population would be affected.

Among the diving species, both Tufted Duck and Goldeneye were widely dispersed, and in each instance half the birds were recorded in small or medium-sized groups. With Goldeneye, however, one very large flock at Seafield accounted for over a quarter of the total and would be vulnerable to any disaster occurring in the Forth. No flocks of comparable size

Table 5. Numbers of eight species of duck counted at 346 sites in January 1968

Dabbling Ducks	Mallard	Teal	Wigeon	Pintail
Sites with a count of				
0	92	236	205	327
1 - 50	107	75	57	15
51 - 100	46	11	16	0
101 - 250	46	19	29	2
251 - 500	36	4	19	2
501 - 1000	9	1	11	0
1001 - 2500	6	0	7	0
over 2500	4	0	2	0
Total counted	49867	5735	30486	1162
Maximum single count	3850	500	2500	420
Percentage on major sites	41	29	49	91

Note For Mallard and Wigeon major sites are those holding over 1000 of the species; for Teal the figure is 250 and for Pintail 100

Diving Ducks	Tufted	Pochard	Goldeneye	Scaup
Sites with a count of				
0	226	286	213	318
1 - 20	51	37	89	14
21 - 50	37	14	22	6
51 - 100	12	3	11	0
101 - 200	9	1	7	3
201 - 500	10	3	3	2
over 500	1	2	1	3
Total counted	6559	7556	4820	22252
Maximum single count	860	2800	1400	15500
Percentage on major sites (holding over 200)	54	75	49	97

were recorded for Tufted Duck in January 1968 but, as mentioned earlier, gatherings of over 2000 do occur on the upper Forth during severe frost. Only under these conditions is this species likely to be in any danger.

Pochard were recorded on only half as many waters as the two previous species and the Duddingston and Town Loch flocks accounted for two-thirds of the total (2100 and 2800 birds respectively). The Duddingston roost, being a bird sanctuary, is unlikely to suffer any deleterious changes, but at the Town Loch, where the power station recently switched from coal to oil, some pollution has already been reported. As the bulk of the Scottish Pochard population is concentrated in the Forth area any factor which adversely affects conditions there might reduce the total wintering numbers.

Scaup were concentrated primarily in one locality, with comparatively insignificant numbers scattered elsewhere round the coast; 95% of the birds counted were on the Forth, making this species extremely vulnerable to any oil pollution or other disaster which might occur there. If the Scottish-

wintering Scaup do comprise most of the Icelandic breeding stock then oiling in the Forth could devastate this entire population.

Records for the sea ducks, sawbills and Shelduck are insufficient to justify similar detailed examination but some comments, based on a general review of the data, can be made. Among the sea ducks, Eider, with its very large concentration at the mouth of the Tay, is the species most likely to suffer seriously from oil pollution. Large-scale mortality from this cause has indeed already been rcorded there (Greenwood & Keddie 1968). Both Velvet and Common Scoters also occur at times in very large flocks, but since they frequent more open coastal waters they are probably less vulnerable than Eiders to oiling. The wintering population of Long-tailed Ducks, which consists mainly of scattered small flocks, is unlikely to be seriously affected by local pollution.

The only areas where sawbills are known to gather in sufficiently large numbers for adverse conditions to affect the population as a whole are the Beauly Firth (both Red-breasted Mergansers and Goosanders) and the upper Forth (Red-breasted Mergansers only). Developments in the Inverness area might well influence conditions in the Beauly Firth, while the risk of oiling in the Forth is ever-present.

Several of the most important Shelduck wintering grounds are in areas where conditions may well change in the next ten years (Grangemouth, Solway and Cromarty). Reductions in the extent of the intertidal mud available in these areas, or changes in its biological characteristics, could affect the numbers of Shelduck wintering in Scotland and possibly also the breeding population.

Influence of weather on habitat selection in winter

It is well known that some ducks prefer fresh, and others tidal, waters, but there is little published information on the degree to which the usage of different habitat types is influenced by weather conditions. To obtain some measure of interspecific differences in this respect a comparison has been made between duck numbers on ten fresh and ten tidal waters in October, when the birds have a choice of habitat, and in January, when freezing of fresh waters may restrict the choice. The records for three seasons, representative of very severe, average, and very open conditions (appendix 3), have been used to demonstrate the effects of varying winter severity.

The resorts used in this comparison were chosen so far as possible to represent a range of habitat types, and to carry between them substantial numbers of each species. Only waters for which October and January counts were available

in each of the three seasons could be used, and this restriction may have resulted in rather inadequate representation of Wigeon on tidal waters. The sites selected were: (fresh waters) Strathbeg (a very large and fairly eutrophic loch), Duddingston, Kinnordy and the Forfar-Rescobie-Balgavies group (small to medium-sized eutrophic lochs), Gladhouse and Lintrathen (large reservoirs), the Slains group at Newburgh (small lochs) and the Ambrisbeg group in Bute (one large and two small), Fitty (typical of the rather bare waters in South Fife), and Harray (a large, shallow Orkney loch); (tidal waters) Tyninghame, Eden and Ythan Estuaries (small estuaries opening to the North Sea), Longman Bay and Skibo Estuary (sheltered sites in Inverness and Dornoch Firths), Tullibody Island, Kennet Pans and Grangemouth-Kincardine Bridge (stretches of upper Forth), Seafield (Forth foreshore at Leith), and Stenness (a brackish loch in Orkney, very close to Harray).

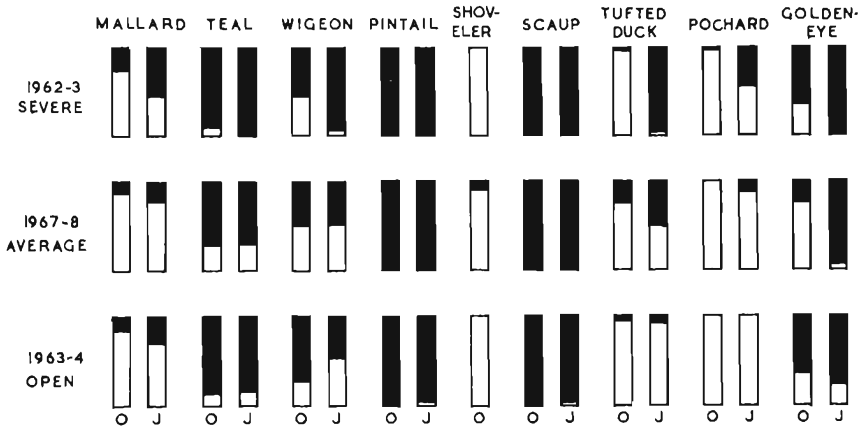

FIG. 6. Proportions of nine duck species recorded on fresh water (white) and tidal water (black), in October (O) and January (J), in winters of varying severity (based on records from ten fresh and ten tidal waters).

The percentages of each species recorded on fresh and on tidal waters are shown in fig. 6. The virtually exclusive use of tidal waters by Pintail and Scaup, and of fresh water by Shoveler, is what would be expected, and no further comment on these species need be made (no January figure for Shoveler is given since the numbers present at that season were negligible).

Mallard show a strong preference for fresh water and frequently continue to roost on frozen lochs and feed on the surrounding farmland when all other species have moved away. Only during conditions of frozen snow cover, as in

January 1963, were more than half the Mallard recorded on tidal water. An average winter, by contrast, produced little change from the autumn pattern of distribution. Most of the Teal were recorded on tidal waters even in autumn, an unexpected finding in view of the *Handbook* comment "resorting . . . to a less extent to sea coasts, estuaries and mud-flats." Again only very severe conditions reduced the proportion (in this case already very small) on fresh water. Wigeon are usually thought to be mainly maritime outwith the breeding season, but in Scotland a substantial proportion winter on fresh water, and only really severe weather drives practically all the birds to the coast.

The closest correlation between weather and distribution is seen in the Tufted Duck. In autumn nearly all are found on fresh water (the majority of tidal birds in October 1967 were on the brackish Loch of Stenness), and if conditions remain open, as in 1963-64, no significant movement to tidal water takes place. In an average winter, with some of the shallower lochs frozen in January, about half the Tufted Duck move to estuarine waters; and in a very severe winter almost all leave their preferred habitat.

Pochard seem to show an even stronger attachment to fresh water. The figures are somewhat misleading, however, since they are greatly influenced by the counts for Duddingston. If the surmises made in section 1 are correct, the apparent strong preference for fresh water is probably true as far as roosting is concerned, but appreciable numbers of Pochard must feed on tidal water.

Goldeneye have the least consistent autumn distribution, with the highest numbers occurring on fresh water in some seasons and on tidal water in others. By midwinter, however, a large proportion of the Goldeneye population is always on tidal water, even in an open season.

A good illustration of the way in which normally scattered populations may be concentrated by severe weather is provided by the records for the upper Forth, between Grangemouth and Alloa. In the mild January of 1964 this area held 1381 dabbling ducks (579 of which were Pintail) and only one diving duck. In the very hard weather of January 1963 there were no fewer than 6174 dabbling ducks and 3502 diving ducks on this 10-mile stretch of river, much of which is less than half a mile wide. Under such conditions there could well be competition for food between the various species.

Habitat changes

Even in the absence of direct interference by man, habitats change gradually as estuaries silt up and lochs become en-

riched. When man intervenes, changes are liable to be sudden and extensive. They may occur intentionally, as in the creation of new reservoirs and the drainage of wetlands, or quite unintentionally, through water pollution or other activities which affect the ecology of the habitat. Detailed records of the wildfowl using newly-created waters and areas undergoing development are invaluable in helping to forecast the probable effects of similar developments in the future. Records are equally useful in retrospect, when a long series of counts on an individual water may provide the only factual evidence of a less-obviously changing habitat.

Recent physical changes to Scottish habitats have probably been comparatively unimportant to wintering wildfowl. A few small lochs have been filled in, completely or partly. In the latter case the numbers of diving ducks have been reduced, but the dabbling species have suffered little effect. Reclamation by tipping ash and rubble along the shoreline is also taking place, and in some areas, such as Invergowrie Bay, is gradually reducing the extent of the tidal mudflats. In England the creation of gravel pits and reservoirs has provided many valuable new habitats. In Scotland, on the other hand, most recently created waters are situated in hilly areas and are very deep. They are consequently of little value to wildfowl. However, some of the newer lowland reservoirs, for example the Backwater Dam in Angus, are already used as roosts by Mallard feeding on nearby agricultural land and may eventually carry appreciable numbers of diving ducks.

Future physical changes are likely to be on a larger scale and to have more far-reaching effects. If the plan for a Solway Barrage reaches fruition, freshwater conditions will be created in the upper Solway and the feeding grounds of Pintail and Shelduck will be reduced. The Pintail resort in Longman Bay is likely to be adversely affected, if not destroyed, in the near future, since plans for industrial development there involve the reclamation of a considerable area of foreshore. The much-publicised Invergordon project includes the establishment of an aluminium smelter, and also a petrochemical works, in the Cromarty Firth. Increasing pollution is bound to result; oil spillage could endanger the Goldeneye in the Firth; and, if the proposed reclamation of Nigg Bay is carried out, a third Pintail feeding ground will vanish. Changes in the area might also affect the Wigeon which use the Cromarty Firth in autumn.

All these schemes involve physical alteration of the environment. Less obvious changes affecting wildfowl habitats

are also occurring as a result of pollution, and many must pass unnoticed; but occasionally their effects on wildfowl numbers are sufficiently striking to attract attention. Such was the case with the Tullibody Island-Kennet Pans stretch of the Forth, where Mallard and Teal numbers have dropped steadily over the last six years (table 6). Enquiry from the

Table 6. Counts of Mallard and Teal on the Tullibody Island-Kennet Pans stretch of the Forth

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
Mallard						
Peak	1554	907	756	637	734	416
Total	6065	3570	2728	2410	2157	1294
Teal						
Peak	4390	1501	975	861	552	298
Total	12627	4848	3169	2053	1382	1113

Note Total figures are the sum of the seven monthly counts for the season

Forth River Purification Board revealed that until 1963 distillery 'spent wash' (consisting mostly of agglomerations of yeast and some of the soft tissue boiled out of the grain before and during distillation) was discharged into the river near Cambus, at the upstream end of this stretch. In 1963 the distillery installed a plant to dry the spent wash for use as cattle feed. For the next two years some of the wash still reached the river, owing to breakdowns in the plant, but since then none has been discharged. There has been no increase in other forms of pollution. Presumably, therefore, it was the spent wash which formerly attracted such large numbers of duck to the area. Unfortunately a reduction in the level of pollution does not always result in improved conditions for wildfowl.

A change is apparently also occurring at Seafield, where the numbers of diving duck (especially Scaup) have increased markedly in the last few years, suggesting that more food has become available. No information is obtainable on the populations of marine animals in this stretch of the Forth, but as Edinburgh expands, an increasing volume of sewage is discharged. It is currently 26.5 million gallons per day from the Water of Leith and Seafield outfalls alone and contains considerable quantities of crude sewage as well as domestic drainage and industrial waste. Presumably the sewage provides food for the ducks, either directly, or indirectly by increasing the marine fauna.

The most serious threat to wildfowl and their habitats is

that of oil pollution in estuarine and coastal waters. Unfortunately it is also the most difficult to control. The *Torrey Canyon* experience showed that diving species suffer the greatest losses; the Medway incident in 1966 demonstrated that oil deposited on saltings and mudflats could kill birds feeding over the area; and observations following the leakage from the *Tank Duchess* off Dundee proved that slicks carried to and fro on the tide present a recurring threat to both birds and beaches. Mention has already been made of the oiling in the Tay Estuary, which killed more than 1300 ducks early in 1968. More recently serious oil pollution of the Clyde was narrowly averted. Tankers ply regularly up the Forth as far as Grangemouth and, since 20,000 or more diving ducks frequent the inshore waters near Leith in midwinter, and important concentrations of Shelduck and Pintail use the flats near Grangemouth, and large flocks of Tufted Duck, Goldeneye and Red-breasted Merganser occur on the upper tidal reaches of the river, oiling anywhere on the Forth could constitute a major wildfowl disaster. The preparation of a plan of campaign, which would coordinate the activities of local authorities, River Boards and others, and could be put into operation without delay in the event of a serious oil spillage, should be regarded as a matter of great urgency.

Other human activities that influence wildfowl distribution or numbers are shooting and aquatic sports (especially water skiing). The growth of Wildfowlers' Associations and the introduction of shooting permits and bag limits have decreased the disturbance caused by indiscriminate and uncontrolled shooting. It seems unlikely that over-shooting now has any real effect on either total numbers or regional distribution of wintering duck, though it may still affect local distribution in some areas. In Scotland the climate is unfavourable to aquatic sports during most of the winter, and these are consequently a more serious threat to breeding than to wintering birds.

Conclusions and suggestions

Much information has accumulated regarding the wintering distribution and numbers of the dabbling and diving ducks, the data being most complete for east-central Scotland. The most important single 'unknown' concerning these species is the location of the feeding grounds used by the Duddingston Pochard. It should be possible, through liaison between Lothians and Fife observers, to investigate this matter more closely. More comprehensive cover of waters in the Clyde region is desirable, and any records from the Highlands and Islands would be useful, since these areas are least well covered.

Information on the sea ducks is still extremely scrappy, and counts from the presumably important waters around the northern and western isles are almost entirely lacking. Knowledge of these species could be greatly expanded by encouraging observers to make coastal counts whenever opportunity permits, rather than to attempt them only on the set monthly dates. More coordinated counts (similar to those organised by the Inner Solway Wildfowl and Wader Group) are needed along stretches of coastline, in the larger firths and on inter-island waters. Such counts would also help to fill gaps in the picture of sawbill and Shelduck numbers and movements.

Little is known about the reasons for the large annual fluctuations which occur in the numbers of most species wintering in Scotland. Although the explanation must in most cases be sought outside this country, there is still much to be learned about native stocks and the extent to which variations in their breeding success affect wintering numbers. The Wildfowl Breeding Survey is a non-repetitive enquiry (a fact which should increase its appeal to many who are unwilling to undertake monthly winter counts) and combines well with 10-km square recording for the BTO Atlas. Ornithologists doing Atlas work are asked to make the small extra effort of recording wildfowl numbers in addition to evidence of breeding. Such information is essential if any assessment is to be made of the size of the Scottish breeding populations of Mallard, Teal, Wigeon, Tufted Duck and the sawbills.

Some of Scotland's most important wildfowl habitats are in areas for which major developments have been proposed. Particular effort should be made to obtain detailed records of the birds using these districts before such developments begin, and wherever possible to follow the subsequent changes in wildfowl usage.

Although the midwinter censuses do not take place at the best time for duck counting in Scotland, since the probability of frost and snow occurring in January is high, increasing emphasis is likely to be placed on these International counts in the future. The more complete the coverage at these censuses, both in this country and abroad, the more reliable will be the picture which eventually emerges. An appeal is therefore made to ornithologists all over Scotland, and especially to those in the north and west, to participate in this annual effort. Further details may be obtained from the Wildfowl Trust, Slimbridge, Gloucestershire.

Acknowledgments

I am indebted to George Atkinson-Willes and Chris Beale, of the Wildfowl Trust, for permission to use the count records

and for responding speedily to many requests for additional data. The Superintendent of the Meteorological Office (Scotland) and his staff kindly assisted me with the weather records, and the River Inspectors of the Forth and Lothians River Purification Boards replied promptly to my queries regarding pollution.

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Last, but by no means least, I must record my indebtedness to the many dedicated duck counters without whose efforts this paper could never have been written.

Summary

Scottish Wildfowl Count data for the period 1962-68 have been analysed to obtain information on the distribution, numbers and ecology of wintering ducks. The largest recorded concentrations of Wigeon and Goosander were in the North; of Teal and Pintail in the North and Solway; and of all other species in Tay-Forth; but data on the sea ducks were too sparse to be reliable. The species were recorded in approximately the following order of decreasing abundance: Mallard; Wigeon; Scaup; Teal and Eider; Tufted Duck, Pochard, Goldeneye and Common Scoter; Pintail and Velvet Scoter; Shoveler, Long-tailed Duck, Red-breasted Merganser and Goosander; Gadwall; Smew. Numbers of Pochard wintering in Scotland increased substantially during the period under review but Mallard, Teal, Wigeon and Tufted Duck numbers fluctuated markedly from year to year. Peak counts of Shoveler were generally recorded in September-October; of Mallard, Teal, Wigeon and Pintail in November-December; and of Scaup, Tufted Duck, Pochard and Goldeneye in December-January. Flock size and distribution varied greatly between the commoner species, with Mallard, Wigeon and Goldeneye the most widely distributed and Pintail, Scaup and Pochard the most locally concentrated. Habitat changes and oil pollution appear to constitute potential threats to the Scottish-wintering flocks of Pintail, and of Scaup and Pochard, respectively.

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Few detailed references have been given in the text since the data discussed were drawn largely from unpublished records (held at the Wildfowl Trust, Slimbridge, Glos.), and to a lesser extent from the Current Notes sections of *Scottish Birds* Vols. 2-5. Additional information was obtained from the sources listed below.

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Appendix 1. Ringing recoveries of Scottish duck (excluding British recoveries of Scottish-ringed birds)

		Ringed in		Recovered in	
Species	**Birds**	**Country**	**Month(s)**	**Country**	**Month(s)**
Mallard		Scotland	Winter	Finland Sweden Norway Faeroes Latvia Germany Holland	May-Aug
	7	Finland	June-Aug	Scotland	Dec-Feb
	2	Norway	June-July	Scotland	Dec-Jan
	5	Russia	June-Aug	Scotland	Sept-Jan
	1	Iceland	Aug	Scotland	Dec
	5	Denmark	Apr-July & Nov	Scotland	Oct-Jan
	8	Holland	July-Dec	Scotland	Sept-Jan
	3	Belgium	Aug-Sept	Scotland	Sept-Nov
Teal	7	Scotland	Jan-Mar	Sweden	Apr-Aug
	1	Scotland	Mar	Denmark	Aug
	1	Scotland	Mar	Poland	July
	1	Scotland	Feb	Iceland	May
	1	Scotland	Mar	Finland	May
	12	Denmark	July-Dec	Scotland	Sept-Feb
	37	Holland	July-Dec	Scotland	Aug-Mar
	18	Iceland	June-Aug	Scotland	Oct-Feb
	2	Belgium	Apr-June	Scotland	Sept-Oct
	4	France	Nov-Mar	Scotland	Sept-Jan
	1	Norway	July	Scotland	Nov
	2	Finland	July	Scotland	Nov-Jan
	1	Russia	July	Scotland	Jan
Wigeon	3	Scotland	Jan-Feb	Russia	May-June
	1	Scotland	June	Russia	Sept
	1	Scotland	June	Iceland	Jan
	1	Scotland	June	France	Oct
	1	Scotland	June	Holland	Sept
	21	Iceland	May-Sept	Scotland	Sept-Feb
	3	Finland	June-July	Scotland	Sept-Jan
	2	Norway	July	Scotland	Dec-Mar
	1	Latvia	Aug	Scotland	Feb
	4	Russia	July-Aug	Scotland	Oct-Jan
	3	Denmark	Oct	Scotland	Nov-Feb
	5	Holland	Jan-Mar & July	Scotland	Sept-Jan

Pintail	3	Iceland	June-July	Scotland	Sept-Nov
	1	Holland	Sept	Scotland	Dec
Shoveler	1	Scotland	June	Spain	Dec
	2	Latvia	May-June	Scotland	Nov & Feb
	1	Holland	Dec	Scotland	Oct
	1	Belgium	Mar	Scotland	Apr
	1	NW Germany	June	Scotland	Aug
Scaup	1	Scotland	Feb	Iceland	Spring
	12	Iceland	June-Aug	Scotland	Aug-Mar
Tufted Duck	4	Scotland	Jan & Sept	Denmark	Oct-Feb
	1	Scotland	Jan	Sweden	Sept
	4	Scotland	Dec-Jan & Aug	Finland	May-Aug
	22	Scotland	Jan & June-Sept	N. Ireland	Sept-Feb
	5	Scotland	June-Sept	Eire	Oct-Feb
	1	Scotland	Aug	France	Feb
	3	Scotland	June & Jan	Russia	Oct & May
	1	Scotland	Jan	Iceland	Sept
	1	Scotland	Jan	Germany	Jan
	10	Iceland	June-Aug	Scotland	Nov-Mar
	2	Latvia	June	Scotland	Jun & Nov
	1	Denmark	Apr	Scotland	Jan
	1	Sweden	Aug	Scotland	Jan
	1	Finland	July	Scotland	Jan
Pochard	2	Denmark	June-Aug	Scotland	Sept & May
	1	Lithuania	July	Scotland	Jan
Goldeneye	1	Scotland	Jan	Sweden	July
	6	Sweden	May-July	Scotland	Nov-Mar
Long-tailed Duck	None				
Velvet Scoter	1	Norway	July	Scotland	Oct
Common Scoter	None				
Eider	18	England	May-July	Scotland	Oct-April & June
Red-breasted Merganser	6	Iceland	June-Sept	Scotland	Oct-Mar
Goosander	1	Sweden	July	Scotland	Dec
Shelduck	3	Scotland	Apr-May	W. Germany	Sept-Oct
	9	Germany (Weser Est.)	Aug-Sept	Scotland	Jan, Feb, May-Aug, Dec

Note This appendix is based on available recoveries up to March 1968 (Tufted Duck to September 1969) but it is not certain that all recoveries are included.

Appendix 2. Calculation of 'indices of relative abundance'

In the early analyses of Wildfowl Count data interpolation was used where counts had been missed. This obviously involved much guesswork and made the results unreliable. In 1960 a technique based on comparison with a master year was evolved for tracing trends in the British duck wintering populations. The following account of this technique has been extracted from "Recent population changes in British ducks" by S. K. Eltringham and G. L. Atkinson-Willes, published in the *Twelfth Annual Report of the Wildfowl Trust* (1961).

1. A standard or master year is selected from the seasons under review,

for preference the one in which the data are most complete. In the present study the season 1959/60 has been chosen for the purpose.

2. The counts for each month of the master year are in turn compared with the data from the corresponding months in each of the other years. All waters which were counted in both the master and the paired month are included in the sample, and the numbers of ducks present on each occasion are summed to give two directly comparable totals. These individual samples vary, however, both in size and composition, according to the data available, so that direct comparisons between all years are not, at this stage, possible.

3. To overcome this, the numbers of ducks in the other years are expressed as percentages of the number present in the master year. These percentages can be used as indices to show the relative abundance of a species month by month in all the years under review. By definition the population in the master year will always have a value of 100.

Example : To compare the number of ducks present in September of 1952, 1956 and 1959 (1959 being the master year)

(1) A sample of 52 waters held 9000 ducks on 10.9.52 and 10,000 on 15.9.59.

(2) A sample of 74 waters held 12,000 ducks on 20.9.56 and 16,000 on 15.9.59.

Therefore :

The waters in pair (1) held 90 ducks in 1952 for every 100 in 1959 and the waters in pair (2) held 75 ducks in 1956 for every 100 in 1959. The relative numbers of ducks in September of the three seasons was thus 90, 75 and 100 respectively.

4. This comparison between months is only the first stage; the method can now be extended to provide a seasonal index, showing the relative abundance of a species over the winter as a whole. These seasonal indices are derived from the data on which the monthly indices are based; for each season the actual numbers of ducks in all the paired months are summed to give two comparable totals. These totals are then expressed as percentages of those in the master season. The advantage of this method is that due weight is given to the months when the ducks are most plentiful; a big relative increase in mid-winter, when thousands of birds are present, is clearly much more important than a similar increase in early autumn, when there may be only a few hundred. It also takes into account the length of time during which large concentrations are present.

Appendix 3. Weather records

The weather factor which has the greatest influence on duck distribution is frost. Both the severity and the duration of frost are important since both affect the proportion of waters which freeze. The rate at which ice cover develops varies from one loch to another according to depth, area, exposure to wind, and the force of in-flow streams. Ideally, full records for each individual water involved should be used in analysing the influence of weather conditions on distribution, but such records would be impossibly complicated and in any case are not available.

On the advice of the Meteorological Office (Scotland) the records from only one station have been used to assess the relative severity of the seasons 1962-63 to 1967-68. The station selected (again on the advice of the Meteorological Office) was Blackford Hill Observatory in Edinburgh. As this site is at 400 feet it does not experience the extremes of temperature, due to frost-hollow effects, encountered at low-lying sites.

Table 7 shows the monthly mean temperatures, their difference from the 30-year average figure, and the lowest minimum recorded each

Table 7. Monthly temperatures in °C at Blackford Hill, Edinburgh

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
November						
Mean	5.1	6.1	6.7	3.3	4.9	5.9
Variation	—1.2	—0.2	+0.4	—3.0	—1.4	—0.4
Lowest	—2.8	—2.2	—0.6	—2.8	—1.7	—1.1
December						
Mean	3.1	3.7	3.2	3.3	3.9	4.5
Variation	—1.5	—0.9	—1.4	—1.3	—0.7	—0.1
Lowest	—3.9	—6.1	—5.6	—3.9	—2.8	—4.4
January						
Mean	0.1	4.5	2.7	2.5	4.1	3.9
Variation	—3.1	+1.3	—0.5	—0.7	+0.9	+0.7
Lowest	—6.7	—3.3	—5.6	—6.1	—2.8	—5.0
February						
Mean	—0.1	4.3	3.3	3.2	4.9	1.3
Variation	—3.6	+0.8	—0.2	—0.3	+1.4	—2.2
Lowest	—6.7	—4.4	—2.8	—6.1	—1.1	—4.4
March						
Mean	5.8	3.9	4.3	6.6	6.1	6.0
Variation	+0.6	—1.3	—0.9	+1.4	+0.9	+0.8
Lowest	—5.0	—1.7	—9.4	—2.2	—2.2	—1.7

Note For each month the first line gives the mean temperature, the second gives the variation from the 30-year average, and the third gives the lowest temperature recorded.

Table 8. Number of days of snow and air frost each month at Blackford Hill, Edinburgh

	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
November						
Snow lying	8	0	0	8	0	0
Air frost	9	5	2	14	4	3
December						
Snow lying	4	0	2	4	2	2
Air frost	12	7	10	8	8	12
January						
Snow lying	26	0	5	5	4	1
Air frost	23	7	12	14	10	11
February						
Snow lying	25	2	4	10	2	10
Air frost	27	7	8	12	2	20
March						
Snow lying	0	0	10	0	0	1
Air frost	6	7	11	3	1	3

month. In Table 8 the number of days per month on which air frost was recorded and on which snow was lying are shown. The "abnormal conditions" referred to in the text are (1) in November 1965 the mean temperature was 3°C below average, snow was lying on 8 days and air frost was recorded on 14 days (early onward passage of Shoveler), (2) in January-February 1963 there was a long period of almost continuous frost and snow and the mean temperature was more than 3°C below

average in each month (marked midwinter drop in Mallard and Wigeon), (3) in March 1965 the lowest minimum temperature of the six seasons was recorded and there was more snow and frost than usual (delayed dispersal of all species considered except Mallard and Scaup).

In the three seasons chosen to represent winters of varying severity in section 3 the frost records immediately prior to the January counts were :

1963—only 2 days frost-free out of 23 (severe).
1964—not more than 3 consecutive days frost in the previous month (open).
1968—10 days frost immediately before count (near average).

Short Notes

Medium-sized race of Canada Goose in Islay

On 17th February 1969, after heavy snow the previous day, large numbers of Barnacle Geese were moving south in Islay. One party of these passed close to me, and with them was a single Canada Goose. It was only slightly larger than its companions and was certainly not as large as the introduced race *canadensis*. It was also markedly darker on the underparts than *canadensis;* this impression was not an illusion caused by light effects, since with snow on the ground the underparts of a bird appear lighter than they really are.

It is difficult to say to what race it might have belonged. To judge from Peter Scott's drawings in the Second Annual Report of the Wildfowl Trust (1949) it seems far too large for *parvipes* and too small for *interior*, but in view of the darker plumage it would seem likely that it was a small individual of the latter.

A race of Canada Goose smaller than the Barnacle was recorded in Islay on 5th April 1958 (*Scot. Birds* 1: 274).

M. F. M. MEIKLEJOHN.

Marsh Harriers summering in Scotland

In the first week of May 1969 a Marsh Harrier in dark brown plumage, with whitish crown and leading edges to the inner wings, was seen on the Scottish marsh where the 1966 pair first appeared (*Scot. Birds* 5: 25). In the last week of the month it was joined by another, markedly smaller but in similar plumage. Both birds were present until 25th July but neither was seen after that date. The pair was most frequently seen about an extensive *Phragmites* reed bed fringed with clumps of sallows *Salix* sp. No nest was found, and no display, food pass or other evidence suggesting nesting was recorded. From the arrival date of the presumed

male, young could not have been reared by the time the birds left the area.

This note was compiled from interviews with people living in the area, and on 9th July the local recorder and others saw two Marsh Harriers, in the plumages described, hunting over different parts of the marsh. Neither bird was seen again by the local recorder in four visits totalling about six hours watching. In case Marsh Harriers should return to the area this note appears over the name of the editor.

ANDREW T. MACMILLAN.

Gyr Falcons in Shetland

Doubts have been expressed about the identification as a Gyr Falcon of a raptor at Halligarth, Unst, from late May to August (actually to 16th November) 1966 (*Scot. Birds* 4: 371). Other observers reported that it exhibited characteristics of an *Accipiter*, in plumage, appearance and behaviour; and abraded plumage and its 6-month stay suggested an origin in captivity. After extensive correspondence with the observers and referees it has proved impossible to establish its identity. The observers agree that the orginal identification cannot be regarded as proved and that this record should be withdrawn. This is being noted also in the report of the *British Birds* Rarities Committee.

We have carefully reexamined the evidence for the identification of a dark Gyr Falcon at Kergord on 9th September 1965 (*Scot. Birds* 4: 87), since it was suggested that the published description was not conclusive. In spite of its apparently uniform dark plumage we are satisfied that it was correctly identified. The observer emphasises in correspondence that it was quite different form the Halligarth bird (which he took for a Goshawk) and gave a very strong impression of "falcon," the silhouette (in some 20 minutes observation) exactly like a very large and very heavy Peregrine ("anchor-shaped"), with no trace of ragged wingtips as it twisted and turned in the air.

EDITORS.

Sociable Plovers in Orkney

On 15th January 1969 J. S. Byres, of Carrick, Eday, telephoned to describe a bird which had been present near the farmhouse for a few days. It was a complete stranger to him and was consorting with some Common and Black-headed Gulls in a grass field, where at times it could be

observed at close range. His description left me in no doubt that it was a Sociable Plover.

It was obviously a plover type of bird but looked a bit larger and taller than either the Golden Plover or Lapwing. Its general colour was pale drab with a tinge of blue-grey, paler on the underparts, except for a dark patch across the belly and whitish beneath the tail. A prominent whitish buff forehead continued as a stripe above the eyes to meet in a sharp V behind the head. The top of the head was brownish with some buff edgings. Rump and tail were white, with a dark subterminal band. The primaries appeared to be blackish and the secondaries white, showing as a conspicuous wing-bar in flight, and the wings were rounded at the ends, though not as broadly as in the Lapwing. Legs and bill were blackish, both being rather longer than those of either Golden Plover or Lapwing.

The bird remained on Eday for just about a week. The only previous Scottish records are also from Orkney in winter. One, a 1st-winter female, was shot on North Ronaldsay on 3rd November 1926 (*Scot. Nat.* 1927: 157), and the other was seen by me at Isbister, Rendall, in 1949. Details were not published at the time, but I was in no doubt whatsoever about its identity. The bird was in a field near my house for a couple of days in early December 1949 with a small party of Lapwing. It stood noticeably higher on longer legs and had pale drab to dove grey upperparts. It was paler below but with a dark patch on the belly and whitish under the tail, which was mainly white above with a dark band near the end. Below a brownish crown were most noticeable broad white eyestripes coming together at the back of the head. In flight the wings resembled those of a Lapwing, being blunt-ended, but not so broad, and there was a noticeable white wing-stripe.

E. BALFOUR.

Recent News

ANDREW T. MACMILLAN

Probably the most important event of the autumn was the **large-scale wreck of Guillemots** and other seabirds on the west coast, and this is discussed in the Editorial. Other seabird news includes the discovery of a **new gannetry** on the Flannans in the course of **Operation Seafarer**, which has achieved very good cover of the coasts and islands of Scotland this year (including Rockall); it should be possible to fill in the gaps next year.

In several areas this is reported to have been a good autumn for **Little Stints** and **Curlew Sandpipers**. A fall of interesting **passerine migrants** was noted in Fife and Shetland in the middle of September, and the **Pink-footed Geese** began building-up from about the 21st, until there were over 10,000 at Loch Leven on 1st October. Near Threipmuir, Midlothian, an unusual concentration of upwards of 200 **Goldcrests** was reported in a wood on 5th October.

The **Snowy Owls** had a less successful season in 1969, all but one of the chicks dying in the nest, evidently from some form of food shortage. News of the four young **White-tailed Eagles** introduced to Fair Isle last year is that the last one has now disappeared after being seen in poor condition, soaked with Fulmar oil. Possibly it never learned to force the flying adults to the ground and kill them from behind instead of exposing itself to the frontal offensiveness of the nestlings.

Most people doubtless now accept that Scottish records of **Flamingos** refer to escapes. One from the Edinburgh Zoo has been noted at various places up and down the Firth of Forth over quite a period, and there are also reports from the Outer Hebrides. An interesting example of the movement of escaped birds was the arrival on the isolated island of Swona in Orkney of two **Bar-headed Geese** with other migrants in early May, following southeasterly winds.

Reviews

Nature Conservation in Britain. New Naturalist series no. 49. By Sir Dudley Stamp. London, Collins, 1969. Pp. xiv + 273; 23 plates (32 photographs) and 5 maps. 21½ x 15 cm. 36/-.

Those who were concerned with the loss of wildlife and habitats after the last war and in the early years of the Nature Conservancy ploughed a pretty lonely furrow. One of these was the late Sir Dudley Stamp, an indefatigable worker on committees to do with nature and natural resources and a member of the editorial board of the Collins New Naturalist series.

It is partly due to his efforts and those of others like him that so much has been achieved in this field. Partly also it is due to the intensification of pressure on land and water in Britain in the last ten years. It needs an effort of imagination to grasp the meaning of the loss of a habitat on the other side of the world and to care; but the loss of one's favourite downland, marsh or forest strikes home. Far more people seem to care now, and this seems an appropriate time to take stock of the whole conservation movement in Britain. Sir Dudley Stamp does this in an extremely detailed and professional manner in this book, published posthumously.

He introduces the subject by sketching the background to the need for conservation and the difficulties in a crowded country where conditions are changing rapidly. He then traces the development of the concept of conservation, from protection to management, and the implications of

this in the control of pests and in activities in nature reserves. Problems of conservation on farms, in forestry, wetlands and in different regions of Britain are treated fully. Scotland gets a chapter to itself mainly because conditions are different from those in England, there being in Scotland, as he puts it, an *embarras de richesse*; relatively, perhaps, but so much has already been lost.

This book is an excellent account of conservation in Britain to date, and how it has been achieved. The author sees problems for the future but, in his exuberance, glosses over them. He applauds the ski lift on Cairngorm and the fact that it operates all the year round; then points out the dangers of so many people in alpine Scotland; but he gives no solution. He states that a systematically managed forest is favourable to wildlife. It may be, but intensive forestry leaves little room for anything else, despite good intentions.

This is an account by an able committee man of an instalment in, so far, an undoubted success story. Whether the next instalment will describe success remains to be seen. Sir Dudley Stamp sees a double role for nature conservation in the future: education, and scientific guidance in the use of environment. The second may well be the more difficult to put over. At the moment, in any dispute, industry (say) usually wins, because the only motive apparently recognised by powerful barbarians in our materialistic society is that of cash profit. They are pressing hard on the relatively little that remains in Britain of beautiful and inspiring countryside. But what is the use of achieving affluence and even national solvency if in the end we have an environment unfit to live in?

The format, and illustrations of people, animals, and places maintain the usual high standard of the Collins New Naturalist series. There is a full bibliography of reports by official and other bodies, and four useful appendices on conservation organisation and areas, the last compiled by James Fisher.

J. D. LOCKIE.

Birds of Asia. Illustrations from the lithographs of John Gould. Text by A. Rutgers. London, Methuen, 1969. Pp. [10] + 321; 160 coloured plates. 24¼ x 18 cm. 72/-.

John Gould's *Birds of Asia*, one of the great bird books of all time, was produced in London in 35 parts from 1850 to 1883, the last three parts by Bowdler Sharpe after Gould's death. It consisted of descriptive letterpress by Gould and 560 lithographs, coloured by hand, printed by Hullmandel and Walter, Walter, and Walter and Cohn, from drawings by Gould, H. C. Richter and J. Wolf, drawn on stone by W. Hart, the whole bound into seven magnificent imperial folio volumes. One of the rarer of Gould's works, and not often offered for sale, a copy fetched £7000 in April of this year at Sotheby's.

At first sight it seems a good idea to make these famous plates available in some form or other to the present generation. This the publishers have done by making a selection of 160 of the 560 plates, with a new text by the Dutch ornithologist A. Rutgers. The reproductions are very good, and the Dutch printers have managed to convey some idea of the brilliance of the original plates. They have overcome to a reasonable extent the flatness of colour so noticeable in modern photo-lithographic or gravure reproductions of nineteenth century lithographs drawn on stone and hand-coloured. But one cannot help thinking that the publishers might well have reproduced the whole work, in say four volumes at a cost of £15-£20, judging by the modest cost of the present volume, and with the original text. Then we would have had a worthwhile facsimile, even in the reduced size, of Gould's original *Birds of Asia*, which could quite well have been successful financially and which would have been

of much more interest to both ornithologist and bibliophile, though admittedly unlikely to sell to a mass market.

Reproductions of Gould and Audubon have appeared before. The Gould reproductions were not particularly successful, but the 1937 complete Audubon, after being remaindered before the war, quickly sold out and has since become a collector's item; and the plates were not nearly so well produced as those in the book under review. A market could well have been reached which the present work will certainly not interest; but at least the book will serve as an introduction to Gould, whose works are of course out of reach of most people today.

It may not be generally known that our great libraries in Edinburgh are well supplied with Gould's works, available to all for consultation. There is a growing appreciation of the ever-differing interpretation of the bird artist, as compared with the colour photographer, although their efforts are indeed complementary. It is good to find attention drawn to a great bird illustrator of an earlier age. If for no other reason this book is worth buying.

RITCHIE SEATH.

The Hill of Summer. By J. A. Baker. London, Collins, 1969. Pp. 159. 21 x 13½ cm. 28/-.

J. A. Baker has followed his first book, *The Peregrine*, acclaimed so widely two years ago, with another, woven likewise from the fabric of night and day, of landscape, wind, and living things. *Hill of Summer* is the obverse side of the same compounded year, as different in mood as the change in season. Winter has given way to a languid summer, and the strange obsessive search for the Peregrine is held in abeyance. The book describes twelve landscapes suffused with the song of larks and the azure sky, landscapes to enjoy at leisure, letting each page soak into the eye.

The language and imagery is as finely judged as ever and stays in the memory. "A weasel runs silently through the bracken. It burns, like a reddish-brown flame, along the fuse of the scent it follows." The observation is cool, detached, coming on fire in the telling, but while the eyes are watching they have no hindrance from the emotions. How many of us, following a Hobby in full chase, would see the "spurts of dead grass that drifted down", behind its pursuit, or see beyond the gorse blossom, the "dusty airless caves of shadow" underneath ? Both books constantly challenge us to keep our observation fresh, unprejudiced by the well trodden behaviour of our eyes.

Mr Baker has now given us a vivid cycle of the year. One misses occasionally the more mundane non-happenings of daily life, and perhaps these will provide an equally potent source of inspiration in the future. The author, revealing himself a little more in this reflective summer mood, should have the last word. "One wishes only to go forward, deeper into the summer land, journeying from lark-song to lark-song, passing through the dark realm of the owls, the fox-holdings, the badgershires, out into the brilliant winter dominion, the sea-bleak world of the hawks."

JOHN BUSBY.

Birds of the British Isles and their Eggs. Wayside and Woodland series. By T. A. Coward. Edited by J. A. G. Barnes. London, Warne, 1969. Pp xvi + 359; 97 colour plates, 80 photographic plates, 1 figure. 21½ x 15 cm. 55/-.

This is a taller single-volume revision of the classic work, first published in 1920, on which a generation of birdwatchers was reared. Thorburn's (and other's) plates are supplemented with photographs by the Bottomleys and Eric Hosking, and there are a few new plates by Robert Gillmor. After 50 years there is life in this book still.

A.T.M.

Dawn Chorus and Nightingale and **Mountain and Highland Birds. Shell Nature Records.** British Birds series DCL 708, 709. Two 33.1/3 r.p.m. 7" records in illustrated descriptive sleeves. Recorded by Lawrence Shove and others, and edited by him. Published 1969 for Shell-Mex and BP by Discourses Ltd, London. 14/3 each.

Eighth and ninth in a series previously reviewed (*Scot. Birds* 4 : 326, 523; 5 : 65). Northern recordings include the work of David Bradley, John Kirby, Charles Palmar (consistently misspelt) and Patrick Sellar. Available from SOC Bird Bookshop.

A.T.M.

The Scottish Ornithologists' Club

Revenue Account for the year ended 30th June 1969

	Year to 30/6/69	Year to 30/6/68
INCOME—		
Subscriptions received for year	£2258	£2168
Income Tax recovered on covenanted subscriptions	311	302
Dividends and Interest received (gross)	228	229
Surplus on Bookshop (Sales £4302)	1157	900
Sale of "Scottish Birds" to non-members	91	90
Sundry Sales less sundry purchases	56	21
Contribution from the World Wildlife Fund towards facilities granted by the Club	27	6
Donations received	3	53
	£4131	£3769
EXPENDITURE—		
Branch Expenses including lectures	£356	£340
Travel Expenses of Council Members and of Delegates to Conferences	83	51
Secretarial Services	2240	2090
Office Expenses	505	446
Scottish Centre for Ornithology and Bird Protection : Club's share of running expenses including £100 contribution to the House Fabric Fund for year 1968	385	395
Cost of books purchased for Library	54	113
Cost of publishing "Scottish Birds" (less advertising revenue £211)	704	649
Net cost of Annual Conference	2	18
Subscriptions paid	33	29
	£4362	£4131
Excess of Expenditure over Income carried to Balance Sheet	231	362
	£4131	£3769

Balance Sheet as at 30th June 1969

	Year to 30/6/69	Year to 30/6/68
Accumulated Surplus as at 30th June 1968	£4221	£2758
Deduct: Excess of Expenditure over Income for year	231	362
	£3990	£2396
Add: Share of Scottish Ornithological Cruise Ltd. surplus on liquidation	—	1810
Premium on repayment of £500 5% Defence Bonds	—	15
Accumulated Surplus as at 30th June 1969	£3990	£4221
(**Note:** £1000 of this surplus is earmarked for the House Fabric Fund)		
Made up of:		
Cash in hand and Bank current account	£147	£167
Savings Bank Accounts	557	42
Bookshop stock at valuation	840	602
Tie and Badge stocks at valuation	133	153
Debts due to Club	298	261
Investments at cost, as below	3500	4000
	£5475	£5225
Less:		
Life Membership Fund £300		150
Subscriptions paid in advance 55		41
Debts due by Club 690		358
Sum due to Endowment Fund 143		158
Sums earmarked for:		
Library Binding 238		238
Painting 59		59
	1485	1004
	£3990	£4221

Investments as at 30th June 1969:	Market value	At cost	At cost
Loan to Edinburgh Corporation at 5½% at 7 days call	£ —	£ —	£500
Loan to County Burgh of Wigan at 7¼% (formerly 7¼%)	600	600	600
Safeguard Industrial Investments Ltd.— 700 Ord. shares of 5/- each	367	508	508
£950—6½% Treasury Loan 1976	869	946	946
£1300—British Electricity 3% Guar. Stock 1974/77	917	952	952
£550—5¼% Conversion Stock 1974 ...	468	494	494
	£3221	£3500	£4000

ENDOWMENT FUND

(The free income of which is available for the advancement of Ornithology)

Revenue Account for the year ended 30th June 1969

	Year to 30/6/69	Year to 30/6/68
INCOME—		
Interest and Dividends received (gross)	£190	£178
EXPENDITURE—		
Grant as detailed in Report of Council	33	30
Unexpended Income for the year	£157	£148

ENDOWMENT FUND

Balance Sheet as at 30th June 1969

Endowment Fund as at 30th June 1968		£3080	£2080
Add : Additions to Fund during year		3	1000
		£3083	£3080
Less : Loss on realisation of £1151 3½% War Stock ...		564	—
		£2519	£3080
Accumulated unexpended Income as at 30th June 1968	£277		129
Add : Unexpended Income of year	157		148
		434	277
		£2953	£3357
Made up of :			
Investments at cost as below		£2441	£3000
Royal Bank of Scotland Deposit Account		369	199
Due by Club's General Funds		143	158
		£2953	£3357

Investments as at 30th June 1969 :	Market value	At cost	At cost
£1151 3½% War Stock	£ —	£ —	£1000
976 Units of the Equities Investment Trust for Charities Ltd.	1708	1000	1000
£1140 5% Exchequer Stock 1975/78 ...	872	1000	1000
£440 8½% Convert. Unsecured Loan Stock 1993/98 British Printing Corporation Ltd.	396	441	—
	£2976	£2441	£3000

HOUSE FABRIC FUND

Summary of Accounts for year to 30th June 1969

		Year to 30/6/69	Year to 30/6/68
RECEIPTS			
Balance as at 30th June 1968		£110	£26
Year's rent from Royal Society for Protection of Birds		—	100
Year's rent from Mr and Mrs George Waterston		100	100
Rent from World Wildlife Fund for period from 1st November 1968		87	—
Annual Contribution from Scottish Ornithologists' Club Revenue Account		—	100
Miscellaneous Interests		4	1
		£301	£327
EXPENDITURE			
Repairs and Maintenance		£5	£33
Property Burdens		171	166
Insurance		18	18
		£194	£217
On Deposit with Dunedin Building Society	£94		
At credit of account with Morton, Fraser & Milligan, W.S.	13		
		£107	£110
		£301	£327

Note : The balance of £107 includes £19 unexpended from the Harvey Donation.

EDINBURGH, 3rd October, 1969.—I have audited the foregoing Revenue Accounts for the year to 30th June, 1969, and the Balance Sheet at that date. I have accepted as correct the Subscriptions and other receipts shown as received in the Books and the value placed on the Bookshop Stock. Subject to this I certify that in my opinion the foregoing accounts are correctly stated and sufficiently vouched.

(Signed) ARTHUR WALKER,
Chartered Accountant.

REPORT OF COUNCIL

Your Council submits the following Report for the year 1968/69 :

Membership At the end of the session, the Club had 2056 members. For the third consecutive year over 300 new members joined (323), but because of more deaths, resignations and lapsed subscriptions than usual (216) the net increase was only 107. Three more members transferred to Life Membership and one was elected an Honorary Member. A table of membership for the last six years is given below (p. 476).

The number of Deeds of Covenant signed by members rose from 313 to 322, representing 370 subscriptions and contributing £311 to the income of the Club. The Council acknowledges with thanks this assistance and hopes that many more members will consider paying their subscriptions similarly, thus helping the Club at no extra cost to themselves.

	30/6/64	30/6/65	30/6/66	30/6/67	30/6/68	30/6/69
Ordinary	1194	1263	1373	1524	1677	1771
Junior	198	222	252	259	265	274
Life	—	—	—	—	3	6
Honorary	3	3	3	4	4	5
	1395	1488	1628	1787	1949	2056
Increase	134	93	140	159	162	107

Honorary Member At a Council Meeting in January, Mr Duncan Anderson, the Warden of the Duddingston Loch Bird Sanctuary, was elected an Honorary Member of the Club.

Business of Council Five Meetings of Council were held during the session. The Management Committee also met four times, considering among other important business the staffing requirements of the Club. As a result of their recommendations, a new Club Secretary, Major A. D. Peirse-Duncombe, was appointed in March, with Mrs George Waterston continuing as Deputy Secretary and Mrs James Smillie as Membership Secretary. Miss Joan Howie helped in the office for two months during the busy Conference period of 1968.

Council was concerned at Edinburgh City's Development Plans for land at Bawsinch, adjoining the Duddingston Loch Bird Sanctuary. A letter was sent to the Secretary of State for Scotland objecting to the use of this area for playing fields unless a buffer zone was created between the fields and the Sanctuary. The Club was represented by Mr D. G. Andrew, W.S., at a Public Inquiry held in Edinburgh in July; the result of this is awaited.

Mr C. G. Headlam continued his work as Organiser for Scotland of the B.T.O. Atlas Scheme, to which many Club members have given active support. Council thanks all those who are helping with this important project and urges still more members to assist, to ensure that a total coverage of Scotland is achieved. Members of the Club have also assisted with Operation Seafarer, the national census of seabirds organised by the Seabird Group.

Council was pleased to lend support to the appeal for a new Bird Observatory and Hostel on Fair Isle, and is glad to record the success of this venture and to know that the new premises are now completed.

The Club was represented on the British Section of the International Council for Bird Preservation by Sir Landsborough Thomson and Mr George Waterston, and on the Duck Working Group of the International Wildfowl Research Bureau by Miss Valerie Thom.

Endowment Fund The East Lothian County Council and Northern Lighthouse Commissioners have given permission for the disused lighthouse garden at Barns Ness, East Lothian, to be used by ornithologists for migration studies. Your Council approved the expenditure of up to £40 from the Endowment Fund to make the area sheep-proof and to plant shrubs. Club members are carrying out the work, which will be completed this autumn.

Annual Conference The Twenty-First Annual Conference and Annual General Meeting, held in Dunblane, was attended by 310 members and guests. Dr M. W. Holdgate (Deputy Director, Nature Conservancy) was the principal speaker, lecturing on "The Birds of the South Atlantic Islands." He was followed by Mr I. J. Ferguson-Lees (Editor of "British Birds") who spoke on "Palearctic Migrants and African Birds at Lake Chad." Professor M. F. M. Meiklejohn delighted us on the Sunday morning with his "Ornithological Reminiscences."

Branches A full programme of lectures was given in the nine Branches, and the Thurso Group met regularly during the winter. Summer and

winter excursions were again organised by Branches, and the Club excursion to the Solway goose grounds was once more a success. Club members helped at stands at the Ayr Show and the Falkirk Spring Fair, at both of which interest in the Club was stimulated.

"Scottish Birds" Four numbers of the journal were published during the year. The summer number contains the first annual Scottish Bird Report, replacing the quarterly Current Notes. Your Council wishes to records its thanks to the Editor, Mr A. T. Macmillan, and to all the Local Recorders for their work in the production of this excellent Report.

Sincere thanks are expressed also to Dr T. C. Smout, who has retired from the position of Business Editor after holding that post for over seven years, and also to Mr M. J. Everett for his recent services as Assistant Editor. Mr Everett has been appointed to the post of Assistant Reserves Manager of the Royal Society for the Protection of Birds at their headquarters in Bedfordshire.

Club Library The Library Committee met twice during the session to discuss library requirements and the binding programme. No major purchases were made apart from certain new reference books. A number of old and new books, journals and reprints were presented to the library and and Council thanks the donors for these gifts.

Bookshop Support for the Bookshop has again increased, with expanding sales both at home and abroad. The assistance given to us by the British Trust for Ornithology, Royal Society for the Protection of Birds, and Scottish Wildlife Trust, in providing space for book displays at their Annual Conferences and Meetings, has added greatly to our publicity and sales, and Council warmly appreciates this help.

Scottish Centre In October 1968 the Scottish Office of the Royal Society for the Protection of Birds, which has occupied rooms in the Centre since its inception in 1959, moved to larger premises at 17 Regent Terrace. Council wishes to express its thanks for the help given by the R.S.P.B. staff over the years. We are glad to feel that, although physically removed four doors from us, they remain part of the conception of the Scottish Centre, and we are appreciative that cooperation between the two societies continues as strongly as before.

Part of the basement of 21 Regent Terrace has now been leased to the World Wildlife Fund, of which Mr Shewan Lownie is the Regional Organiser, Scotland.

The Centre continued to be used for informal discussion groups and for meetings of the Fair Isle Bird Observatory Trustees, the Isle of May Bird Observatory and Field Station Committee, and the Aberlady Bay Nature Reserve Biological Committee.

During the summer many British and Overseas visitors came for help and advice, and numerous postal enquiries were dealt with throughout the year.

Acknowledgments In conclusion, and as usual, Council wishes to record its sincere thanks to those who have helped the Club so freely throughout the session, by covenants, donations, lectures, Branch organisation, editorial assistance, service on special committees and in many other unseen and useful ways.

For the Council, W. J. EGGELING, President.

THIRTY-THIRD ANNUAL GENERAL MEETING OF THE CLUB

The Thirty-third Annual General Meeting of the Club was held in the Hotel Dunblane Hydro, Perthshire, on Saturday 25th October 1969 at 6 p.m. Dr W. J. Eggeling, President of the Club, presided over an attendance of about 125 members.

Apologies Apologies for absence were received from Dr David Boddington, S. L. Hunter and J. MacGeoch.

Minutes The Minutes of the Thirty-second Annual General Meeting, held in Dunblane on 26th October 1968, were approved and signed.

Report of Council The Report of Council for Session 32, presented by the Chairman, was adopted.

Accounts The Accounts for the year ending 30th June 1969, presented by the Hon. Treasurer, were approved.

Appointment of Auditor Mr Arthur Walker C.A. was re-elected Auditor for the ensuing session.

Election of new Office Bearers and Members of Council In the absence of any other nominations, the Council's recommendations for the following elections were approved. President: A. Donald Watson to replace Dr W. J. Eggeling who had completed his term of office. Vice-President: George Waterston to replace A. Donald Watson. Council Members: Dr I. T. Draper and J. MacGeoch to replace H. A. Maxwell and R. T. Smith, who were due to retire by rotation. The Chairman thanked the retiring members for their services to the Club.

Subscription The Meeting approved the recommendation of Council that Membership rates should be increased, and the proposed amendment to the Constitution that under 3 MEMBERSHIP (e) the rates should now read as follows:

"The Annual Subscription shall be 40s; or 10s in the case of Members who are under 21 years of age, ... Married couples shall be eligible for Joint Membership at an Annual Subscription of 60s, ..."

The Chairman said that existing Members will pay the new rates from 1st October 1970, but those joining the Club will pay the new rates from 1st November 1969.

It was agreed that Council would consider a suggestion that the age limit for Junior Members might be reduced from 21 to 18 years of age.

Conference Location The Chairman reminded Members that last year the question of a different location for the Annual Conference was raised. He explained that the Aviemore alternative had been investigated but the requisite facilites were not as good as Dunblane.

Secretarial Staff The Chairman outlined the changes in staff structure which had come into effect since the last Annual General Meeting. The advice of the Management Committee that two full-time staff were required had been accepted. Mrs Waterston had suggested that either an Assistant Secretary should be recruited, capable of taking over from her within five years, or that she herself should become Deputy Secretary and a Secretary be sought. In the event, after repeated advertisement, no suitable Assistant was found, so the post of Secretary was advertised and Major A. D. Peirse-Duncombe was appointed.

The Chairman paid tribute on behalf of the Club to Mrs Waterston: it was largely due to her work throughout her period as Secretary that the Club had attained its present position; it was the hope of everyone that the appointment of Major Peirse-Duncombe, to whom we extend a warm welcome, would reduce the burden of work upon her and give her at least a little time to call her own.

Votes of Thanks The Chairman moved a warm vote of thanks both to all those who had given help at the Conference and to all the Club's staff. The Meeting closed with a hearty vote of thanks to the retiring President by A. Donald Watson, the President-elect of the Club.

COUNCIL AND OFFICE BEARERS OF THE CLUB FOR SESSION 33

Hon. Presidents: David A. Bannerman, O.B.E., LL.D., Sc.D., F.R.S.E.; Sir Charles G. Connell, W.S.; Sir Arthur B. Duncan.

President: A. Donald Watson.

Vice-President: George Waterston, O.B.E., F.R.S.E.

Hon. Treasurer: Maxwell K. Hamilton, C.A.

Hon. Treasurer of House Fabric Fund: D. G. Andrew, W.S.

Secretary and Treasurer: Major A. D. Peirse-Duncombe.

Deputy Secretary: Mrs George Waterston.

Editor of "Scottish Birds": A. T. Macmillan, C.A.

Assistant Editor of "Scottish Birds": D. G. Andrew.

Business Editor of "Scottish Birds": Major A. D. Peirse-Duncombe.

Council: R. S. Baillie, William Brotherston, R. G. Caldow, Dr I. T. Draper, C. G. Headlam, Dr David Jenkins, J. MacGeoch, Prof. M. F. M. Meiklejohn, T. D. H. Merrie, Miss V. M. Thom.

Branch Representatives to Council: Miss J. V. Black (St Andrews); J. E. Forrest (Dundee); Miss F. J. Greig (Aberdeen); S. L. Hunter (Ayr); J. K. R. Melrose (Dumfries); J. H. B. Munro (Edinburgh); A. L. Ogilvy (Glasgow).

BRANCH AND GROUP OFFICE BEARERS

Aberdeen: Chairman, A. Anderson; Vice-Chairman, A. J. M. Smith; Secretary, Miss F. J. Greig; Committee, J. L. Riddell, D. P. Willis, R. F. Yule.

Ayr: Chairman, S. L. Hunter; Vice-Chairman, A. G. Stewart; Secretary, Dr M. E. Castle; Committee, Dr J. A. Begg, Miss M. S. P. Gibson, T. B. Kay, R. M. Ramage.

Dumfries: Chairman, A. D. Watson; Vice-Chairman, J. K. R. Melrose; Secretary, H. M. Russell; Committee, W. Austin, Miss J. Donnan, J. Maxwell, R. T. Smith.

Dundee: Chairman, D. B. Thomson; Vice-Chairman, Dr D. G. Adamson; Secretary, Miss J. Stirling; Committee, A. Beat, J. E. Forrest, Mrs J. A. R. Grant, J. Hunter Sutherland.

Edinburgh: Chairman, J. H. B. Munro; Vice-Chairman, C. K. Mylne; Secretary, J. A. Stewart; Committee, L. W. G. Alexander, D. Grant, Mrs J. H. B. Munro, J. B. Murray.

Glasgow: Chairman, A. L. Ogilvy; Vice-Chairman, R. G. Caldow; Secretary, Mrs I. T. Draper; Committee, Dr I. T. Draper, J. Eunson, R. A. Jeffrey, J. Mitchell.

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International Wildfowl Research Bureau, Duck Working Group: Miss V. M. Thom.

British Trust for Ornithology, Atlas of British Breeding Birds Project: C. G. Headlam (Scottish Coordinator).

HONORARY MEMBERS

Duncan Anderson, Clyde Bain, Henry Boase, P. W. G. Gunn, Sir Landsborough Thomson.

WEEKEND EXCURSION TO DUMFRIES

The weekend excursion to the Solway goose grounds has been arranged with the County Hotel, Dumfries, from Friday 13th February to Sunday 15th February 1970.

Accommodation: inclusive terms £6.6.0, inclusive of gratuities, as follows—bed on Friday 13th; breakfast, packed lunch, dinner and bed on Saturday 14th; breakfast and packed lunch on Sunday 15th. Members should inform the hotel in advance if they require dinner on Friday night (extra). A limited number of rooms with private bathrooms are available for the additional charge of 20/- per night.

Members may bring guests and should book direct with the Manager, County Hotel, Dumfries (tel. 5401), notifying him that they are attending the Club excursion. It is advisable to bring warm clothing, gum boots if possible, and thermos flasks.

AYR BRANCH WINTER EXCURSIONS—1970

Saturday 3rd January, BARRLOCH. 10 a.m. depart Wellington Square, Ayr. Bring packed lunch.

Saturday 7th February, PRESTWICK shore. 1.30 p.m. depart Wellington Square, Ayr.

Saturday 7th March, CAERLAVEROCK. 9 a.m. depart Wellington Square, Ayr. Bring packed lunch.

Note It is hoped to arrange a bus for this visit. Will members please contact the Secretary (tel. Alloway 41828) before 28th February.

Saturday 4th April, DOONFOOT. 1.30 p.m. depart Wellington Square, Ayr.

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