

SCOTTISH BIRDS

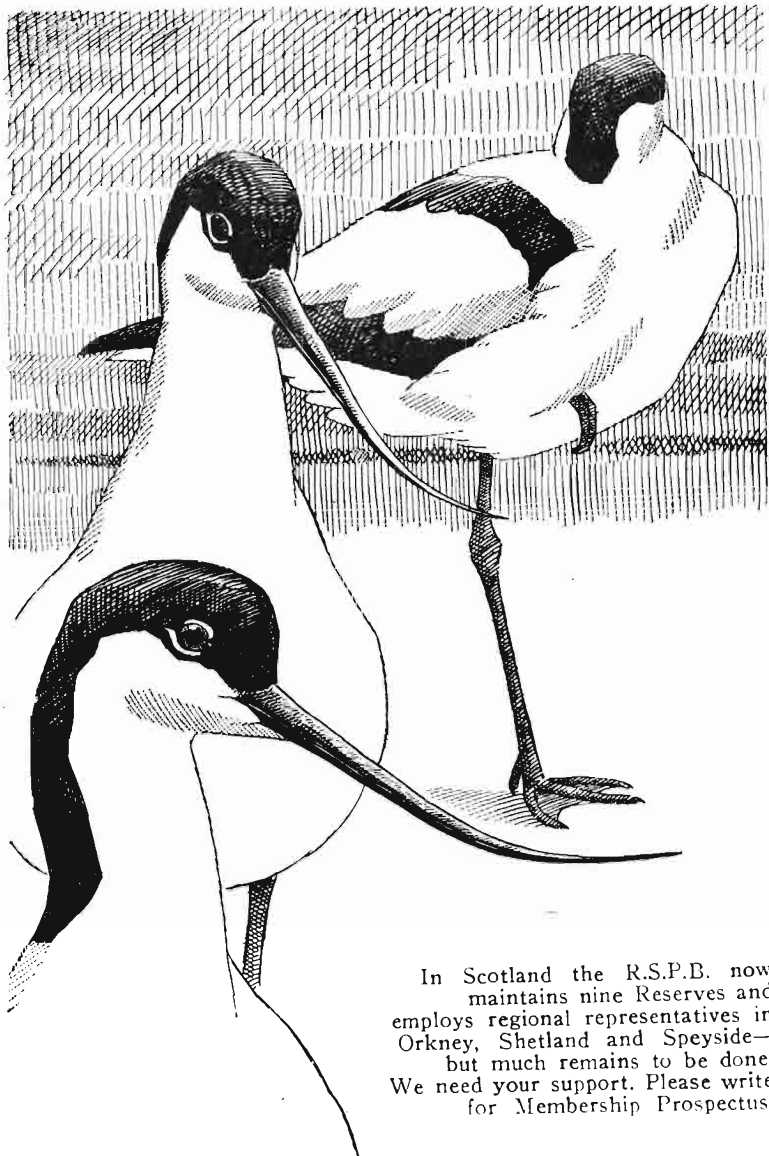


THE JOURNAL OF THE
SCOTTISH ORNITHOLOGISTS' CLUB

Volume 8 No. 3

AUTUMN 1974

Price 75p



In Scotland the R.S.P.B. now maintains nine Reserves and employs regional representatives in Orkney, Shetland and Speyside—but much remains to be done. We need your support. Please write for Membership Prospectus.

*to 'protect
and conserve'*

R S P B

THE ROYAL SOCIETY FOR THE PROTECTION OF BIRDS
21 Regent Terrace, Edinburgh 7

Tel. 031 - 556 5624

OBSERVE & CONSERVE BINOCULARS TELESCOPES

SPECIAL DISCOUNT OFFER

OF UP TO 33 1/3%

POST/INSURED FREE

Retail price Our price

SWIFT AUDUBON Mk. II 8.5 x 44	£66.00	£42.07
SWIFT SARATOGA Mk. II 8 x 40	£44.00	£30.80
GRAND PRX 8 x 40 Mk. I	£36.30	£24.94
SWIFT NEWPORT Mk. II 10 x 50	£49.50	£32.40
SWIFT SUPER TECNAR 8 x 40	£27.50	£17.92
ZEISS JENA JENOPTEN 8 x 30	£39.30	£24.90
CARL ZEISS 8 x 30 Dialyt	£145.31	£95.23
CARL ZEISS 10 x 40B Dialyt	£145.31	£95.23
LEITZ 8 x 40 Hard Case	—	£123.66
LEITZ 10 x 40B Hard Case	—	£119.35
PERL 9 x 35	£21.06	£16.85
HABICHT DIANA 10 x 40 W/A (best model on market under £122)	£121	£76.58
Nichel Supra Telescope 15 x 60 x 60	£95.04	£69.75
Hertel & Reuss Televari 25 x 60 x 60	£91.80	£67.50

All complete with case. Fully guaranteed.

Always 120 models in stock from **£11.00 to £300.00**

Available on 14 days approval—Remittance with order.

The Heron 8 x 40 BCF. Retail approx. £27.50, our price **£18.00**. As recommended by Forestry Commission. Ask for our free brochure 'Your guide to Binocular/Telescope Ownership' and price list.



Send too for Price Lists for all Camping, Climbing, Rambling Equipment from our associate company **FIELD & TREK** (equipment) Ltd., same top quality, same keen prices, **SAME ADDRESS.**

HERON OPTICAL COMPANY Ltd. (Dept. SB),

25 Kings Road, Brentwood, Essex.

Tel. (STD) 0277 221259/219418

Please despatch to me immediately

for which I enclose £...../.....

Please send me your Free Brochure described above plus Binocular/Telescope Price List.

(Delete as appropriate)

Name

Address

.....(SB)



1975 SPECIAL INTEREST TOURS by PEREGRINE HOLIDAYS



Directors : Raymond Hodgkins, MA. (Oxon) MTAI and
Patricia Hodgkins, MTAI.

All with guest lecturers and a tour manager.
All by scheduled air services.

Galapagos Cruise & Upper Amazon Basin . . . The successful departure of July 1974 (Anthony Huxley, Peter Conder, Alastair Fitter) is now followed by the 1 December tour with John Gooders, B.Sc., Dr Mike Harris and Ken Burras, NDH, as guest lecturers. Two tours are planned for 1975. 10 Aug . . . 20 days from £650* . . . **Dr Jim Flegg** of the B.T.O.; **Dr Bruce Campbell**, famous writer and broadcaster on Natural History; **Patrick Synge, M.A.**, botanist of international repute, writer and for many years editor of R.H.S. Journal. 1 Dec . . . 20 days from £650* . . . Arranged in conjunction with **Twickenham Travel Ltd.**, Twickenham, Mx.

India & Nepal . . . Birds and Wildlife . . . Sat Feb 1, 21 days, £565 . . . Delhi (Red Fort) Agra (Taj Mahal) Jaipur plus Sultanpur Jeels, Bharatpur Sanctuary (Siberian Cranes) Khatmandu, Tiger Tops Jungle Lodge (Terai Forest, Nepal) Kaziranga. A repeat with improvements of last year's successful tour with **John and Su Gooders and Ray Hodgkins**.

S. India & Ceylon . . . Sun Feb 16, 21 days £580 Birds & Wildlife . . . Bombay (Borivali Nat. Pk., Elephanta Caves), Colombo, Hikkaduwa, Yala Nat. Pk., Kandy, Wilpattu Nat. Pk., Nagpur, Kanha National Park, Bombay. Arranged in conjunction with Fauna Preservation Society after preliminary survey by Richard and Maisie Fitter. Accompanied by **Dr Bruce Campbell**, the famous ornithologist, writer and broadcaster.

Crete . . . Bird and Flower Tours . . . Thurs. Mar. 27, Tues. Apr. 1, Sun. Apr. 6, 16 days. £280.00. The sixth successful year of these very popular tours which cover the island from East to West, very leisurely using only three centres Agios Nikolaos, Chania and Heraklion. Each tour with Ornithologist, Botanist and Tour Manager is a pleasant interest filled ramble by coach and foot. Guest lecturers include **Dudley Iles, B.Sc., Len Beer, Esq., Dr Humphrey Bowen, John Parrott, B.Sc., Dr Sue Coles, Ursula Bowden, M.A.**

Peloponnese . . . Bird and Flower Tour . . . Wed. Apr 2, 15 days, £280.00. An inevitable repeat of last year's success with **Allen Paterson, NDH** (Flowers) and **Derek Lucas** (Birds). Athens, Nauplia (Epidaurus, Tiryns, Mycenae) Argos, Tripolis, Taygetus Mountains, a new stop at Methoni (remote and beautiful) Olympia.

Eastern Anatolia . . . Birds & Flowers . . . June 4, 15 days, £340.00.* A biennial tour to the wilds. Lake Van, Kars, (Ani), Erzurum, horseback biennial tour to the wilds. Lake Van, (Agdamar), Kars, (Ani), Erzurum, horseback via Istavri over Xenophon's route to Trebizond with **Michael Rowantree, M.A., Anthony Huxley, M.A., Raymond Hodgkins, M.A.**

Detailed brochures available from

(*To be confirmed)

**PEREGRINE HOLIDAYS at TOWN AND GOWN TRAVEL,
41 SOUTH PARADE,
SUMMERTOWN, OXFORD,
OX2 7JP.**

Phone Oxford (0865) 55345 & 54517



OTHER SPECIAL INTEREST TOURS by PEREGRINE HOLIDAYS

Rwanda & Zaire . . . 16 July . . . 16 days . . . £680/. The 1974 tour with Sir Hugh Elliot and Patricia Hodgkins was entirely successful with the main objective—close-up views of mountain gorillas—achieved with almost startling success as slides at the September F.P.S. meeting showed! The 1975 tour will again be arranged in conjunction with the Fauna Preservation Society and will cover the same itinerary of exceptional and unusual wildlife observation.

Peloponnese . . . 3-17 April . . . Sites & Flowers . . . 15 days £280. Dr Pin-sent's tour has become an institution and is particularly attractive this year as it is accompanied by Dr W. T. Stearn, the recognized international authority on Green flora.

Crete . . . 8-22 May . . . Minoan Sites & Flowers . . . 15 days £280. Trevor Rowley, M.A., B.Litt., a young and enthusiastic senior member of Oxford University again takes this tour in its third successful year. Hugh Syngé, B.Sc., now joins it as guest lecturer for botany. He has already impressed our clients in Cyprus and Turkey with his expertise and charm.

Other tours "on the stocks".

Canada . . . Whale Watching in the Gulf of St Lawrence.

Malaysia . . . Birds & Wildlife.

Zambia . . . Birds & Wildlife.

We welcome enquiries from clubs, societies, universities and schools for "tailor-made" tours. Inter alia we have arranged special tours for Birmingham University, the University of South Wales and the Smithsonian Institution of Washington D.C.

COLOUR SLIDES

We are now able to supply slides of most British Birds from our own collection, and from that of the R.S.P.B. Send 15p for sample slide and our lists covering these and birds of Africa—many fine studies and close-ups.

FOR HIRE

We have arranged to hire out slides of the R.S.P.B. These are in sets of 25 at 45p including postage & VAT per night's hire. Birds are grouped according to their natural habitats.

W. COWEN, Keswick

Attractive cottages to Let

set in the hills of the

Mull of Kintyre

Two fairly isolated, excellent
for walkers and bird watchers

Send for details with s.a.e. to

CARSKIEY LTD.,

Carskiew Farm, Southend,

Argyll, PA28 6RU.

SCARCE MIGRANT BIRDS IN BRITAIN AND IRELAND

J.T.R. Sharrock



Dr Sharrock takes a ten year period and investigates in detail all records of a selection of birds which arrived as scarce migrants from Europe, Asia and America. He considers their breeding and wintering ranges, their numbers and the frequency of their occurrences and suggests its cause. Over 130 maps and diagrams and 24 photographs.

208 pages, August £3.80 net.

SEVENTY YEARS OF BIRDWATCHING

H.G. Alexander

This is not an autobiography, but a book about birdwatching, birdwatchers and, especially, birds by an exceptional Englishman who began watching birds in Kent in 1908 and has never stopped. A leading ornithologist, he knew most British and many foreign ornithologists of his day, he also travelled widely in India for the Society of Friends, and now lives in retirement in Pennsylvania, USA. Illustrated by Robert Gillmor, and with photographs. 272 pages, May, £3.80 net.

Postponed from June/July

FLIGHT IDENTIFICATION OF EUROPEAN RAPTORS

R.F. Porter, Ian Willis, Steen Christensen, Bent Pors Nielsen

The authors have been studying the 38 species of European diurnal birds of prey and the problems of their field identification for many years, and this book is the outcome and the definitive guide to the subject. Over 350 drawings and photographs.

256 pages, September, £4.80 net.

WATCHING BIRDS

James Fisher and Jim Flegg

Among the deservedly popular writings of the late James Fisher, *Watching Birds* was probably the most read and consulted. First published in 1940 by Penguin and several times reprinted it eventually went out of print and its author planned to re-write it. This task has now been expertly achieved by Dr Jim Flegg, Director of the British Trust for Ornithology, and it becomes once again *the* guide to watching and understanding birds. Over 60 illustrations.

168 pages, October, £2.80 net.

T. & A. D. POYSER LTD

281 High Street, Berkhamsted, Hertfordshire

All titles are available from the Bird Bookshop, 21 Regent Terrace,
Edinburgh, EH7 5BT.

SCOTTISH BIRDS

THE JOURNAL OF THE SCOTTISH ORNITHOLOGISTS' CLUB
21 Regent Terrace, Edinburgh EH7 5BT (tel. 031 - 556 6042)

CONTENTS OF VOLUME 8, NUMBER 3, AUTUMN 1974

	Page
Editorial	149
S.O.C. Great Crested Grebe Enquiry 1973. By R. W. J. Smith	151
Breeding and Moulting Eiders in the Tay Region. By B Pounder	159
Recent Studies on Barnacle Geese at Caerlaverock. By Myrfyn Owen and C. R. G. Campbell	181
Short Notes	
Early nesting Merlins in Galloway (R. C. Dickson, A. D. Watson)	194
Early nesting Tawny Owls in Aberdeen (Robert L. Swann, Robert Rae)	194
Nightingale of eastern subspecies on Fair Isle) (R. A. Broad)	195
Reviews	
The Coastline of Scotland. By J. A. Steers. Reviewed by J. J. D. Greenwood	195
The Cairngorms. By Desmond Nethersole-Thompson and Adam Watson. Reviewed by Alan G. Knox	196
Fair Isle Bird Observatory : Report for 1973. Edited by George Waterston. Reviewed by R. J. Raines	197
The Seabirds of Britain and Ireland. By Stanley Cramp, W. R. P. Bourne and David Saunders. Reviewed by Norman Elkins	197
The Buzzard. By C. R. Tubbs. Reviewed by N. Picozzi	199
Seventy Years of Birdwatching. By H. G. Alexander. Reviewed by A. G. Stewart	200
Der Zug Europaischer Singvogel. Edited by Gerhardt Zink. Reviewed by R. H. Dennis	201
Letters	
Long-tailed Ducks in the Outer Hebrides (Norman Elkins)	201
Long-tailed Ducks in the Uists (Arthur B. Duncan)	202
Requests for Information	202
The Scottish Ornithologists' Club	204
Vivat Ornithologie. By Dr Ian D. Pennie	208

Editor D. J. Bates

Business Editor Major A. D. Peirse-Duncombe



BILL SINCLAIR

Wild Life sound recordist of the year recording Crested Tits
at Landmark, Carrbridge. Hear Sinclair Sound in the new Multi-
Screen Wild Life Programme at :

Landmark

CARRBRIDGE
Inverness-shire

Open all year.

Tel. Carrbridge 613

EXHIBITION - MULTI-SCREEN THEATRE - BOOK & CRAFT SHOP
RESTAURANT AND BAR - NATURE TRAIL - PICNIC AREA

SCOTTISH BIRDS

THE JOURNAL OF THE SCOTTISH ORNITHOLOGISTS' CLUB



Volume 8 No. 3

Autumn 1974

Edited by D. J. Bates

Editorial

Scottish Bird Report: 1973 Readers will be disappointed to learn that the 1973 Bird Report has been delayed until the winter number. Despite the prompt submission of records, editing by both Roy Dennis and myself has been impeded by pressure of other work. My job as editor is combined with managing the Club's bookshop, and the great increase in bookshop business, while obviously beneficial to the Club, has made urgent demands on time that should have been spent editing *Scottish Birds*. Hence this autumn number is even later than expected.

We are confident, however, that with more bookshop staff we can publish *Scottish Birds* punctually, and still provide a bookshop service which is of value both to our customers and to the Club.

Geese as pests The Secretary of State for Scotland recently published a proposal to make an order under the Protection of Birds Act allowing the killing of Greylag and Pink-footed Geese during the close season in the counties of Perth, Kinross, Angus, Fife, Stirling and Clackmannan. This proposal, which would confer on these geese the status of pests, is deemed necessary owing to the damage done by these birds to the early spring grazing on many farms. Objections were invited by 21st October 1974.

The SOC Council has lodged a formal protest to the Secretary of State and the reasons are quoted in full as follows :

1. For much of the time these geese are in Britain, their feeding does no harm to agriculture and may often be beneficial. Competition between geese and domestic stock for young grass in spring presents a real problem, but one which is heavily localised and restricted to only a few fields out of many. The problem can be dealt with simply by scaring the geese away from crucial fields for the short period that is necessary. Adequate means for doing this already exist. Not only can the farmer shoot the birds out of season if he can prove damage, but he can also freely use the various scaring devices of which several highly effective types have become available in recent years. Reducing the population on the other hand would not necessarily lead to any reduction in the damage. This was the advice produced by all three organisa-

tions which have researched the problem in recent years—the Department of Agriculture and Fisheries for Scotland, the Nature Conservancy and the Wildfowl Trust.

2. It is not usual to shoot legitimate quarry species in the breeding season, yet a substantial part of the breeding cycle of geese, including courtship and copulation, is accomplished in Britain, and the cycle is continued with egg laying almost as soon as the birds arrive in Iceland. Disruption by spring shooting might therefore have serious effects on subsequent nesting of the geese.

3. The proposal might have international repercussions, and its timing could hardly be worse. For some years British conservationists have been active in attempting to persuade the Iceland Government to protect the main breeding area of the Pinkfoot, currently threatened by a hydro-electric project. The sudden relegation of the species to pest status in Britain would not help to strengthen the case. In addition, Britain has for some years been to the fore in international attempts to rationalise hunting. The spring shooting of waterfowl is now considered to be generally unacceptable. The next discussion of this subject will be at a meeting of the International Wildfowl Research Bureau in Germany in December of this year, when Government delegates from thirty nations will be present. After arguing with effect for years for the rationalisation of hunting, the British delegates will be in a weak position if they have to admit to a retrograde step in their own country.

Other objections have been lodged by the RSPB and the Wildfowl Trust. The outcome is not known at the time of going to press.

Sea-ducks around the Scottish coast Two letters appear in this issue as a result of the Short Note on Long-tailed Ducks in the Uists which was published in the winter 1973 issue of *Scottish Birds*. These would appear to indicate that there may be a considerable amount of unpublished data on the numbers of sea-ducks in various places around the Scottish coast. These data could be particularly valuable at a time when industrialisation is threatened in places where it was undreamed of only a few years ago, and readers who possess any such material should forward it to the Editor for publication.

Photographic material We have a number of very excellent photographers in the SOC and the work of some of these has been featured in previous issues of *Scottish Birds*. It nevertheless becomes increasingly difficult to maintain the high standard achieved in the past and combine this with variety and originality.

Good photographs of ornithological subjects will always be welcomed, particularly if they illustrate material submitted for publication in the journal, and members sending reports suitable for publication as Short Notes are especially asked to bear this in mind. In addition, any photographers, amateur or professional, who would like their work to be featured in *Scottish Birds* should send good black-and-white prints to the Editor.

S.O.C. Great Crested Grebe Enquiry 1973

R. W. J. SMITH

The British Trust for Ornithology is conducting another Great Crested Grebe census in 1975. As in 1973, counts in Scotland will be organized by R. W. J. Smith. Local recorders will be responsible for ensuring coverage of their own counties.

Introduction

In 1973 there was an official S.O.C. enquiry into the breeding population and success of Great Crested Grebes *Podiceps cristatus* in Scotland. In addition, comparison was made with the 1965 census (Prestt & Mills 1966).

Observers were asked to make at least two visits—one in early summer to locate the breeding birds and another in late summer to count the surviving young. Observer cover was generally good but there were some gaps. The difficulties of censusing such apparently obvious birds as Great Crested Grebes can be illustrated by records from three observers on one water. One observer had a pair in May and none in June, a second quoted five-six pairs with about four young reared, while a third report gave a casual observation of one smallish young with an adult on 1st October.

1973 proved to be an abnormal year. After a very dry previous autumn and winter the water level of many of the east coast reservoirs was well below the line of emergent vegetation and many birds made no attempt to breed. Some appeared on waters from which there were no previous records. Some waters held fewer pairs than usual. No young were reared on waters severely affected by the drought, nor on the normally unused waters to which the birds had been displaced.

Number of adults

The number of Great Crested Grebes reported on all waters was 152-158 pairs with 29 unmated birds—a total of 333-345 birds. In the 1965 census, 301 birds were counted and 345 estimated in Scotland. It would seem that the population was at about the same level in 1973 as in 1965, although the figures are not directly comparable. Several waters were counted in 1973 that were missed in 1965, but it is difficult to be sure how many, as not all nil returns were named in the 1965 report. Waters that held birds in 1965 and were not covered in 1973 were as follows: four in Angus (15-16 birds in 1965), two in Clackmannanshire (eight-nine birds in 1965), two in Fife (six

birds in 1965 and five-six in May 1974), one in Perthshire (one bird in 1965, probably none in 1973), one in Roxburghshire (one-two birds in 1965) and one in Stirlingshire (two birds in 1965). These might have given an additional 30 or so birds in 1973. In the Clyde area, R. W. Forrester estimates that of other lochs not covered in 1973, perhaps Kilbirnie Loch in Ayrshire might have held one pair, and Eaglesham Moor Lochs, Knapps Loch, Stavely Reservoir and Harelaw Reservoir in Renfrewshire might have had two-three pairs between them. This gives an estimated total of 370-380 birds from all known or suspected waters in 1973.

The 1965 census was held mainly on two consecutive days to try to avoid double counting or missing some of this rather mobile species. In 1973 no attempt was made to co-ordinate visits so that birds which moved between two or more waters could have been counted twice or missed completely. Probably, however, this has not affected the final figures to any appreciable extent.

The distribution by county is not greatly changed. Perthshire still has most, with 79-81 birds (65-84 in 1965) and Fife is still second, although numbers have gone down in recent years. Lindores Loch in Fife held most birds (22-26) in 1965, but in 1973 there were only five pairs. The highest count on any water in 1973 was at Loch of Lowes in Perthshire where there were seven pairs.

Number of young

The attempt to gauge the breeding success of Great Crested Grebes in 1973 was less successful than the census of adults. At least 81 young birds were reported from all waters, with six of these known not to have survived. Some of the former were fairly small, and there may have been further casualties. There were also two nests with eggs reported on last visits. The remaining 75+ young from some 150 breeding pairs represent about one young from two pairs. This apparently low ratio had several contributory factors. The most important was the low water level, especially in the east of the country. This may have caused some pairs to move to less suitable areas. From 14 waters, with 26 pairs, the reason given for failed or non-breeding was low water level, and on upper and lower Loch Ken, with six pairs, fluctuating water levels and perhaps disturbance were blamed. Although the winter and spring of 1973 were the driest on record, falling water levels, particularly on reservoirs, are an annual hazard, and the species is apparently able to maintain itself on these reservoirs in spite of it.

On the form circulated to observers it was suggested that most eggs would have hatched by the end of July and that a second visit then would be adequate (Campbell & Ferguson-Lees 1972; Witherby *et al.* 1940). Many late visits to count the number of young were made before mid July. However, some young were still being hatched in mid September. On Castle Loch, Dumfriesshire, hatching dates were: one young in mid August, one young about 1st September and four young about 16th September. It is interesting that all the four young from the last brood survived and fledged. Table 1 gives the hatching dates of late broods.

Table 1. Dates of hatching of late broods in 1973

Date	1-10 Aug.	11-20 Aug.	21-31 Aug.	1-10 Sep.	11-20 Sep.
Number of young	2	3	3	1	4
per brood	2	2	2	—	1
	—	1	—	—	—

In all, ten broods, totalling 21 young, were reported as hatching after the beginning of August—more than one quarter of the known total for the year. Where dates were given, it is known that no visits were made after mid July to six lochs (with 14 pairs) where no young had been recorded but breeding conditions were still suitable. It is possible that some young may have hatched later in the season. This species is also sometimes double-brooded.

In recent years divers *Gaviidae* and Slavonian Grebes *Podiceps auritus* have also reared late broods in Scotland, perhaps due to cold and drought in the early part of the spring (R. H. Dennis pers. comm.).

Records from previous years

Many recorders gave information on Great Crested Grebes from previous years. Most waters held similar numbers from year to year, and there was a tendency for each site to have a history of either successes or failures. From 14 waters where comparison was possible there were ten where the results were similar to those of the previous few years. Young were present on seven of these but not on the other three over several seasons. Various observers commented on frequent disturbance from fishing activities and some other interference such as egg-collecting.

Some waters have shown more violent fluctuations in breeding numbers. Threipmuir Reservoir, Midlothian, has a

main loch, with a marshy end separated by a causeway. In 1967 there were five broods; in 1969, 12 adults and four broods, and in 1970 there were seven pairs—five of these in the marshy area. By 1972 there were only two pairs, with just one pair in 1973 when the water level was so low that the marsh had been dry since the previous winter. On 8th July 1973 D. Mitchell noticed large numbers of small dead fish washed up or floating on the water. In early 1974 two pairs were on the main loch and none on the normally more favoured marsh although it was full. In Midlothian the summers from 1965 to 1969 were wet and water levels remained high. Since then rainfall has been well below average. Reservoir levels fell during autumn 1969 and have fluctuated widely since, remaining full for comparatively short periods. A good breeding stock had built up when the water levels were right and there was plenty of available food. The series of recent dry years must have drastically reduced both fish and other freshwater fauna in the marsh and perhaps in the main loch of Threipmuir. A similar explanation may account for the decrease on Morton Lochs, where seven pairs bred in 1968 and five pairs in 1969. By 1972 there were only two pairs. Survival of young here has always been poor.

D. W. Oliver says of Kilconquhar Loch: "... in the early 1960's, six pairs were the inevitable breeding season counts, and there were always a few chicks reared". In 1970, '71 and '72 there was only one pair and no surviving young. Possibly some of the 1973 birds were from other waters (e.g., Cameron Reservoir).

Lindores Loch, which had the largest colony in 1965 (22-24 birds), was treated with rotenone in 1967 to clear out pike and allow restocking with trout. There was a slump in the numbers of Great Crested Grebes in 1967 and there were fewer still in 1968 (when only two chicks hatched). In 1972 there were only three pairs, but at least one chick hatched. Dr Derek Mills (co-author of the 1965 census) comments that there is no evidence that rotenone has any long-term detrimental effect on wildlife. The toxic effect is short-lived and soon disappears. Apparently the treatment at Lindores Loch was about 90% effective, but some pike, and probably other fish such as sticklebacks, survived. The loch is unsuitable for trout to breed. It is restocked annually, but these trout are most likely to be of a size too large for Great Crested Grebes to take. The annual restocking with so many large fish creates an artificial situation which prevents the original balance from being restored. Under these conditions, the birds may not regain their former numbers.

Breeding distribution by counties

1. The 1965 figures are the actual counts, with the estimated totals, where different, in brackets.
2. The No. of young 1973 figures are those counted at the last visit, with the highest count, where different, in brackets.
3. ? denotes that the number is unknown.
4. W denotes that the water level was exceptionally low in 1973.

	No. of adult birds 1965	No. of pairs 1973	Unmated birds 1973	No. of young 1973
ABERDEENSHIRE				
Loch Davan	?	3	0	?
Loch Kinord	?	1	0	?
Meikle Loch	3	0	2	0
Sand Loch	?	0	1	0
Loch of Strathbeg	3	2	1	?
Nil returns from Old Deer, Loch of Skene				
ANGUS				
Balgavie Loch	8	3	0	1
Forfar Loch	4(6)	2	0	0
Loch of Lintrathen	3(4)	?	?	?
Lochindorb and Laird's Loch	2	?	?	?
Long Loch	4	?	?	?
Rescobie Loch	7(8)	1	0	0
Thripley Loch	6	?	?	?
ARGYLLSHIRE				
Loch Tulla	1(2)	?	?	?
AYRSHIRE				
Creoch Loch	?	1	0	2
Loch Fergus	?	1	0	3
Loch o' the Lowes	0	?1	0	0
Loch Martnaham	3(4)	2	0	?0
BANFFSHIRE				
Nil				
BERWICKSHIRE				
Nil				
CAITHNESS				
Nil				
CLACKMANNANSHIRE				
Gartmorn Dam	7(8)	?	?	?
Kennet area	1	?	?	?
DUNBARTONSHIRE				
Nil—see Stirlingshire for Mugdoch Loch				
DUMFRIESSHIRE				
Castle Loch	8	3	2	6
Glenkiln Reservoir	?	1	0	0W
High Tae Loch	4	1	1	0
Kirk Loch	0	1	0	0
Mill Loch	2	2	0	3
EAST LoTHIAN				
Nil				

	No. of adult birds 1965	No. of pairs 1973	Unmated birds 1973	No. of Young 1973
FIFE				
Cameron Reservoir	2(4)	0	0	0W
Carriston Reservoir	1(2)	2	0	0W
Coul Reservoir	?	1	0	0
Craigluscar Reservoirs	?	0	4	0
Cullaloe Reservoir	2	1	0	0
Loch Fitty	6	0	1	0
Loch Gelly	4	?	1	?
Kilconquhar Loch	9	4	1	0
Kinghorn Loch	2	?	?	?
Lindores Loch	22(24)	5	0	0
Morton Lochs	6	4	0	0W
Loch Ore	1	1+	0	?
Otterston Loch	?	1	0	0
Peppermill Dam	?	0	1	0
Raith Lake, Kirkcaldy	?	1	0	0
Town Loch, Dunfermline	?	1	0	0
Tullieallan Loch	2	1	0	2

Nil returns from Ballo/Harperleas Reservoirs, Balbuthie Ponds, Clatto Reservoir, Craigtoun Park (St Andrews), Gillingshill Reservoir, Loch Glow, Luthrie curling pond (1 May record), Loch Ornie, Roscobie Loch, Scotsraig Pond (Tayport).

INVERNESS-SHIRE

Nil

KINROSS-SHIRE

Loch Leven	8	2-4	?	1
------------	---	-----	---	---

KIRKCUDBRIGHTSHIRE

Loch Arthur	?	1	0	0(2)
Auchenreoch Loch	2	1	0	?
Loch Ken (upper)	2	5	2	0
Loch Ken (lower/River Dee)	0	1	0	0
Loch Roan	2	?	?	?
White Loch (Colvend)	?	1	0	1(2)
Woodhall Loch	2	1-2	?	1

LANARKSHIRE

Douglas (three ponds)	?	1	0	0
Gadloch	6	1	0	3
Glenboig Loch	2	0	0	0
Hamilton Reserve	2	1	0	3
Hogganfield Loch	1	0	0	0
Johnston Loch	6	0	0	0
Lanark Loch	?	0	1	0
Possil Marsh	6	1	0	0
Roughrig Reservoir	?	1	0	0
Springfield Reservoir	1(2)	0	0	0W
White Loch (Carnwath)	?	1	0	0
Woodend Loch	4	2	1	4

Nil returns from Barons Haugh, Bishop Loch, Black Loch, Bonkie, Carstairs Loch, Lilly Loch, Lochend Loch, Newmains, Orchard Farm (Bellshill) and from Blackwood Camps, Cowgill, Culter Waterhead, Daer, Forrestburn (two pairs in May 1972), Gair, Glenbuck, Hillend and Wellbrae Reservoirs.

	No. of adult birds 1965	No. of pairs 1973	Unmated birds 1973	No. of Young 1973
MIDLOTHIAN				
Cobbinshaw Reservoir	1(4)	1	0	0W
Crosswood Reservoir	0	1	0	0
Duddingston Loch	2	1	0	0
Gladhouse Reservoir	2	1	0	0W
Rosslynlee Reservoir	0	1	0	0(2)
Threipmuir Reservoir	7(10)	1	1	0W
MORAYSHIRE				
Nil				
NAIRNSHIRE				
Nil				
PEEBLESSHIRE				
Fruid Reservoir	not built	1	0	0W
Portmore Loch	1	1	1	0W
PERTSHIRE				
Loch of Balloch	2	1	0	0
Loch of Butterstone	6(10)	4	1	0W
Carsebreck	1	?0		
Loch of Clunie	2(6)	4	0	1
Loch of Craiglush	3(4)	1	1	0W
Pond of Drummond	2	1	0	1
Dupplin Main Loch	4	\ 2	0	0
Dupplin Little Loch	2	\ 2	0	0
Fingask Loch	0(2)	0	1	0
Laird's Loch	2	1	0	0
Loch of Lowes	6(8)	7	0	3W
Marlee Loch	5(8)	6	0	0
Lake of Menteith	14	5-6	0	c5
Monk Myre	0(2)	0	0	0
Loch Monzievaird (Ochertyre)	2	1	0	1(2)
Rae Loch	1(2)	1	0	?
Redmyre Loch	1	0	0	0
Stare Dam	2	1	0	3
Stormont Loch	8	2	0	0W
Loch Watston	2	0	0	0
White Loch (Blairgowrie)	0	1	0	4
RENFREWSHIRE				
Aird Meadow	18)	3	0	?
Barr Loch)	6	0	8
Castle Semple Loch	2	1	0	1
Brother Loch	?	1	0	?
Harlaw Dam	?	2	0	2
Loch Libo	?	1	0	1
Rowbank Reservoir	?	1	0	?
Waulkmill Dam	?	1	0	0
Whittliemuir Dam	?	1	0	?
ROXBURGHSHIRE				
Acreknowe Reservoir	?	1	0	0
Alemuir Loch	4	2	0	0
Wester Wooden Loch	1(2)	?	?	?
Yetholm Loch	3	0	0	0
SELKIRKSHIRE				
Akermuir Loch	2	1	0	?
Cauldsheels Loch	4	0	0	0

	No. of adult birds 1965	No. of pairs 1973	Unmated birds 1973	No. of Young 1973
Clearburn Loch	1(2)	0	0	0
Headshaw Loch	2	0	0	0
Lindean Loch	1(2)	1	3	3
Shielswood Loch	1	0	1	0
Under Shaws Loch	2	0	0	0
STIRLINGSHIRE				
Antermoney Loch	?	1	0	0
Bardowie Reservoir	2	2	0	0
Carron Dam	?	2	?	4
Carron Reservoir	2	1	0	0
Craigallian Loch	1(2)	1	1	3
Edenkillin Loch	2	?	?	?
Mugdoch Loch	2	1	0	0
North Third Reservoir	2	0	0	0
Nil return from Carbeth Loch.				
SUTHERLAND				
Nil				
WEST LOTHIAN				
Linlithgow Loch	4(6)	4	1	6
WIGTOWNSHIRE				
Castle Loch	0	1	0	0
Mochrum Loch	0	1	0	0
Lochinch (two lochs)	?	5	?	5 broods

Discussion

Between 1965 and 1973 the Great Crested Grebe population in Scotland has, in general, maintained its numbers. Probably most suitable waters are now colonised, and the population will tend to remain fairly stable. After a series of good (that is, wet) years, when reservoir levels do not fall too much or too quickly, there is probably an increase on some waters, but numbers will tend to drop again in dry years. Breeding success may be hampered by fluctuating water levels and by boating and fishing interests, but the Great Crested Grebe is a resilient species. Fears have been expressed in some quarters that there may have been a general decrease recently due to the above pressures and to the increased use of pesticides and herbicides. The census does not provide any evidence in support of this.

It may be that some waters are crucial in maintaining the species at a high level during prolonged spells of unfavourable breeding seasons. In the Lothians, for example, Linlithgow Loch usually holds about four pairs and several young are fledged every year. When there is a succession of dry summers there may be few other young reared in the district. Provision must be made, as at Linlithgow, to ensure that the birds continue to breed on these important waters, undisturbed by human activities such as boating.

Acknowledgments

This enquiry was organised by S.O.C. local recorders. I am grateful to them and to the other observers, some of whom covered a large number of waters. I hope that I have included them all in the following list: L. Adams, Miss E. A. Armstrong, T. Boyd, W. R. Brackenridge, E. D. Cameron, P. N. J. Clark, E. A. Clifford, Mrs P. M. Collett, G. M. Crighton, T. P. Daniels, R. H. Dennis, G. Dick, R. A. Dickson, R. Donaldson, T. Dougall, B. Downing, Dr I. T. Draper, M. Drummond, Sir A. B. Duncan, J. Edelston, Dr E. C. Fellowes, R. W. Forrester, H. Galbraith, I. Gibson, M. J. P. Gregory, Dr K. C. R. Halliday, G. Horne, Mrs E. James, A. G. Knox, D. Macdonald, M. A. Macdonald, K. S. Macgregor, R. L. McMillan, Dr M. K. McCabe, Cdr R. H. Miller, D. Mitchell, J. Mitchell, Miss B. H. Moore, W. M. Moyes, D. E. Murray, D. Oates, D. W. Oliver, N. Picozzi, H. Robb, Dr M. Rusk, P. W. Sandeman, I. Simpson, A. J. Smith, C. H. Smith, R. T. Smith, R. L. Swann, Miss V. M. Thom, L. A. Urquhart, A. D. Watson, J. G. Young, B. Zonfrillo. I would also like to thank Dr Derek Mills, Roy Dennis and A. T. Macmillan for their very helpful comments.

Summary

A census of breeding Great Crested Grebes in Scotland in 1973 gave a total of 333-345 adult birds, showing little change from the 1965 total of 301-345 birds. With low water levels at many breeding sites, the last counts showed only 75 young surviving from a potential breeding population of about 150 pairs. Some of these young may not have survived to fledging. Recent decreases on some waters are discussed.

References

- CAMPBELL & FERGUSON-LEES. 1972. *A Field Guide to Birds' Nests*. Constable, London.
- PREST, I. & MILLS, D. H. 1966. A census of the Great Crested Grebe in Britain 1965. *Bird Study* 15: 163-203.
- WITHERBY, H. F., et al. 1940. *The Handbook of British Birds, Vol. IV*. Witherby, London.

R. W. J. Smith, 33 Hunter Terrace, Loanhead,
Midlothian, EH20 9SJ

Breeding and moulting Eiders in the Tay region

B. POUNDER

(Plate 13)

Introduction

The importance of the Tay estuary as a wintering area for Eiders *Somateria mollissima* has been recognised for a long time (Berry 1939, Atkinson-Willes 1963, Pounder 1971), but there is little information available on the status of the area during the summer months. Grierson (1962) has described the adverse effects on the breeding populations brought about by the afforestation of Tentsmuir on the southern shore of the

estuary and wartime military operations at Earlshall between the Tay and the Eden. However, Baxter and Rintoul (1953) reported moulting flocks in St Andrews Bay, and this, with regular sightings of large flocks of adult males off Tentsmuir Point in recent years (M. Smith, J. F. P. Keddie, pers. comm.) implied a possible recovery and increase in the local breeding populations and led to the investigations described here.

Methods and accuracy

Most of the observations and counts were made with the aid of a 30x60 telescope at sites from the South Esk at Montrose to the cliffs south of St Andrews, and these were supplemented by a few counts at Johnshaven-Gourdon and Fife Ness (figs. 1 and 2).

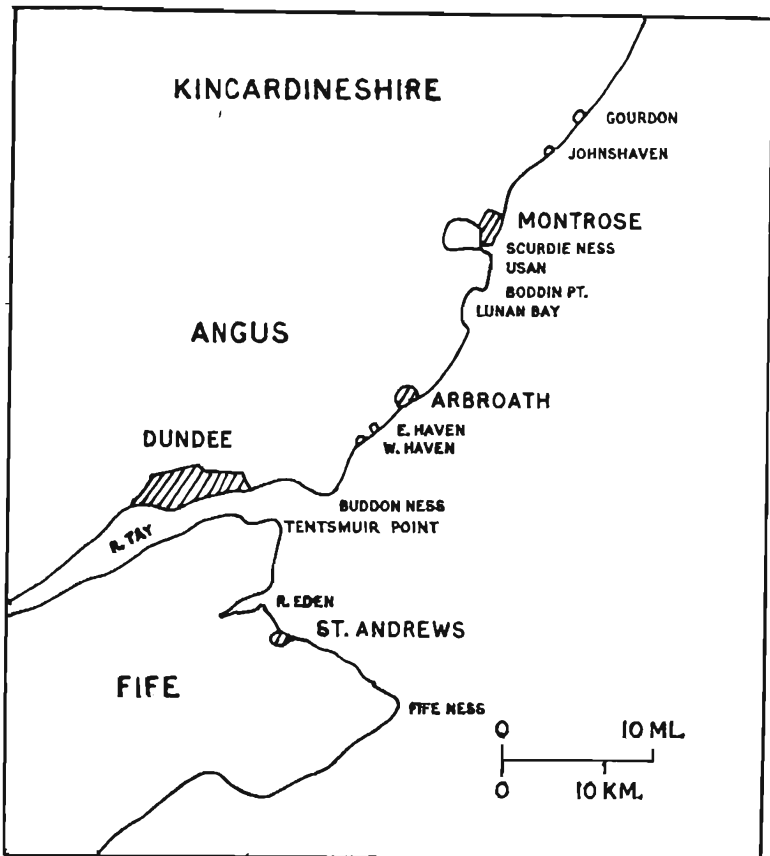


Fig. 1. The study area

About three or four visits per week were made to selected sites during the April to September periods of 1971 and 1972 and a smaller number during 1973, the selections being made so as to obtain as regular coverage as possible for each site throughout the study periods. The accuracy of counts varied from site to site and from visit to visit at any particular site. It was sometimes possible to count flocks of up to 200 birds with a 100% accuracy on calm clear days, but conditions were often so bad as to make any sort of count impossible. On some occasions, repeated counts of flocks of up to 1000 birds showed accuracy of $\pm 10\%$ was attainable, especially when large numbers of birds were on sandbanks at sites such as Tentsmuir Point. However, experience showed that the steep seaward slopes of the sandbanks could often hide very large numbers of birds, so even these counts were of uncertain accuracy. The least accurate counts were those carried out on flocks on choppy water in the Tay and Eden estuaries. Lighting effects were extremely important. For example, male birds were often almost invisible when viewed on grey water illuminated by a weak sun, and females were sometimes difficult to see when sought in good light with the sun behind the observer. For these reasons, it was sometimes necessary to count birds of one sex only and estimate the total numbers in the flocks from average values of male:female ratios deduced from easily visible portions of the flocks. The numerous sources of error made only a relatively small number of the counts sufficiently accurate for inclusion in this paper.

The winter-summer transition period

Throughout March the Eider flocks in the Tay estuary carried out their daily tide-dependent movement cycle (Pounder 1971). The sex ratio was 1:1 and the birds were flying in pairs during the second half of the month. During the first few days in April, unattached males were seen both in flight and with paired birds on the water. The ratio of males to females was 1.4:1 by 15th April, and pairs of birds flying on to Buddon Ness and the Tentsmuir shores indicated that some nesting activity had commenced by that time. Increasing numbers, particularly of males, were seen ashore during the second half of April and early May as the numbers in the estuary proper decreased, and the areas of water covered by the estuary flocks became progressively smaller as the birds concentrated more and more off Tentsmuir Point. The transfer of large numbers of unattached males from the estuary to the beaches and sandbars near Tentsmuir Point indicated the possible existence of a large breeding colony in the immediate vicinity of the estuary, and this view is supported by the observations described in the following sections.

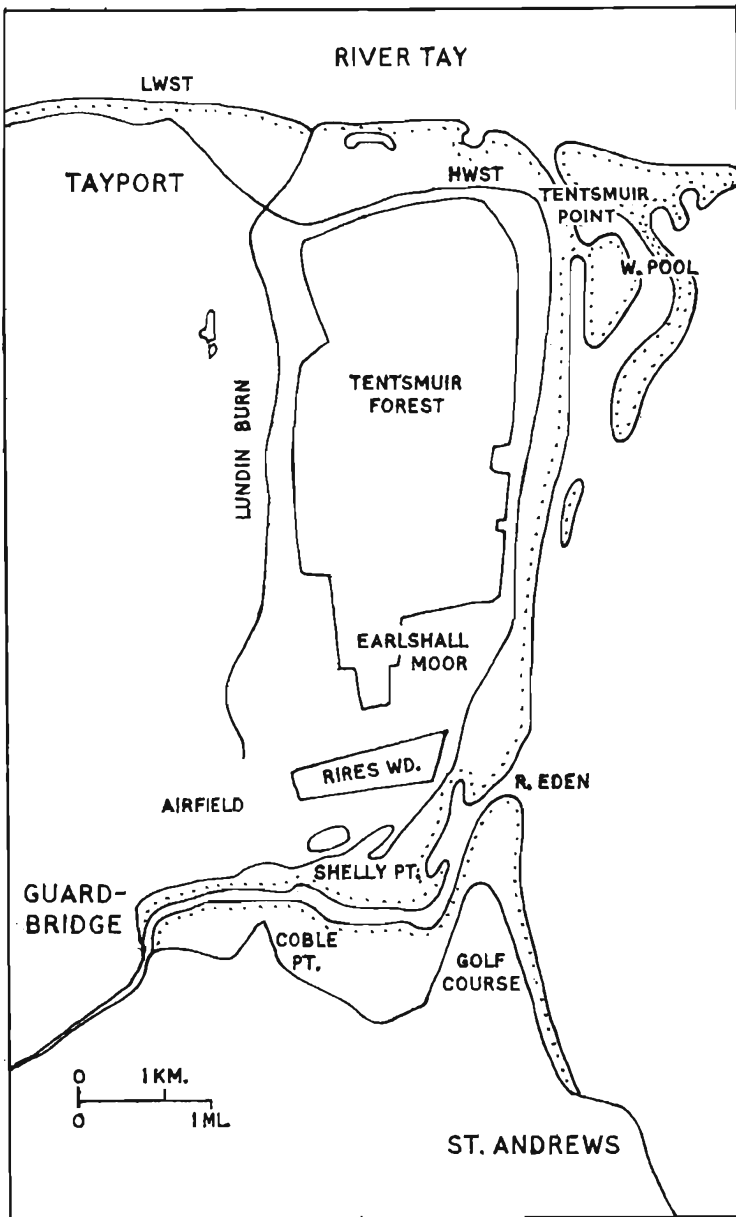


Fig. 2. The Tentsmuir - St Andrews area showing locations of sites referred to in the text.

The breeding period

Buddon Ness

Pairs of Eiders were seen flying to the beaches along the western shore of Buddon Ness during late April of each of the three years, but observations thereafter were limited because of military training activities in the area. However, 40 pairs were on the beaches during late April and early May of 1971/72 and pairs and single birds of both sexes were flying in and out of the military areas during the remainder of May and early June. Ten nest sites were located from a distance during the first three weeks of June 1971 and eight of these, which were in exposed positions in short grass, were attended by birds of both sexes. The males deserted the area by 12th June when a group of ten ducklings was seen in the sea, and the last female was seen on July 4th.

Tentsmuir Point

Large and increasing numbers of adult males were concentrated on the Headwell Sands and immediately to the south of the West Pool (fig. 2) throughout May and early June 1971, '72 and '73 (fig. 3). The flocks spent most of the time on the beaches and the seaward slopes of the sandbanks and seemed to venture to the water only when disturbed. Pairs and single birds of both sexes were seen flying in and out of Tentsmuir Forest and to and from the direction of Earlshall Moor during the first three weeks of May. When on the water, the males displayed vigorously, and single females, when they were present, were often harassed by ten to twenty males at a time. The numbers of males reached a maximum during early June and then fell sharply (fig. 3). Numbers of females were always considerably less than those of males. They dropped initially and then rose to a maximum in mid June (fig. 3), coinciding with the appearance of groups of ducklings on the sea. Broken Eider eggs were much in evidence among the dunes and in the forest fringes, and single females were often seen flying along the forest rides up to 1 km from the shore. Single females with chicks were seen on fresh-water pools well within the forest during early June of 1969 and 1970.

Earlshall Moor

No attempt was made to count nesting birds by crossing the fences round the moor, but observations throughout May and June showed that nesting females were well distributed both on that part of the moor visible from the edge and on some large sand dunes near the foreshore. Approximately 2 km² of ground was visible, but a large number of nests could easily have been obscured by hummocks. Whereas most of the nests contained a female only, many were guarded by a male, espec-

ially at exposed nest sites on short grass. No males were seen guarding nests in the dune area near the foreshore where the nests were located in dense cover under the remains of war-time tank traps.

The Earlshall keeper reported nests distributed all over the moor, particularly near the southeast corner, but also as far back as the Lundin Burn and arable land approximately 3 km from the sea. A total of 160 sitting females were counted along the edges of the moor visible from the boundary fences between 7th and 20th May 1972 but this was obviously only a proportion of the total number of nest sites.

Many broken Eider eggs were found along the edges of the moor and in the dunes in front of the moor, and by the end of May most of the nests in the dunes contained eggs broken by predators. A neat pile of 20 badly blown and broken eggs was found on 23rd May 1972 and pointed to egg-collecting children as a serious source of predation. Nests in the dunes were particularly vulnerable, especially as the females, when flushed by children and walkers, often left the eggs uncovered and unguarded for up to 20 minutes at a time. The females defecated on the eggs when disturbed, whereas eggs were covered with down when the female left voluntarily. Similar behaviour has been described by Salomonsen (1950, p. 127) and Freeman (1970).

Parties of ducklings were being escorted over the wide beaches in front of the moor during early June, and the attendant females (and males in one or two cases) were frequently hard pressed to ward off Carrion Crows *Corvus c. corone*, which usually accompanied the groups. One or two ducklings often waddled beneath the tail of an adult female when danger threatened. Others were seen being led out of the forest areas along rides and ill defined tracks leading to broken sections of boundary fence, and the most favoured tracks were always liberally marked by piles of Eider droppings. R.A.F. personnel reported groups containing up to 100 ducklings crossing the runways of Leuchars airfield from Rires Wood which forms the southern boundary of the moor.

The Eden estuary

Although the numbers were smaller, the initial rise and fall in the numbers of adult males in the Eden was similar to that at Tentsmuir (fig. 3). As at Tentsmuir, the birds tended to remain ashore as much as possible, the Shelly Point beach being the most favoured locality. Ten nests were found on the south shore of the estuary in June 1973 and approximately 20 on the north shore near the end of the airfield runway and in small clumps of trees just above high-water mark. The sitting females were not disturbed by jet aircraft directly overhead.

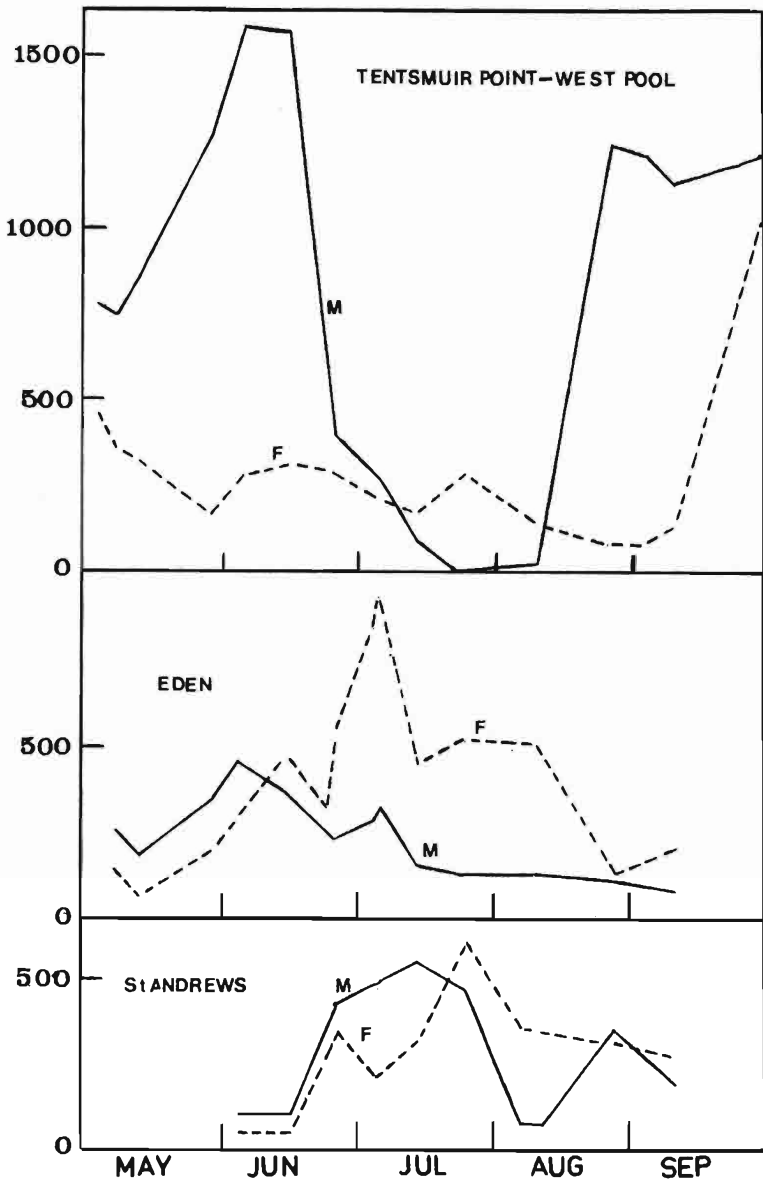


Fig. 3. Numbers of male and female Eiders between Tentsmuir Point and St Andrews, 1971

The real importance of the Eden estuary was as a nursery area for ducklings hatched on Earlshall moor and its surrounding woods, and the most important area for duckling flocks was between Coble Point and St Andrews golf courses. (Casual observations in previous years indicated that the largest crèches were then further west, near the Guardbridge end of the estuary). In 1971 duckling numbers were relatively small, never more than 220 on any occasion, and it was notable that the crèches contained very young ducklings as late as the end of July. Parties with young were continually stalked by Carrion Crows when on the mud-flats, and it appeared that a high predation rate was being maintained by these birds, the losses possibly being replenished by replacement clutches. Several ducklings which had difficulty in keeping up with the rest of the flocks appeared to be loath to venture into the water, and when caught on the mud-flats were found to be waterlogged. The situation was different in 1972 when 300 ducklings were counted on 18th June but well over 1000 on 25th June. Further, it was impossible to distinguish between young birds and adult females by the middle of July at the observation ranges involved. Counting conditions were poor during 1973, but the situation then appeared to be similar to that in 1972 rather than in 1971.

St Andrews

There are two crèche areas at St Andrews: beneath the Scores cliff and off the northern end of Kinkell Braes cliffs, and the two combined are second in importance only to the Eden estuary. A low raised beach runs along this coast and, being grass covered in many places and strewn with rocks and boulders, would afford ample space for a considerable breeding colony of Eiders. The terrain is rough enough to provide good protection for the nest sites, despite the pressure on parts of the area by holiday-makers.

Other sites

Large flocks of females with ducklings off the low-lying rocky foreshore between Usan and Scurdie Ness indicate the presence of an Eider breeding colony, and N. K. Atkinson (pers. comm.) has found nests among the grassy, rocky areas close to the splash zone as well as further back in long grass. He has also reported nests further south in cliff-bound bays, several of which have grassy talus slopes, and because of their inaccessibility these probably support a relatively well protected breeding population.

Groups of ducklings are a common sight off the high cliffs north of Arbroath at Red Head and the northern end of Carlingheugh Bay where there are more inaccessible suitable

nesting areas. The low-lying coast between East Haven and Elliot, south of Arbroath, also holds a breeding colony, and duckling flocks here are a common sight throughout the summer months. Nests have been seen in dune areas and on arable land close to the shore (N. K. Atkinson pers. comm). At least one Glaucous Gull *Larus hyperboreus* has harried parties of female Eiders with chicks during the 1971/72 breeding seasons.

Breeding success 1971 and 1972

The first young were seen in the last few days of May and the first days in June, but maximum numbers occurred later (table 1). The table also gives numbers of birds of the year

Table 1. Eider duckling counts

Site	Maximum (unfledged) duckling counts		Duckling & juv. Nos. 8th-11th August	
	1971	1972	1971	1972
Mains of Usan	26 (June 27)	30 (July 2)	20	25
Boddin	50 (Aug 10)		50	
Red Head	52 (July 26)		32	
West Haven	94 (July 27)	53 (Aug 3)	100	53
Buddon	5 (June 12)		0	
Tentsmuir	33 (June 24)	60 (June 25)	0	30
Eden	220 (July 5)	1000 (June 25)	100	200
Kinkell	50 (July 25)	320 (July 11)	40	130
Fife Ness	20 (July 14)		10	
Totals	550	1463	352	438

observed between 8th and 11th August, by which time most, but by no means all (especially in 1971), were fully fledged and relatively safe from predators. Duckling counts are very inaccurate, the density of the flocks making it difficult to estimate the numbers even from above and at moderately close range. The problems are greatest when counts are attempted from sea level at the most important sites in the Eden estuary or at St Andrews, where the presence of rock skerries adds to the difficulties.

The moulting period

The onset of body moult in the males was evident by the end of the first week in June when the dispersal from Tentsmuir began. This dispersal coincided with increased numbers of moulting males between West Haven and East Haven north of the Tay, in the Eden estuary, and off St Andrews Castle. The moulting birds kept out of the water as much as possible until about the middle of July, and little feeding was noticed during this period. The flocks moved offshore during the third week

in July with the approach of the flightless stage of the moult, and the results of counts indicated that a northward movement was taking place. For example, the maximum 1971 counts of moulting males off East Haven and Scurdie Ness occurred on 23rd June and 24th July respectively. Counts in Lunan Bay between these two sites were maximum during the second week of July in both 1971 and 1972, but the counts were inaccurate because of poor light and the possibility of confusing the, by now, very dark birds far offshore with flocks of Common Scoters *Melanitta nigra*. Further evidence of a northward movement was provided by the appearance of large numbers of moulting males between Johnshaven and Gourdon when numbers further south were decreasing (fig. 4). The Johnshaven flock numbered 2100 on 10th August 1971 and nearly 3000 on 1st August 1972.

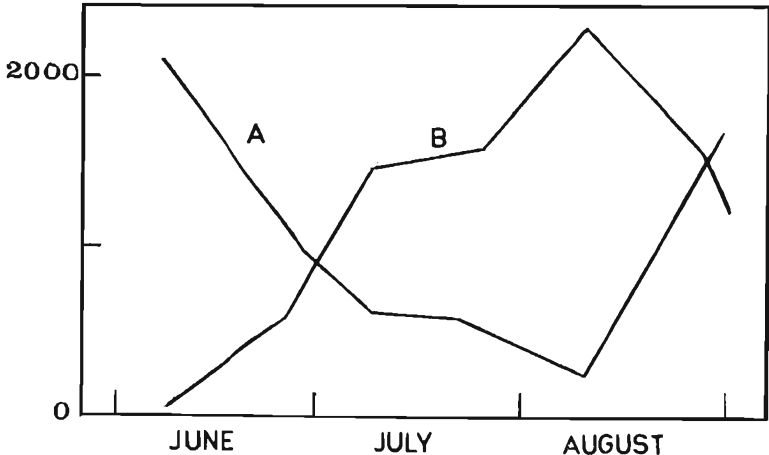


Fig. 4. Numbers of male Eiders between Tentsmuir and St Andrews (A) and Johnshaven and Gourdon (B): 1971.

The onset of moult in the females was much more difficult to observe than in the males, and concentrations seen off Usan and St Andrews, although numbering several hundred birds, were nothing like as large as the concentrations of moulting males seen at Johnshaven.

Male Eiders, many still in moult, made a sudden reappearance in the Tentsmuir Point area during the last week of August (fig. 3). During 1971 and 1972, the flock remained throughout the whole of September on the sandbanks off the eastern shore of the West Pool (fig. 2), especially in 1971, when this bank was larger and exposed at all but the highest tides. Accurate counts in 1971 showed that the flock remained constant in size until the arrival of an approximately equal number of females

in early October, whereupon the numbers decreased to a typical winter level of approximately 400 pairs. Large flocks of Eiders, mostly males, were carrying out the typical winter daily movement cycle in the estuary proper during late September in 1971, '72 and '73, and these flocks appeared to be separate from the West Pool flock in 1971. This conclusion was less certain during 1972 and 1973 because of bad observing conditions and the fact that the West Pool sandbank appeared to dry out for much shorter periods of the tidal cycle, with the result that there was some mixing of the West Pool and estuary flocks.

Total numbers and breeding population

The most reliable of the count data are grouped for comparison in table 2. Bearing in mind the many possible sources of error, the results in this table indicate the presence in the study area of approximately 3000 males. The high August numbers are complicated by a possible influx of males returning to the Tay region from areas outwith the study area, and the low female numbers might be the result of moulting flocks having been overlooked. The counts in table 2 include adult and juvenile birds. Adult and juvenile females could not be distinguished in the field, and while juvenile males are conspicuous during the breeding period, they are difficult to pick out from the adults when in eclipse plumage.

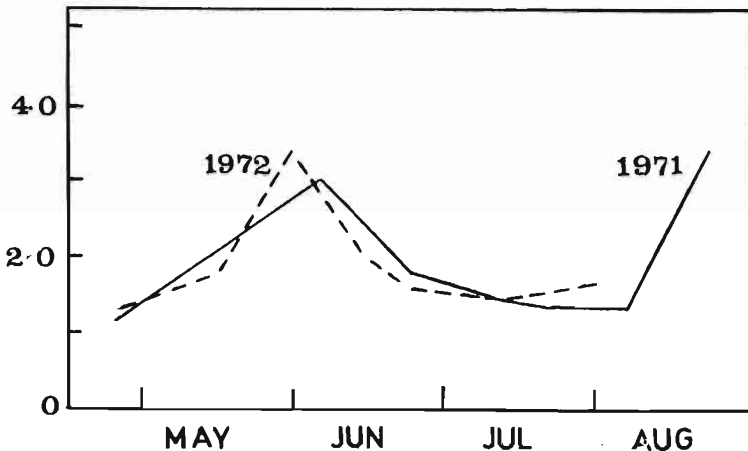


Fig. 5. Ratios of males to females in Eider flocks between Gourdon and Fife Ness.

The count results when expressed as male:female ratios (fig. 5) are what one would expect of a breeding population, with an initial value of approximately 1:1, rising during the

Table 2. Eider counts from St Andrews, Fife, to Gourdon, Kincardineshire

		22-29		9-20		28-31		5-7	
		April		May		May		June	
		♂	♀	♂	♀	♂	♀	♂	♀
Tentsmuir	1971	2934	2066	—	—	—	—	1589	300
Point to West Pool	1972	2700	1830	1830	1140	1084	293	—	—
	1973	2330	1700	—	—	—	—	—	—
Earlshall	1971	—	—	—	—	—	—	—	—
	1972	53	45	142	0	185	90	—	—
	1973	—	—	—	—	—	—	—	—
Eden estuary	1971	—	—	—	—	—	—	449	302
	1972	390	310	170	40	450	120	—	—
	1973	478	508	—	—	—	—	—	—
St Andrews	1971	—	—	—	—	—	—	110	39
	1972	250	180	215	67	200	60	—	—
	1973	122	100	—	—	—	—	—	—
West Haven	1971	—	—	—	—	—	—	154	56
	1972	50	50	—	—	210	60	—	—
	1973	—	—	—	—	—	—	—	—
Lunan Bay to Gourdon	1971	—	—	—	—	—	—	140	72
	1972	—	—	182	112	—	—	—	—
	1973	—	—	—	—	—	—	—	—
Totals	1971	2934+	2066+	—	—	—	—	2442	769
	1972	3443	2415	2539	1359	2129	623	—	—
	1973	2930+	2308+	—	—	—	—	—	—

breeding period when many females are out of sight on nests, falling to near 1:1 when the females reappear with young, and finally rising late in the season when the females move away to moult. [Females moult much later than males (Witherby *et al.* 1939).]

According to Milne (1965), the return of Eiders from the Tay to the Forvie Reserve in Aberdeenshire is rapid and takes place during the second week in April, and there is evidence that the Forth flocks return even earlier (Pounder, 1971). Further, the Tay wintering population does not reach its maximum until well into October, so it may be assumed that large concentrations of Eiders in the Tay estuary between May and September belong to a local breeding population. This is sup-

Table 2—continued

		10-23		24-30		5-9		11-14	
		June		June		July		July	
		♂	♀	♂	♀	♂	♀	♂	♀
Tentsmuir Point to West Pool	1971	—	—	420	231	275	186	—	—
	1972	1420	290	580	540	—	—	30	92
	1973	—	—	—	—	—	—	—	—
Earlshall	1971	—	—	—	—	—	—	—	—
	1972	—	—	30	60	—	—	0	50
	1973	—	—	—	—	—	—	—	—
Eden estuary	1971	—	—	146	550	320	942	—	—
	1972	330	595	370	790	—	—	150	930
	1973	—	—	—	—	—	—	—	—
St Andrews	1971	—	—	420	348	30	210	—	—
	1972	120	175	219	209	—	—	100	230
	1973	—	—	—	—	—	—	—	—
West Haven	1971	—	—	300	150	168	166	—	—
	1972	280	76	250	240	—	—	200+	200+
	1973	—	—	—	—	—	—	—	—
Lunan Bay to Gourdon	1971	—	—	839	112	1652	161	—	—
	1972	—	—	1780	106	—	—	2488	280
	1973	—	—	—	—	—	—	—	—
Totals	1971	—	—	2125	1391	2445	1665	—	—
	1972	2150	1136	3229	1945	—	—	2968+	1782+
	1973	—	—	—	—	—	—	—	—

ported by the changes in the male:female ratio illustrated in figs. 3 and 5.

The sizes of the breeding population could be determined as follows. If daily counts of males and females were available, the maximum number of females could be taken as the maximum number of males (M max) divided by the ratio (R) of males to females observed during early spring or winter, and the minimum number of Females (F min) would be a good estimate of the number of non-breeding females in the population. Thus the number of breeding females (F b) would be

$$F b = \frac{M \text{ max}}{R} - F \text{ min}$$

Table 2—continued

		25-26		1-2		10-11		27-29	
		July		August		August		August	
		♂	♀	♂	♀	♂	♀	♂	♀
Tentsmuir Point to West Pool	1971	0	143	—	—	10	51	1240	70
	1972	—	—	0	50	—	—	—	—
	1973	—	—	—	—	—	—	—	—
Earlshall	1971	—	—	—	—	—	—	—	—
	1972	—	—	0	0	—	—	—	—
	1973	—	—	—	—	—	—	—	—
Eden estuary	1971	123	522	—	—	120	478	110	120
	1972	—	—	60	570	—	—	—	—
	1973	—	—	—	—	—	—	—	—
St Andrews	1971	470	595	—	—	120	380	360	330
	1972	—	—	210	360	—	—	—	—
	1973	—	—	—	—	—	—	—	—
West Haven	1971	150	180	—	—	120	330	20	180
	1972	—	—	170	335	—	—	—	—
	1973	—	—	—	—	—	—	—	—
Lunan Bay to Gourdon	1971	1950	565	—	—	2371	442	2303	430
	1972	—	—	3000	638	—	—	—	—
	1973	—	—	—	—	—	—	—	—
Totals	1971	2693	2005	—	—	2741	1681	4033	1130
	1972	—	—	3440	1953	—	—	—	—
	1973	—	—	—	—	—	—	—	—

Although daily counts are not available for this study, those obtained during 1971 for the Tentsmuir-St Andrews area are probably good enough to yield a meaningful estimate of F b. The results are shown in table 3 which also includes some data for 1972. Unfortunately, accurate counts could not be made during the critical period in 1972 and the true minimum number of females was probably missed. The value $R=1.0$ was taken because many counts of samples of the Tay Eider flocks in winter and early spring showed equal numbers of males and females. This value for R has also been assumed elsewhere, e.g. in Holland (Hoogerheide 1950, 1958).

There are, however, two reasons for choosing $R=1.3$ as an alternative. Firstly, Holm-Joensen's aerial survey of the Tay

and Forth on 26th Oct 1971 showed that $R=1.33$ for a total of 2578 Eiders visible on air photographs (the individual values for the Tay and Forth were very similar). Secondly, the incubation period is between 26 days (Belpolskii 1961, Ahlen and Andersson 1970) and 28 days (Gross 1938, Pedersen 1962, p. 62), so the first observations of ducklings at the end of May indicate that most of the nesting activity might not have commenced during the last week in April. Thus the counts in the first column of table 2 might be a true indication of the total numbers in the breeding population, and if so, indicate that $R=1.27 \pm 0.06$ (standard deviation).

Table 3. Eider counts and calculations of breeding numbers from two assumed values of the overall male:female ratio

Area	Max. No. Males	Min. No. Females	No. of breeding (females Fb)	
	(M max)	(F min)	R=1.0	R=1.3
1971				
Tentsmuir beaches	1589 (June 5)	158 (May 30)	1431	1064
Eden-Earlshall	449 (June 5)	67 (May 19)	382	279
St Andrews	100 (June 5)	39 (June 5)	61	38
Totals	2138	264	1874	1381
1972				
Tentsmuir beaches	1420 (June 10)	290 (June 10)	1130	828

An order of magnitude check on the breeding population sizes shown in table 3 can be obtained as follows. The maximum 1971 count of first-summer males between Tentsmuir and the Eden was 81. Although Heinroth (1928/31) states that Eiders are adult at two years old, Bent (1925, p. 87) considers that most do not breed until one year later. Thus the numbers of non-breeding males in the Tentsmuir-Eden area might have been approximately 160, a figure which is roughly comparable with the minimum female count in table 3.

For 1971, table 3 indicates that the proportion of adult females was between 84% ($R=1.3$) and 88% ($R=1.0$). If we assume the same values for 1973, the number of breeding females can be estimated from the number of males counted on 24th April. For the Tentsmuir-Eden-St Andrews area, this number was 2930 so the breeding population in this area amounted to approximately 2578 ($R=1.0$) to 2461 ($R=1.3$).

For the total breeding population in the study area, we can do little more than take a round figure of 3000 pairs, which from the data in table 2 appears to be the approximate number

of adult males present. A check can be made on this figure from some accurate counts of females along the Angus coast during 1972 (table 4). The figures indicate that there were at

Table 4. Numbers of female Eiders along the Angus coast : 1972

	11th June	13th June	1st July	2nd July
Buddon Ness-Carnoustie	110			
Carnoustie-Arbroath		684		
Arbroath-Ethiehaven				198
Boddin-Scurdie Ness			250	

Total = 1242

(Data from N. Atkinson)

least 1242 adult females between the north shore of the Tay and the South Esk during the breeding period and this, with a breeding population in the Tentsmuir-Eden-St Andrews area similar to that in 1971, yields a total breeding population of approximately 3000 pairs.

Discussion

Despite the many sources of error, it is felt that the breeding population in the whole Tay area must be at least comparable with the values calculated above. It is evident that the Tentsmuir-Earlshall colony has increased markedly from the 50 pairs reported by Grierson (1962) and, although equally spectacular increases have occurred elsewhere (e.g. Hoogerheide 1958), part of the success at Earlshall must have been due to the efforts of the keeper, Mr Skinner, to protect the colony after the ravages of the war years.

There is ample space at Earlshall (fig. 2) to support a large breeding colony, especially as large protected areas are available nearby on Leuchars airfield and in the forests. Although Eiders are well known to nest among trees, it is not known how many actually penetrate the densely wooded parts of Tentsmuir. However, the numbers are probably considerable, since nests are common in the few areas of dense scrub accessible to observers and through which Eiders probably make their way on foot.

The breeding success of the Tay population is not known because of the difficulties encountered when estimating duckling flock sizes, but the loss of eggs and young at Earlshall must be high. The moor is attractive to avian predators, such as Carrion Crows and Great Black-backed Gulls *Larus marinus*, and to egg-collecting children. In addition to Eiders, it supports many other breeding birds such as Black-headed Gulls *L. ridibundus*, Herring Gulls *L. argentatus*, Shelducks *Tadorna*

tadorna, Curlews *Numenius arquata* and Lapwings *Vanellus vanellus*. Rabbits affected by myxomatosis are widespread. Duckling losses in the woods may be high due to the distance they must travel to the sea through dense undergrowth and uneven ground. Eider ducklings in Spitsbergen are relatively safe from predation when on the sea (Ahlen and Andersson 1970) and this appears to be the case on the Eden where they are only molested by Carrion Crows when on the mud flats at low tides. At St Andrews and West Haven adult females put up a vigorous defence against Herring Gulls (and a single Glaucous Gull at West Haven), but at Red Head in Angus ducklings are only rarely molested by the Herring Gulls from a very large breeding colony on the cliffs.

The effect of egg and duckling predation is indicated by the results in table 1, from which, assuming a Tentsmuir-Eden breeding population of 1800 pairs, it can be deduced that only one or two ducklings per 18 pairs have survived until the second week in August. If repeat clutches are common, and according to Ahlen and Andersson (1970) and Bent (1925) they probably are, the survival rate per egg laid must be very low indeed. Milne (1969) has reported a survival rate of usually less than 5% for the Forvie colony.

It is interesting to compare the sizes of the breeding populations computed above with the numbers of Eiders which winter in the Tay. The wintering flocks appear to contain approximately 20,000 birds (Pounder 1971, Milne and Campbell 1973). Thus, if we assume that these include 3000 pairs from the Forvie colony in addition to the local breeding population of approximately 3000 pairs, a further 4000 pairs must be accounted for. It appears from the large numbers of Eiders wintering in the Forth (Milne and Campbell 1973, Player 1971), that the Forth area is probably not the source of the excess birds, and neither is the Farnes area (Milne 1965), nor the continental coast of Europe (Pounder 1971). The only reasonable possibility is that the Tay wintering numbers are made up of birds from local breeding populations scattered all along the east coast northwards of the study area.

There is a dearth of information from which to estimate how long the large east coast breeding population has been established. However, there is no evidence that the Tay wintering numbers have changed significantly during the past few decades. For example, Grierson (1962) reported a flock which must have numbered 20,000 in 1953, and Berry (1930) described a flock extending from Tayport to past Tentsmuir Point in numbers which were "vast [and] quite incalculable". Moreover there is nothing in Berry's account to suggest that this was in

any way unusual. Since Eiders along the Scottish coasts appear to carry out only local migratory movements (Milne 1965), we may assume that these wintering numbers reflect the establishment of a very large east coast breeding population since at least the late 1920's.

Acknowledgments

I would like to thank N. K. Atkinson for providing information on the breeding sites along the Angus coast, and M. Smith and J. F. P. Keddie for details of the flocks in the Tentsmuir area.

Summary

Observations and counts of Eiders along the east coast of Scotland between St Andrews and Gourdon are presented and interpreted in terms of the existence of a breeding colony of between 1500 and 1800 pairs in the Tentsmuir-St Andrews area, and of another approximately 1000 pairs scattered along the remainder of the coast. It is considered that colonies of this general size have been established in these areas since the late 1920's at least. The results indicate a northerly movement of males during late summer to a moulting area between Johnshaven and Gourdon.

References

- AHLEN, I. and ANDERSSON, A. 1970. Breeding ecology of an Elder population on Spitsbergen. *Ornis. Scand.* 1: 83-106.
- ATKINSON-WILLES, G. L. 1963. *Wildfowl in Great Britain*. H.M.S.O. London.
- BAXTER, E. V. & RINTOUL, L. J. 1953. *The Birds of Scotland*. Oliver & Boyd. Edinburgh & London.
- BELPOL'SKII, L. O. 1961. *Ecology of sea colony birds of the Barents sea*. Jerusalem.
- BENT, A. C. 1925. *Life Histories of North American Wild Fowl, Pt. II*. Smithsonian Inst. U.S. Nat. Mus. Bull. 130. Washington, and 1962 Dover. New York.
- BERRY, J. 1930. Notes on the movements of duck off Tentsmuir Point, Fifeshire. *Scot. Nat.* 1930: 43-46.
- BERRY, J. 1939. *The Status and Distribution of Wild Geese and Wild Duck in Scotland*. C.U.P. Cambridge.
- FREEMAN, M. M. R. 1970. Observations on seasonal behaviour of the Hudson Bay Elder *Somateria m. sedentaria*. *Can. Field Nat.* 84: 145-153.
- GRIERSON, J. 1962. A checklist of the birds of Tentsmuir, Fifeshire. *Scot. Birds* 2: 113-164.
- GROSS, A. O. 1938. Elder ducks of Kent Island. *Auk* 55(8): 387-400.
- HEINBOH, O. & M. 1928/31. *Die Vogel Mitteleuropas*. Band 3-4.
- HOOPERHEIDE, C. 1950. De Eldereenden op Vlieland. *Ardea*. 37: 139-161
- HOOPERHEIDE, J. & C. 1958. Het aantal Eldereenden bij Vlieland. *Limosa* 31: 151-155.
- MILNE, H. 1965. Seasonal movements and distributions of Eiders in Northeast Scotland. *Bird Study* 12: 170-180.
- MILNE, H. 1969. Elder biology (report to B.O.U. Autumn Scientific Meeting). *Ibis* 111: 278.
- MILNE, H. & CAMPBELL, L. H. 1973. Wintering sea ducks off the east coast of Scotland. *Bird Study* 20: 153-172.
- PEDERSEN, A. 1962. *Polar Animals*. London.
- PLAYEY, P. V. 1971. Food and feeding habits of the Common Elder at Seafeld, Edinburgh, in winter. *Wildfowl* 22: 100-106.
- POUNDER, B. 1971. Wintering Eiders in the Tay estuary. *Scot. Birds* 6: 407-419.
- SALOMONSEN, F. 1950. *The Birds of Greenland*. Copenhagen.
- WITHERBY, H. F. et al. 1939. *The Handbook of British Birds, Vol. 3*. London.

B. Pounder, 64 Forfar Road, Dundee, Angus.

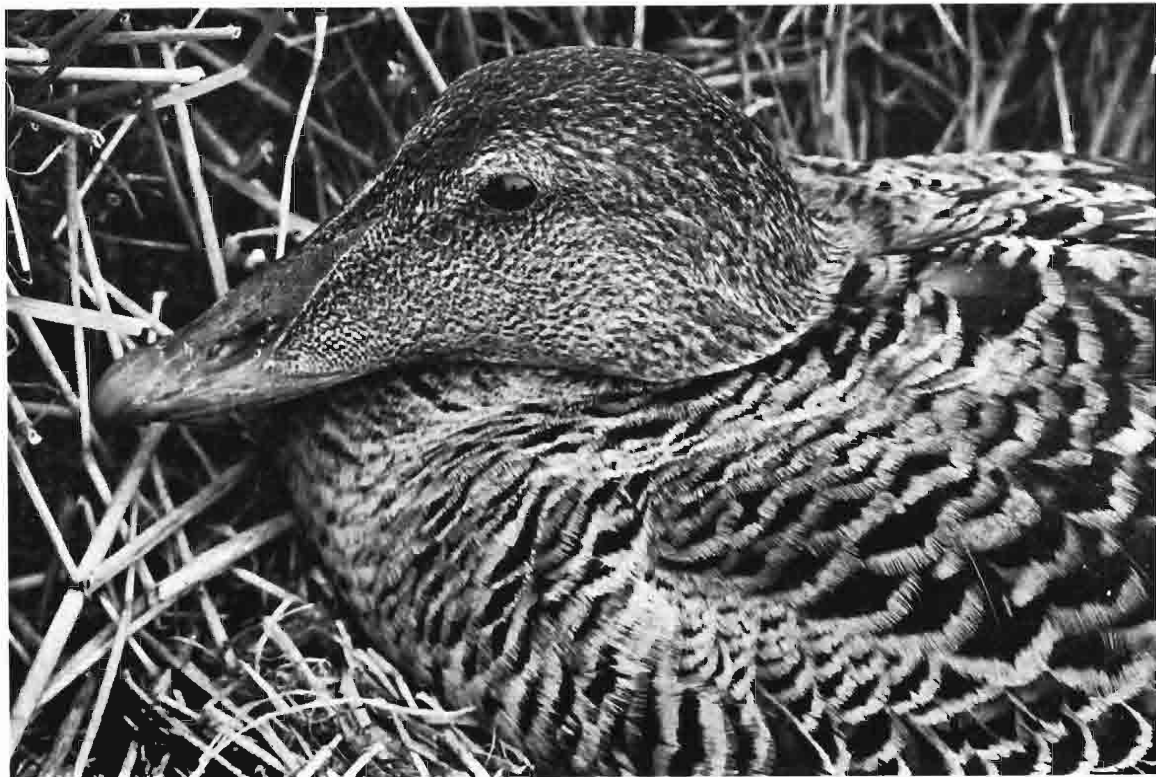


PLATE 15. Female Elder on nest (page 159).

Photograph by William S. Paton.





PLATE 14/15. The 1973 juvenile white Barnacle (page 184). The bird is flanked by its two normal parents, and the other juvenile in the family follows.

Photograph by M. Owen



PLATE 16a. Pair of Barnacle Geese individually marked in Spitsbergen in July 1975, on Eastpark farmland in October 1975 (page 185).

PLATE 16b. Barnacles feeding on fenced merse at Eastpark (page 185).

Photographs by M. Owen.



Recent studies on Barnacle Geese at Caerlaverock

MYRFYN OWEN and C. R. G. CAMPBELL

(Plates 14-16)

Introduction

A National Nature Reserve was established at Caerlaverock, Dumfriesshire, in 1957 following the total protection given to Barnacle Geese *Branta leucopsis* on the mainland of Great Britain by the Protection of Birds Act (1954). Goose numbers had been down to only a few hundred in the late 1940's but recovered in the 1950's and were at 1000 when the reserve was established (Roberts 1966). The main aim of the Nature Conservancy was to provide a sanctuary for the Barnacle Goose so that persistent disturbance and shooting would no longer have a critical effect on the population. As a result of protection and the creation of the reserve the population thrived, until in 1964 J. G. Harrison and J. Ruxton counted between 4000 and 4500 Barnacles on Rockcliffe Marsh, Cumberland.

In 1970 the Wildfowl Trust took over the tenancy of Eastpark Farm with the aim of modifying the management of both the sanctuary (600 acres of which is part of Eastpark Farm) and some 235 acres of arable farmland in favour of the geese. Thus the Trust's aims, while encompassing the Nature Conservancy's sanctuary provision, also included ensuring an increase in the supply of food available to the geese and thereby increasing their usage of Eastpark Refuge. A long-term research programme into the requirements and general ecology of these geese was started in 1970, the first four years of which were financed by a grant from the Natural Environment Research Council. This paper describes the movements, numbers and breeding performance of the geese during four seasons of study and discusses the future prospects of the population. Details of the history of the reserve and of recent Wildfowl Trust developments can be found in Harrison (1974).

Goose numbers

Barnacle Geese Throughout the four seasons the numbers and distribution of geese in the Caerlaverock area were assessed on at least five days of every week. Table 1 shows the pattern of arrival and the maximum flock size in the four seasons, compared with those of earlier years (Roberts 1966). The date of first arrival is remarkably constant, though in the

first two years the flock was completed much later than usual. In 1970 and 1971 it is possible that the remainder of the flock was present elsewhere in the Solway. R. H. Kerbes reported 2500-3000 on Rockcliffe on 16th November 1970, while the maximum seen at Eastpark up to this date was 2300, but the total of 3200 was not recorded from any site until 25th November. Although maximum numbers showed wide annual fluctuations in the 1960's, a steady increase has been recorded since 1970.

Table 1. Numbers and arrival dates of Barnacle Geese at Caerlaverock

	First arrival	Date maximum first recorded	Maximum count
1957-65	29th Sept*	17th Oct*	3700 (1965)
1970	30th Sept	25th Nov [†]	3200
1971	28th Sept	11th Nov [†]	3700
1972	27th Sept	15th Oct	4400
1973	20th Sept	15th Oct	5100

Data for 1957-65 from Roberts (1966).

*Mean date over 9 years

[†]It is possible that the remainder of the birds were elsewhere on the Solway before this

The increase in numbers has been reflected in greater use of the Caerlaverock area (mainly Eastpark Refuge) as shown in Table 2. Thus the amount of goose-days spent at Caerlaverock has more than doubled since 1969/70, and the proportion of time the geese spend there in preference to other Solway sites has also increased. Unfortunately, data collected in the 1960's are not suitable for similar treatment, but the pattern of Caerlaverock usage has been similar to that in 1969/70 and 1970/71 (Roberts 1966). The number of days on which geese can be seen at Caerlaverock, an important consideration in the recreational value of the refuge, has also increased in the last two seasons, while the length of the Solway season is unchanged.

When not at Caerlaverock the Barnacles have usually been found at one of two other main haunts: Rockcliffe Marsh in Cumberland; and farmland near Southernness Point, mainly in the Preston and Merse-head area, some ten miles southwest of Eastpark. Usually the Southernness area holds fewer than 1000 geese at a time, while the whole flock may remain at Rockcliffe for an extended period, particularly after the end of the shooting season.

Pink-footed Geese *Anser brachyrhynchus* use the refuge in large numbers (up to 5000 on Eastpark Merse) mainly after

Table 2. Use of the Caerlaverock area and the Solway by Barnacle Geese, 1969/70 to 1973/74

	Caerlaverock			Solway		Caerlaverock as % Solway	
	Days present	Average No.	Goose-days (thousands)	Days present	Goose-days* (thousands)	Days present	Goose- days
1969/70	(130)	1600	(190)				
1970/71	157	1200	183	211	530	74	30
1971/72	135	2000	275	222	680	61	40
1972/73	169	2500	430	227	740	74	58
1973/74	195	2430	480	225	960	87	50

Data for 1969/70 are from Kerbes (1970 and pers. comm.). Figures in brackets include estimates for beginning of season.

*Assumes that after their arrival birds not seen at Caerlaverock are elsewhere in the Solway. This has been shown to be so on many occasions during the present study although previously irregularities in Solway usage apparently occurred (Kerbes 1970, Young 1971).

the shooting season, though up to 1500 were present on East-park stubbles in autumn 1973. Small numbers are usually present throughout the winter.

Greylag Geese *Anser anser* regularly visit the refuge but the highest number was only 72 (in 1972-73).

Among other species are a single Light-bellied Brent *Branta bernicla hrota* which has accompanied the Barnacles in the four seasons, and two Greenland Whitefronts *Anser albifrons flavirostris* seen with Pinkfeet in 1971/72. A single Lesser Snow Goose *Anser c. caerulescens* has been seen in three of the four winters.

White Barnacles An almost pure white Barnacle Goose was first recorded in the Solway flock by Peter Scott in 1930. Two were seen in the following winter, but as Barnacles were then legally shot these birds quickly disappeared from the population. Another was present in 1963/64, 1964/65 and in November 1965 (Harrison 1967). One white goose was seen in 1970, and two in 1971/72. There were four in autumn 1972, and two of these were ascertained by their behaviour to be juveniles in a family of two normal adults and one normal juvenile. One of these four was not seen after 20th November 1972 and, as the total number of birds remained the same, it was assumed to have died. In 1973 four white Barnacles appeared, and we found that one of these was again a juvenile, with normal parents and a normal sibling (Plate 14/15). All four are individually recognisable (the two 1972 siblings were ringed in 1973), and we watch their progress with interest. It is possible that all the white birds seen recently have been produced by one pair.

Barnacle feeding ecology

The use of merseland and arable grassland by the geese is shown in table 3. The pattern of usage has shown a high degree of annual variability in the use of farmland. The geese

Table 3. Use of merse and arable habitats by Barnacle Geese at Caerlaverock

	Merse	Eastpark arable	Other arable	All arable
1957/65	69.5			30.5
1969/70	80			20
1970/71	42.1	44.3	13.6	57.6
1971/72	31.6	51.1	17.3	68.3
1972/73	70.7	16.4	12.9	29.3
1973/74	37.5	51.7	10.8	62.5

All figures are percentages
1957-65 from Roberts (1966)
1969/70 from Kerbes (1970)

have tended to use the sanctuary merse first, before resorting to arable fields, but in 1973/74 the sequence was reversed, the birds concentrating their feeding on Eastpark farmland until January. The reasons for the changes are not clear, but food shortage, heavy frosting and tidal flooding will cause moves from merseland, while disturbance on farmland (probably at its lowest ever on Eastpark in 1973/74) determines the extent to which it is used. The main farmland feeding has always been on Eastpark.

While on Eastpark merse Barnacles spend most of their time on the inner, fenced area of some 225 acres which is heavily grazed in summer by cattle and sheep (Plate 16b). The eastern end of the sanctuary comprises about 240 acres grazed only by sheep. On this east merse the geese tend to use those areas, usually around the margin, which are grazed most heavily in summer. The remaining area, consisting of little grazed, lower riverside terraces and new merse, is occasionally used. Here the geese much prefer the newly established areas, feeding on saltmarsh grass *Puccinellia maritima*.

Outside Caerlaverock, most of the Barnacles' time is spent on Rockcliffe Marsh, which is rather similar in vegetation to the Caerlaverock merses, though not as heavily grazed. Here Barnacles normally use the most recently colonised outer areas of the marsh and are frequently found on the newly established *Puccinellia* areas on the western tip and on the north side.

It was found in 1970 that a large proportion of Barnacles' food on merseland consisted of clover *Trifolium repens* stolons—storage stems which run along the soil surface—(Owen and Kerbes 1971). As the geese eat the only part of this plant which survives the winter, it was important to find what effect the geese had on summer clover stocks and on their own food supply in the following season. The stolon stock on the fenced (heavily stock grazed) merse was assessed on three occasions in each season, in late September, late April and in June. The number of clover leaves was counted in 220 to 230 quadrats, along twelve transects placed at 200 metre intervals along the length of the merse, and stolon length and weight were related to the number of leaves. The relationship between leaves and stolons is very close (correlation coefficient (r) usually greater than 0.9), and so leaf counts give fairly accurate indications of stolon stock.

The results of these surveys are shown in fig. 1, where the quantity of stolons is expressed as a percentage of that in September 1971. At this time there were an estimated 130 tons fresh weight (about 35,000 miles) of stolons on the 225 acres of fenced merse. The results show a drastic decrease

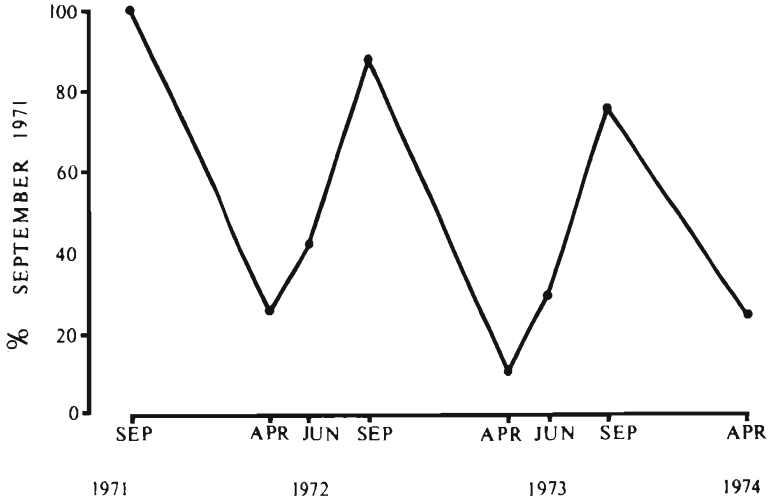


FIG. 1. Clover stocks on the 225 acre fenced Eastpark merse, at eight times between 1971 and 1974. Amounts at other times expressed as percentage of September 1971, when total standing crop was 130 tons fresh weight.

in stolons over each winter, which is partly due to natural die-off but mainly due to the activities of the geese. The plant recovers well during summer, but there has been an overall decrease in September food supply during the three years. In April 1973, after heavy usage by large numbers of geese, the clover stock was particularly low (12% of 1971) but following increased usage of farmland by the geese in 1973/74 the 1974 April stock reached 25% of the September 1971 level. It appears therefore that the Barnacles have some effect on their food supply for the following seasons, but the good recovery capacity of clover has prevented this effect from being too drastic in the seasons studied.

The diet of Barnacle Geese on merseland has been the subject of intensive study. The main method has been the collection and analysis of droppings, as described in Owen and Kerbes (1971). While on the merse, the geese increase their feeding on stolons during October, when they also take grasses and other plant leaves. Their diet consists of up to 90% stolons in November and December, but when stocks are depleted in January the geese eat an increasing quantity of grasses and move to new areas. When they find unexploited clover, as for example on Powhillon merse, adjacent to the refuge, after the shooting season, or on Rockcliffe, they may again feed heavily on stolons. On the whole, while on Caerlaverock merseland, about 60% of the Barnacles' diet has been found to be clover stolons.

When on farmland Barnacles eat grass leaves almost exclusively, although when they use stubbles which have not been undersown with grass, they will take a proportion of spilled grain. This is, however, a very small part of their overall diet.

Habitat management

The Wildfowl Trust are the tenants of Eastpark Farm but sublet the grazing to a local farmer, who manages the agriculture of the farm. As a result of our research work we have been able to recommend changes in the management of the refuge, which we are implementing in co-operation with the farmer.

Our main aim on the merseland is to increase the quantity of stolons available. Fig. 2 shows the relationship between grass height and clover abundance on a relatively little-grazed part of the merse. This shows that clover growth is much influenced by the amount of summer grazing, which controls the height of the grass. In fact, in the 240 acres of merse at the eastern end the amount of clover per unit area is only one seventh of that found in the heavily grazed, fenced area. We

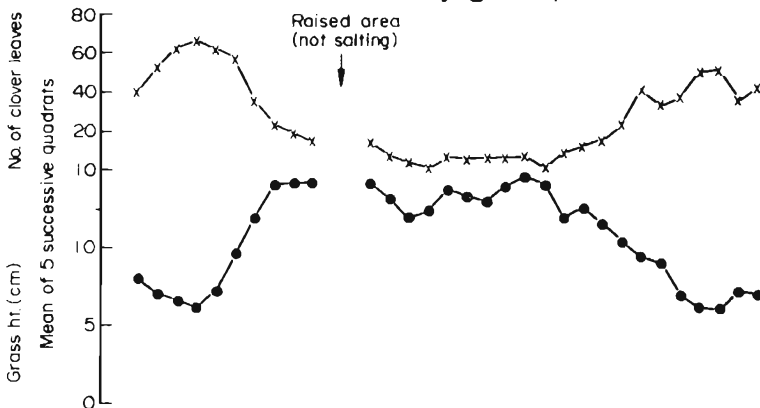


FIG. 2. Number of clover leaves per 120 metre quadrat along a typical transect across the unfenced eastern end of Eastpark merse, and the height of vegetation at the same sites, September 1972. In order to even out irregularities, figures are running-means of five successive quadrats. From Owen (1973).

are therefore encouraging the grazier to increase his stocking of the merse. In 1974 an additional 90 acres of the east merse was included in the fenced area. Disturbance by stock feeding and shepherding activities has been much reduced during the goose season, and this has allowed the geese to feed over most of the merse undisturbed. It is hoped that further reductions in disturbance can be made in future.

The first aim of management on the farmland has been to ensure that grass is available on all fields in winter. Cereals are limited to a maximum of 40 acres, about one-fifth of the arable area, and all cereals are undersown with grass. Barnacle Geese were found to be reluctant to use undersown stubbles because the straw had been left long (c. 9 inches) and they found difficulty in grazing amongst it. Stubble straw was cut low after harvesting in 1973, and the geese then freely grazed on the undersown grass.

It was found that the presence of cattle on fields deterred the geese, and in 1972 a covered stock-wintering area was built at the farm. Farm stock are no longer on the arable fields after mid November.

The grassland at Eastpark was in poor condition in 1970, and the farmer is now being encouraged to increase soil fertility. As most geese prefer newly sown nutritious grasses to the old swards, fields are gradually being reseeded by sowing grass under cereals.

It is hoped that by these practices and continued improvements in the quality of grazing at Eastpark, the geese can be assured of a reserve food supply when conditions are unsuitable for merse feeding. At the same time the arable farmland is maintained in full agricultural production, and the value of the land for farming is being improved.

Individual marking of geese

The research programme has been expanded to include individual marking of Barnacles. Attempts were made to catch geese by rocket-netting in 1973 and 1974, but, mainly because of our own restrictions on disturbance, these attempts were unsuccessful. Goose catching was possible, however, in summer 1973 when an expedition visited the breeding grounds in Spitsbergen (Jackson, Ogilvie and Owen 1974). Some 1460 geese were seen, and 416 were caught for ringing. Of these, the 350 adults were marked with individually coded plastic rings as well as with the usual monel rings. The code consists of three black letters on a yellow ground, and can be read at up to 300 metres in ideal conditions (Plate 16a).

When the flock returned to Caerlaverock in 1973 one in every 15 birds was individually recognisable. Data were collected on the family and flock relationships of these birds throughout the winter, and by the end of the season no fewer than 329 (94%) of geese marked with plastic rings in Spitsbergen had been seen. In addition, 31 of 66 goslings, marked with monel rings only, were seen. Individually marked geese will be used in future to intensify study of aspects of family and flock behaviour and feeding behaviour.

Future prospects for the population

The dynamics of this goose population have been the subject of much speculation (Boyd 1964, Roberts 1966, Kerbes 1970, Young 1971), mainly because of the difficulty of counting the whole population. Nearly all the evidence from ringing before 1973 has indicated that the population is a closed Spitsbergen-Solway one. More than 800 birds were ringed at the breeding grounds between 1962 and 1964, and 316 caught with rocket nets at Caerlaverock in February 1963. Many birds ringed in Spitsbergen were retrapped at Caerlaverock and *vice versa* (94 of the 316 caught at Caerlaverock bore Spitsbergen rings). The vast majority of recoveries have been either from the Solway or from Spitsbergen, with birds ringed at Caerlaverock having been recovered at all parts of the known Spitsbergen breeding range. There has also been a scattering of recoveries from northern Britain and elsewhere along the migration route, two from Denmark and one each from France and Ireland. Thus, despite intensive ringing (at one time about a third of the population was carrying rings) there is no evidence from this source to suggest that the population is other than a Solway-Spitsbergen one.

The validity of this argument has been brought into question by information from winter counts, particularly from occasional high counts that are difficult to explain. For example, in March 1964 J. G. Harrison and J. Ruxton counted 4000-4500 on Rockcliffe Marsh, including a leucistic bird which had not been seen at Caerlaverock. In the autumn of 1964, however, several counts indicated that the total Solway population was no more than 2900 birds. As breeding success was poor, with about 200 juveniles, only about 2600 of the 1963/64 population had returned, giving a mortality of between 35% and 42%, which would be high for such a protected population. More recently in 1969/70 J. Young and R. H. Kerbes separately counted 4000 geese at Caerlaverock. However, in the following winter the Solway population was repeatedly assessed at only 3200 birds. Moreover there were 47% juveniles following the successful 1970 breeding season: thus only 1700 of the original 4000 had returned, giving a mortality of 67%, which again seems most unlikely.

Various explanations have been put forward for these fluctuations, as summarised by Young (1971):

(a) Part of the population may winter elsewhere, perhaps staying in Norway and only reaching the Solway in some years, possibly because of adverse weather conditions. This is an attractive explanation, as there are numerous small uninhabited islands off the Norwegian coasts where the birds might winter unseen. However, weather records from the

coast of southwest Norway show that the ground is covered by snow for over two thirds of February in most years (24 days in February 1970, when few birds were seen on the Solway). Some of the islands may be kept snow-free by wind, but average air temperatures of much less than zero (February 1970 -5°C) would make conditions unsuitable for geese, which are reluctant to feed on frozen vegetation.

(b) Part of the population may winter undetected elsewhere in Britain or Ireland. This is unlikely, since large numbers of geese are involved (over 2000 in 1970) which would surely be detected even if they joined several other flocks. There are not many sites capable of supporting even a few hundred Barnacle Geese that are not regularly visited by wildfowl counters.

(c) Birds from the Greenland stock may occasionally move into the Solway, perhaps *en route* to Ireland. It is likely that the large numbers of Barnacles recorded at the turn of the century were not of Spitsbergen stock, but, although about 1700 birds had been fitted with plastic collars in Greenland in 1961 and 1963 (about 10% of the population at that time), there is only one recent record of a Greenland bird at Caerlaverock. All the information from ringing (not least the 1973/74 evidence) indicates that only Spitsbergen breeding birds winter regularly in the Solway.

Since 1970 numbers have been consistent with the theory that the population is closed. The population structure and mortality in the years of study are shown in table 4. Early in

Table 4. Population structure and mortality of Spitsbergen/Solway Barnacle Geese 1970-73

	% juvs.	Average brood size	Total flock	Successful breeding pairs	No. juvs.	Failed non-breeders	Estimated mortality %*
1970	47.2¶	3.0¶	3200	500	1510	690	—
1971	15.0	1.8	3700	310	560	2520	1.7
1972	26.0	1.9	4400	600	1140	2060	12.0
1973	21.0	1.6	5100	670	1070	2690	8.4

*Mortality rate of birds from one October to the next.

¶From Young 1971.

the season juveniles are easily distinguished by their brownish backs and ill defined edging to the black on the head and neck, and about 20% of the population was aged each year (usually in October). As birds of the year stay with their parents, the brood size can also be ascertained. The number of successful breeding pairs is the number of juveniles divided by the average brood size. The remaining members of the flock are neither

juveniles nor have they bred successfully and so come into the 'failed/non-breeders' category. In good breeding seasons these are mainly two-year-old geese. This analysis shows that the increase in numbers can be accounted for solely by recruitment through breeding and that mortality has been low, as would be expected for a population which is protected over the whole of its range. It seems unlikely on this evidence that a consistent sub-population is wintering elsewhere. No large influxes have been detected during this study, and the maximum recorded has remained constant through each season.

There remains the mystery of greatly fluctuating numbers in the past, and the failure of the population to expand despite recruitment through breeding in the sixties. One possibility which has not been given serious consideration is that these high mortality rates have in fact occurred. In recent years the geese have used offshore islands for breeding and moulting to a great extent (Norderhaug 1970). The 1973 expedition found that these islands were rocky and supported little vegetation, and so conditions through the moult must have been difficult. The geese are kept away from the mainland by human activity and perhaps because of foxes. It is possible that birds that arrive at the breeding grounds in poor condition do not survive the moult or die on autumn migration. It may be significant that the major apparent mortalities occurred in years when the population was high—over 4000 individuals. There may be a social controlling mechanism that results in non-breeders being affected more than breeders. For example, in 1970 a loss of 2000 non-breeders in summer would account for the drop in population and also for the exceptionally high proportion of young birds in the following winter.

If these occasional high mortalities have been real and the result of food shortages at the critical moulting period, why did a similar crash not occur in 1973, when the population was at a record level of 4400? There are two possible explanations: (a) conditions on the breeding grounds may have improved in recent years; (b) winter conditions may have improved so that all birds return to the breeding grounds in sufficiently good condition to sustain them through the moult, whatever the summer food supply.

It is known that springs and summers have been exceptionally mild in Spitsbergen over the last few years, and this has been reflected in the consistently good breeding performance of the geese. (The 1971 breeding success appears depressed because nearly half the returning birds were only one year old and thus unable to breed.)

Conditions have also been easier for the geese in the last few winters, which have been especially mild. Improved man-

agement of Eastpark Refuge must also have had an effect, particularly the availability of undisturbed farmland feeding when conditions on the merse were unsuitable or clover stocks were depleted. Thus in the last two years in particular, the majority of the geese have been able to remain at Caerlaverock until after the shooting season, when other areas become much less disturbed.

A combination of these factors might have contributed to the apparent change in the fortunes of the Solway population, although the mysteries of previous irregularities will perhaps never be fully explained.

If the present trend continues, could the increased numbers be accommodated without undue conflict with agricultural interests? We believe that improved management of Eastpark, which has been successful both in attracting the geese and in reducing their use of neighbouring farmland, will continue to provide increased grazing for the Barnacles. The inclusion of an additional 90 acres previously hardly used by geese in the fenced merse could result in an increase in the carrying capacity of the merse of 130,000 goose days (or 1000 geese for four months) if its quality can be brought up to that of the present fenced area. The stricter control of shooting and the reduction of disturbance at other haunts, notably Rockcliffe, should also help to improve the availability of winter feeding.

If our explanation of the behaviour of the population and prediction for the future are correct, we could see many more Barnacles on the Solway in the next few years. On the other hand, conditions on the breeding grounds or other hitherto unknown factors might intervene and again reduce the population to 3000-4000 birds. We shall continue our studies in the hope that in future we can predict the future prospects of this population more accurately and make more informed guesses about the factors that influenced its numbers in the past.

Postscript

By the end of October 1974, 5,500 geese had been counted at Caerlaverock. Although only two white birds were present, this is believed to be the total population. 1974 was a moderate breeding season (about 15% young), and the annual mortality was 8-9%. Although conditions were not entirely favourable for reading rings, over 50% of the 1973-ringed geese had been identified by the end of October. These included 3 birds not seen in 1973-74.

Acknowledgments

We are grateful to L. Colley, who assisted in most of the field work during the study. We profited from valuable discussion, especially with H. Boyd and E. L. Roberts about the

habits of these geese. The work was supported by a grant from the Natural Environment Research Council. Prof G. V. T. Matthews and M. A. Ogilvie made useful criticism of the manuscript.

Summary

The numbers, distribution and feeding movements of Barnacle Geese at Eastpark Wildfowl Refuge, Caerlaverock, over four seasons 1970/71 to 1973/74 are described. Arrival dates are remarkably constant, but the date when the flock was completed was much later in some years. Overall numbers increased from 3200 in 1970 to 5100 in 1973, a post-War record. The use of the Caerlaverock area by the geese has doubled in the last four years, and the proportion of time they spend there in preference to other Solway haunts has increased.

While at Caerlaverock the geese use merseland and farmland for feeding. The proportion of each varies annually, probably in relation to food availability and disturbance. While on merseland their main diet is clover stolons, especially in midwinter. April clover stocks are only 20% of the September values after heavy grazing by the geese, but the plant almost fully recovers before the next September.

Management of the Eastpark Refuge is aimed at improving food stocks on the merse and providing reserve feeding grounds on adjacent farmland, while maintaining the farm in full agricultural production.

The past numbers and breeding performance of the geese are discussed, and compared with those during this study. The behaviour of the population is at present consistent with the theory that it is a closed Solway-Spitsbergen population, and mortality is low, between 2% and 12% per annum. It is suggested that large fluctuations in the past may have been due to high mortality during the moult. More favourable breeding and wintering conditions in the last few years may have enabled this mortality to be reduced or eliminated and may have allowed an increase in population size. This increase could continue unless breeding or moulting conditions again become unfavourable.

References

- BOYD, H. 1964. The number of Barnacle Geese in the Spitsbergen/Solway population in 1964. Wildfowl Trust.
- HARRISON, J. G. 1967. *A Wealth of Wildfowl*. London.
- HARRISON, J. G. (Ed) 1974. Caerlaverock: Conservation and Wildfowling in action. W.A.G.B.I.
- JACKSON, E. E., OGILVIE, M. A. and OWEN, M. 1974. The Wildfowl Trust Expedition to Spitsbergen 1973. *Wildfowl* in press.
- KERBES, R. H. 1970. Preliminary report on Barnacle Geese of the Solway Firth. Unpublished report to the Nature Conservancy.
- NORDERHAUG, M. 1970. The present status of the Barnacle Goose *Branta leucopsis* in Svalbard. *Norsk Polarinstitutt Arbok* 1968: 24-35.
- OWEN, M. 1973. The management of grassland areas for wintering geese. *Wildfowl* 24: 123-130.
- OWEN, M. and KERBES, R. H. 1971. On the autumn food of Barnacle Geese at Caerlaverock National Nature Reserve. *Wildfowl* 22: 114-119.
- ROBERTS, E. L. 1966. Movements and flock behaviour of Barnacle Geese on the Solway Firth. *Wildfowl Trust 17th Ann. Rep.*: 36-45.
- YOUNG, J. G. 1971. Breeding success of Barnacle Geese at Caerlaverock National Nature Reserve 1958-1970. Unpublished report to the Nature Conservancy.

Dr Myrfyn Owen, *The Wildfowl Trust, Slimbridge,*
Gloucestershire.

C. R. G. Campbell, *Eastpark Wildfowl Refuge,*
Caerlaverock, Dumfries.

Short Notes

Early nesting Merlins in Galloway

On 5th May 1974 RCD found a complete clutch of five Merlins' eggs in Galloway, and on 11th June ADW found a Merlins' nest about 5 miles (8 kms) to the southwest, containing four small young about two to four days old. ADW has three other records from previous years in which clutches have been complete between 3rd and 5th May. According to Brown and Amadon (1968 *Eagles, Hawks and Falcons of the World*) Merlins' eggs are normally laid every two days and sometimes over a longer period. If this is the norm, the first eggs of four of these clutches would have been laid during or before the last week of April.

Dunlop (1912 *Brit. Birds*, 5: 322-327) in a paper on incubation gives the first egg of a clutch being laid on 3rd May, but Hendy (1943 *Somerset Birds*) considered that the first egg on the 8th May was a "rather early date" for laying on Exmoor. *The Handbook* states that breeding begins early in May and most birds have laid by the last week of that month. Bannerman (1956 *The Birds of the British Isles Vol. V*) considered that the first week of May, or a more usual date of 11th or 12th May, in southern England would be an early date for laying in Scotland. He points out that Richard Paton did not find eggs in Ayrshire before the fourth week of May.

R. C. DICKSON, A. D. WATSON.

Early nesting Tawny Owls in Aberdeen

On 6th March 1974 a Tawny Owls' nest was found at Mas-trick, Aberdeen, in a hollow tree trunk. It contained five well-grown young of which the oldest was estimated to be three weeks old. Working this back shows that the eggs must have been laid during the mild spell in mid January. All five young were successfully reared although two were later found dead in April.

On 11th April a photograph appeared in the *Evening Express* of an adult with a well-grown young one (about four weeks old). This bird must have laid at the latest in mid February. This second site was only about 250 metres from the first. The size or success of the brood was not known.

According to *The Handbook*, Tawny Owls usually lay from March to June and occasionally in February. For two birds to lay so early would therefore appear to be unusual—especially so far north.

ROBERT L. SWANN, ROBERT RAE.

Nightingale of eastern subspecies on Fair Isle

A Nightingale found dead on Fair Isle by G. J. Barnes on 30th October 1971 was examined by I. S. Robertson, Dr B. Marshall and myself and appeared to have the characteristics of the eastern race *Luscinia megarhynchos hafizi*. The identification was later confirmed by D. Goodwin of the British Museum.

The bird was freshly dead but in a sorry state, with a number of feathers missing and others matted. It was nonetheless possible to make a comprehensive description; the salient features were: wing formula close to Nightingale; general plumage and size similar to Thrush Nightingale *Luscinia luscinia* except that the pale greyish tips to coverts were very prominent; the tail was noticeably long. The description agreed closely with that of a bird trapped at Sharjah in the Trucial States on 13th April 1971 (B. Etheridge, pers. comm.). A comparison of its dimensions with those of other nightingales examined at Fair Isle is given in the table below.

Dimensional comparison of nightingales ringed on Fair Isle

	Wing mm	Bill mm	Tarsus mm	Tail mm	Weight gm	No. examined
<i>L. m. megarhynchos</i>	78-83.5	16-18	26-29	63-68	18.0-21.3	10
<i>L. luscinia</i>	86-94	13.5-18	26.5-30	63-70	19.7-24.5	8
<i>L. m. hafizi</i>	93	17.5	28.5	82	19.7	1

This is the first autumn record of a Nightingale on Fair Isle.

R. A. BROAD.

(This is the first British record of this subspecies, which breeds in Soviet Central Asia and winters in East Africa*. A similar bird, trapped at Ottenby in Sweden in the autumn of 1964, was the first European record†.—Ed.)

*VAURIE, C. 1959. *The Birds of the Palearctic Fauna* and DEMENTIEV, G. P., GLADKOV, N. A. et al. 1954. *Birds of the Soviet Union*.

†SVENSSON, L. 1970. Första fyndet av sydnakttergal i Sverige galilde ostligaste rasan *Luscinia megarhynchos hafizi* (Sev.). *Var Fagelvarld* 29, 67-71.

Reviews

The Coastline of Scotland. By J. A. Steers. Cambridge University Press, 1973. Pp xvi + 335; 32 black-and-white plates, 68 text figures and maps, pull-out map. 24 x 16 cm. £10.50.

This book gives a general description of each part of the Scottish coast from the point of view of the geomorphologist. The factors leading to the present coastal land-forms are described, as far as they are known. Unfortunately, the Scottish coastline is a more difficult subject than that of England and Wales and has been less well studied, so

those who expect this book to be comparable with Professor Steers' earlier volume on the southern half of Britain will be disappointed. Furthermore, those who wish to learn about the fundamental processes of coastal geomorphology will have to turn to that earlier volume, since the general chapters on these topics have been omitted from the Scottish book. This is perhaps a good thing: the book is outrageously expensive as it is—about 3p per page.

The ornithologist will find little of direct interest here. Even botany is rarely mentioned. Nevertheless, anyone who enjoys coastal bird watching will surely find his enjoyment enhanced by the information which is presented. In future, I shall not venture to an unfamiliar part of the coast without consulting it.

J. J. D. GREENWOOD.

The Cairngorms. By Desmond Nethersole-Thompson and Adam Watson. London, Collins, 1974. Pp 286; 7 colour and 36 black-and-white plates, 10 text figures, 4 tables, 7 distribution maps, end-paper maps. 22 x 14½ cm. £3.50.

From either author this would have been an excellent book. Together they have made it outstanding. In *The Cairngorms* two very different styles of writing from Desmond Nethersole-Thompson and Adam Watson have been successfully blended to give a wide based, authoritative account of the whole environment and its natural history. The region dealt with is larger than the title suggests, covering not only the Cairngorm Plateau but also large parts of Speyside, Deeside and the eastern Grampians.

Considerable bias is evident in the cover of different topics, particularly birds, reflecting to an extent the research interests of the authors, but there are also chapters on human history, the old and new generations of naturalists, 'lower vertebrates', mammals, sport, conservation and the future. D. A. Ratcliffe has contributed a detailed description of the exciting flora of the region and, following a trend of increasing appendicisation in some recent books, there is a staggering 24% of the text in this form. The bulk is made up of expert accounts of specific topics: Geology by G. S. Johnstone, Landforms by D. E. Sugden, Soils by R. E. F. Heslop and Climate and Weather by F. H. W. Green. Between them these authors have given a comprehensive survey of the physical background to the Cairngorms. Appendix 2, by Colin Welch, presents an up-to-date review of the invertebrate zoology and particularly the entomology of the region. Minor appendices list breeding birds, Gaelic place-names and show the ranges of eight species of birds and mammals. The quality of the plates is high, although it is slightly disappointing to see some of the bird photographs yet again.

A certain amount of repetition of subject matter covered superficially by Darling and Boyd in *The Highlands and Islands* and in detail by Nethersole-Thompson in his other books has been inevitable, but despite this *The Cairngorms* fills a previously vacant niche as a superb descriptive text of this unique region. In addition, it carries an important message, warning that if the pressures on the hills are not regulated soon the Cairngorms as we know them will be rapidly destroyed.

Considering the overall quality of the book any criticisms pale into insignificance. Probably the worst error is the omission of Linnet from the list of breeding birds! Anyone with an interest in the Highlands will find this book compelling reading, and by present standards, not overpriced.

ALAN G. KNOX.

Fair Isle Bird Observatory: Report for 1973. Edited by George Waterston. Edinburgh, Fair Isle Bird Observatory Trust. Pp 76, 3 black-and-white photographs, numerous line drawings and maps; 22 x 14 cm. 50p.

The name Fair Isle can be guaranteed to generate a feeling of excitement in any bird-watcher and the annual Report must be looked forward to by many, anxious to learn what latest vagrants have found its shores. These people will not be disappointed: 1973 produced a crop of rare birds in mid September which even Fair Isle had not equalled previously. On the 16th a total of 93 species was recorded. Outstanding records for the year were White's Thrush, caught and ringed on September 24th, the first ringed in Britain; Lanceolated Warbler on September 22nd, the second in successive years; and the first dowitcher and White-winged Tern for the island. So many rarities turn up at Fair Isle that it seems a pity not to find first-hand field descriptions in the Report. The inclusion of these would surely enhance its value. It is also surprising that there is no list of names of observers. The bird list is interspersed with Richard Richardson's delightful vignettes illustrating some of the species.

After 'Contents', List of Officers of the Observatory and Foreword by the Chairman comes the Treasurer's Report. Perhaps it is reassuring to know at the outset that the Observatory is in a sound financial state but one feels that the reader will be more interested in the bird news and that the dry figures might be relegated to the end of the Report.

The Warden's Report is a very readable summary of events, both ornithological and social, and will conjure up many happy memories for those familiar with the island, particularly those who were fortunate enough to visit it in 1973. This is followed by the Ringing Report which gives some impressive figures of birds ringed. As usual in such summaries, there is a marked emphasis on the ringing of rarities, which has probably little scientific justification and is perhaps becoming increasingly open to criticism.

We learn from the lists that of 1710 Willow Warblers ringed since 1948, only one has been recovered and that there are only nine recoveries of warblers of any species, six of these being Blackcaps. For these results one wonders whether the trauma of the ringing operation is justified.

The Report ends with a tribute to the late Professor Meiklejohn, one of the most respected bird-watchers of his era and as well known at Cley as at Fair Isle. Some years ago, on the Scottish I.O.C. cruise, it was announced over the intercom that Maury Meiklejohn wished to report that there was a Sooty Shearwater on the port side. It was debatable whether the sudden list to port, as several hundred people moved to that side of the boat, was more of a tribute to the bird or the man.

R. J. RAINES.

The Seabirds of Britain and Ireland. By Stanley Cramp, W. R. P. Bourne and David Saunders. London and Glasgow, Collins, 1974. Pp 287; 4 colour and 8 black-and-white plates; 26 line drawings; 32 maps. 22½ x 16 cm. £3.50.

This book presents a new dimension in British ornithological literature, as it contains the results of the Seabird Group's *Operation Seafarer*, an intensive census in 1969-70 of an important group of birds with which Britain is particularly well endowed. No other book has

gathered together such a wealth of fascinating material since Fisher and Lockley's classic *Seabirds*, written 20 years ago.

Stanley Cramp, an eminent and internationally respected ornithologist with a vast knowledge of all things ornithological, is chairman of the Seabird Group and an authority on pollution problems. W. R. P. Bourne, Secretary and a founder of the Group, is a household name among seabird enthusiasts, and it was mainly his guidance which resulted in this, the Group's first major undertaking since its formation in 1965. David Saunders' enthusiasm and persuasion as organiser of *Operation Seafarer* led the thousand or so amateurs and professionals through the difficult and often dangerous work of the census. He has done his job handsomely, and what must have been a long and arduous task of analysing the countless records, has now given us data which will serve as a base for all future work on British seabirds. Crispin Fisher, son of the late James Fisher who was chairman of *Operation Seafarer* until his untimely death, has aptly been responsible for the clear and unique maps. Robert Gillmor's beautiful illustrations add to the book's attractions, the excellent colour plates depicting all the regular breeding species. There are several well-chosen photographs.

An introduction by Stanley Cramp precedes three general chapters. In the first, W. R. P. Bourne describes the relationship of seabirds to their environment. It is a pity that this important chapter on seabird biology should be somewhat marred by the author's peculiar style of writing. Although the content is sound, the sentence construction is poor, and, occasionally, faulty punctuation masks the precise meaning. The other two chapters by Stanley Cramp are well-written and easily understood. Chapter 2 gives a historical resumé of man's impact upon seabirds, from the earliest hunting activities to the present shadow of pollution. Various types of pollution, both direct and indirect, are lucidly discussed. Because so many aspects of the effects and distribution of pollutants are unknown and difficult to assess, an accurate knowledge of the seabird populations in Britain is essential, so that future changes can be monitored and analysed. The census was carried out for this reason. Chapter 3 gives details of this census, with figures. The populations of some species, such as the Gannet, were counted fairly accurately, but numbers of the nocturnal hole-nesting petrels proved almost impossible to calculate, due mainly to the inaccessibility of their breeding sites. Population changes are also described with reference to past information, and reasons are offered. It is heartening to learn that at least twelve species have shown recent increases over whole or part of their British range, but some are decreasing, especially the Little Tern which suffers from human disturbance on a large scale. An error in this chapter tells us that the Great and Lesser Black-headed Gulls are abundant breeders!

The remainder of the text consists of species accounts, ably written by David Saunders, although Dr J. C. Coulson contributes the section on the Kittiwake. For each of the 24 regularly breeding seabirds in Britain and Ireland, there are paragraphs on identification, food and feeding habits, breeding, movements, world distribution, census methods, and past and present status in the British Isles. The paragraphs on the first five subjects are relatively brief, drawing mainly on the available literature. They form an essential background to the last paragraph, which is based on the data obtained in the 1969-70 census. The section on methods will prove an invaluable guide to all future workers in this field, but the authors are careful to emphasise the inaccuracies inherent in these methods. *Operation Seafarer* covered only coastal colonies. This meant that incomplete coverage was obtained for some species of gulls and terns which have substantial inland colonies, notably the Common and Black-headed Gulls. Population trends are there-

fore obscured, and it is regrettable that these colonies could not have been included. A pity, too, that recent controversy over British names has not been avoided in this book. Leach's Storm-petrel seems an unnecessary expansion of the more familiar Leach's Petrel, and in the short summary on scarcer species and vagrants, the Frigate Petrel has been given the unwieldy title of White-faced Storm-petrel.

Of the 32 maps, the first three show the main seabird stations of Britain and Ireland, giving for each the size, number of breeding species and type of habitat. The next 24 maps are, to the reviewer, the highlight of the book. They are remarkably clear, showing even the tiniest islands. Each map shows the breeding distribution of one species, with orders of abundance for each colony. Historical data are included for some 'difficult' species, and for reasons of security tern colonies are not mapped, but aggregate numbers shown in the appropriate vice-county. The remaining maps include such aspects as the incidence of oiling, sea temperature and salinity, and distribution of oceanic plankton. All are of interest, but the oiling map is a little difficult to interpret, and I feel that it could have been improved. There is also a map showing recoveries of Razorbills ringed in Britain and Ireland. This is a worthwhile addition, but one wonders why similar maps concerning other species are not shown.

The maps are succeeded by tables of numerical data for past and present. Orders of abundance differ slightly from those given on the maps. For instance, order 3 covers 100-999 breeding pairs, but on the maps it covers 101-1000. A colony of 1000 birds could therefore be either order 3 or order 4, a substantial difference. Several small colonies in the tables are omitted from the maps. According to one table, Puffins are of order 3 in Caernarvonshire, but are not mapped in this county. Little Terns are mapped as order 2 for Co. Clare, but are given as nil in the tables.

Several small errors were also noted in the comprehensive bibliography, and ten references quoted in the text are not listed, a small but annoying point if one wishes to follow up a particular reference.

Despite these discrepancies this book is excellent value. It will be a useful addition to any naturalist's bookshelf, but to us in Scotland, who have the lion's share of Britain's seabirds, it is indispensable. The achievement of *Operation Seafarer* will enable this heritage to be guarded against the pressures of the modern world.

NORMAN ELKINS.

The Buzzard. By C. R. Tubbs. Newton Abbot & London, David & Charles, 1974. Pp 199 (including plates); 8 black-and-white plates, 11 text figures and maps, 11 tables. 21½ x 15 cm. £4.75.

Several studies of the Buzzard on the Continent have resulted in excellent accounts, mainly in Danish and German scientific journals. Not surprisingly, the results of these studies are largely unknown in this country, where there have been few serious studies of Buzzards. One of the best and most frequently quoted was done in Devon by P. J. Dare for his doctoral thesis, although, regrettably, it has never been published. Clearly, a monograph by a person well acquainted with the Buzzard and its literature was long overdue. Colin Tubbs has undertaken this daunting task and has produced a fine result.

The first half of the book describes the decline and subsequent recovery of the Buzzard in Britain from 1600 to the present day. These chapters quote from a great many sources, often obscure, and make fascinating reading. The remaining three chapters consider social behaviour, breeding biology and population ecology and cover satisfactorily most aspects of Buzzard biology. They are based on Tubbs' own work from 1962 in the New Forest and make frequent and valuable comparisons between most of the available British and Continental

literature. However, on pages 103-4 Dare is misquoted on one important detail: he did not show that Buzzards range beyond their territory in search of food. On the contrary, he showed that they seldom left their territories, and this is also true of Buzzards on Speyside. Tubbs' observations are interesting because he has shown conclusively that Buzzards in the New Forest do sometimes hunt well outside their territories, as do those studied on the Continent.

Overall, I felt that a more critical appraisal of the text would have resulted in a more cohesive presentation, although the author tells me that the style was to some extent imposed on him by the publisher. The material overlaps between chapters, and this has led to repetition and occasional oversights, for example, an analysis of prey and pellet remains at nests is considered under population ecology rather than breeding biology. The references rely on the reader remembering which chapter number he is reading; it would have been preferable to quote authors in the text and give references in alphabetical order at the end of the book. In addition, many people may be put off by the uninspiring dustjacket and relatively high price for such a short book. This would be most unfortunate and I hope that this well-illustrated book will find a wide readership as it contains so much original material, useful speculation, and reviews the literature so well. The author is to be commended on his fine study in some of the most difficult Buzzard terrain in Britain, and no less for seeing it through to a book as well as publishing details in scientific papers.

N. PICOZZI.

Seventy Years of Birdwatching. By H. G. Alexander. Berkhamsted, T. & A. D. Poyser, 1974. Pp 264; 8 black-and-white plates, 6 maps, numerous line drawings. 24 x 14 cm. £3.80.

Of the four Alexander brothers, all born in the 1880's, three became ardent field ornithologists. One, the second eldest brother Wilfrid, was to become famous as WBA of the Edward Grey Institute, Oxford, while the youngest carried out his bird study as an amateur in different parts of the world, and in this book recounts his vast experiences from the early twentieth century to the present day. Without being pompous, Horace G. Alexander relates how he and his two brothers started to record natural history phenomena by writing up daily records, progressing to compiling territorial and area check-lists, and in some places mapping birds in their breeding territories. Much of our present study methods surely began at the hands of this family and we owe them a lot for their initiative.

Accurate note-taking and recording became a must for HGA, and over the years when he lived in or travelled to various parts of the world he filled many a note-book. In this book we read of these experiences which tell so many concise and important facts about birds and places of ornithological interest. As an autobiography it reveals the personality of the author, showing him as a gentle, retiring and dedicated worker who finds companionship with all he meets while engaged in his hobby. The whole combines to make very enjoyable reading. Robert Gillmor's drawings as usual show grace and give pleasure. I look forward to seeing his pen and brush fully illustrating ornithological books in the future.

I have one criticism—many facts and events are briefly mentioned, then too often one has to read through maybe a further couple of chapters before these points are expounded. Like many magazine stories, "continued on page 125" but without the reference! The book is well produced, but rather expensive for a work of this kind, even though the contents are above average.

A. G. STEWART.

Der Zug Europaischer Singvogel; ein Atlas der wiederfunde beringter Vogel. Edited by Gerhardt Zink. Vogelwarte Radolfzell, 1973. Pp. 15 (introduction) + 30 loose-leaf species accounts; many migration maps. 34 x 27 cm. DM48.

This publication from the Radolfzell bird research station is a series of migration maps for 30 European songbirds based on ringing recoveries from all the European bird-ringing schemes. The maps are on high-quality paper of large format and are presented in loose-leaf form. The introduction runs to 15 pages; it gives a detailed bibliography of ringing recoveries for 26 passerine species not featured in the main part of the atlas; there is also a comprehensive explanation of the terms used in the preparation of the maps. A great deal of data and analysis is given, but unfortunately for the monolingual, the whole text is in German. Nevertheless, the maps can be reasonably easily followed by students of bird migration.

The species mapped in detail range from Wheatear to Firecrest; the detail varies considerably, depending on the recovery data available. Only one record is published for River Warbler, but in contrast there are 13 most detailed and interesting maps for Blackcap. The marked migrational divide of Willow Warblers and Blackcaps is clearly indicated by the maps, and one can see the distinctive southeasterly migration of Lesser Whitethroats. Quite a lot of Scottish data, especially from Fair Isle, has been used in the preparation of the maps. The publication comes unbound and packed in a special folder, and further instalments are planned. A copy is now in the Club library.

R. H. DENNIS.

Letters

Sir,

Long-tailed Ducks in the Outer Hebrides

I was interested to read of the counts of Long-tailed Duck made by C. Brown and D. Jenkins in the Uists (*Scot. Birds* 7: 404). I would like to point out that there are, in fact, some published data on numbers in other parts of the Outer Hebrides. In my short note on the effect of the weather on the Long-tailed Duck in Lewis (*Bird Study* 12: 132-134), I mentioned counts of the species both on Loch Branahuie near Stornoway, and in the adjacent bays. Long-tailed Ducks arrive in this area at the beginning of October, and in winter my highest count was 420 on 1st December 1964. These birds were mainly on the Branahuie banks, the shallow bay south of the loch, which itself lies on a narrow sandy isthmus. In spring many ducks gather on this loch, and my maximum count was 122 on 15th May 1963. Numbers of 150 to 300 have been recorded on several occasions in the past, and I can trace records of c. 150 on the loch on 2nd May 1956 (W. A. J. Cunningham pers. comm.), and c. 300 in Broad Bay, north of the loch, on 25th April 1954 (Smith & Walker, *Fair Isle Bird Obs. Bull.* 2: 238-246). My own maximum spring count was 330 in Broad Bay on 22nd April 1965.

Records indicate that Long-tailed Ducks are very scarce in other parts of Lewis. I have recorded only singles, or at most

up to a dozen, on the west coast. These appear to be transient only, occurring between March and July. It would therefore appear that, if the wintering flock at Stornoway still exists, the wintering population in the Outer Isles must be over 700. This figure does not include the birds in the Sound of Harris, for which there appears to be no published data.

NORMAN ELKINS.

Sir,

Long-tailed Ducks in the Uists

The figures for Long-tailed Ducks in the Uists as seen from the land in quiet weather need not, as indeed the writers of the Short Note (*Scot. Birds* 7: 404) suggest, give an accurate idea of the total numbers in these waters. Certainly in the winter of 1932/33 there were about 500 Long-tails in the western approaches to the Sound of Harris, and these were not seen from the shore at Newton Ferry nor from the sandhills in front of Newton, but were noted on excursions on these waters about every fortnight from early November to late February. They far outnumbered the Eiders in the area, in which there was also a handful of Common Scoters. Perhaps the numbers have fallen greatly since that time, or maybe the birds still winter there and are still invisible from the shore.

In a good many winter boat trips up and down the east coast of both North and South Uist, I have no record of seeing any Long-tailed Ducks; indeed that part of the Minch looks quite unsuitable for them, for the sea-bed surely needs to be sandy rather than rocky to hold many Long-tails.

ARTHUR B. DUNCAN.

Requests for Information

Pochard survey. A survey is presently being carried out on Pochard movements between Seafield and Duddingston. To complement this study the organisers would be grateful to receive notes from other Pochard localities in Scotland and Northern England. Notes under the following headings would be particularly helpful: Place; Date; Time (GMT); Number of Pochards; Wind speed (Beaufort Scale) and direction; Light intensity (e.g. good, fair, poor); Visibility (distance, e.g. $\frac{1}{2}$ mile, ten miles, unlimited); Cloud cover (in eighths); Precipitation (e.g. rain, snow); State of water (e.g. calm, rough, amount of ice cover). Please send all records to: Dr J. Ford, Department of Biological Sciences, Napier College, Colinton Road, Edinburgh EH10 5DT.

Colour-marked waders. Waders are being colour-ringed and -dyed by M. T. Joffe of Culterty Field Station as part of a three-year project into their feeding ecology on the Ythan estuary, Aberdeenshire. Sightings of these birds should be reported to A. J. Prater, British Trust for Ornitho-

logy, Beech Grove, Tring, Herts (who is also collecting details of waders similarly marked in northeast Greenland, as requested in our last issue). Information on the bird's feeding at the time of sighting would be especially welcomed.

Colour-ringed Great Black-backed Gulls. As part of a three year study of the feeding ecology of this species some 3600 *pulli* are to be colour ringed in Orkney with a two-colour combination on the right leg (1200 were ringed this year). Recoveries from this area so far suggest dispersal predominantly down the east coast of Britain, but I appeal to ornithologists everywhere to look out for them. Details of colour-ringed birds should be sent to M. A. S. Beaman, Culterty Field Station, Newburgh, Aberdeenshire AB4 0AA.

Snow Buntings breeding in Scotland. During the last decade Snow Buntings have probably nested more widely and in greater numbers here than hitherto recorded. Desmond Nethersole-Thompson is preparing for *Scottish Birds* a summary of its improved breeding status since the publication of his monograph (*The Snow Bunting*, 1966). Please send any summer records of Snow Buntings in Scotland to the Editor, *Scottish Birds*, 21 Regent Terrace, Edinburgh EH7 5BT. Observers' wishes regarding suppression of localities will, of course, be respected.

National Rookery Survey 1975. A survey of the location and size of rookeries throughout the British Isles is to be made in Spring 1975. This important and comprehensive survey has been adopted as an official S.O.C. enquiry, and it is hoped that cooperation will be obtained from the members of the Club. There is evidence that large changes have occurred in the size and distribution of rookeries in the last 20 years and there is no doubt that further changes will occur. If these changes are to be assessed correctly, the survey in 1975 should be as complete as possible.

Organization will be on a county basis, with county recorders arranging a complete coverage of the area with local observers. Members who are willing to help, should contact the secretary of their local S.O.C. branch who will supply the names and addresses of county organizers. Simple survey cards will be used for each 10 km square, and the main information required is the number of nests in each rookery, the altitude and the grid reference. Counting of nests should be done as late in spring as possible, but before the leaves come out on the trees. The date will vary according to the locality but will normally be in April. Local observers are expected to provide their own maps. The national organizers will be responsible for transferring the data to a set of ordnance maps that will form the master records.

The 1975 rookery survey will be one of the most important projects ever conducted by the S.O.C. and the B.T.O., and the active help of club members is vital if a complete coverage of Scotland is to be achieved. On average, there are two S.O.C. members for every 10 km square in Scotland, and individual involvement in the survey could be high. Further information will be published in the next issue of *Scottish Birds*. Malcolm E. Castle, Scottish Organiser, 9 Finlas Avenue, Ayr.

Wintering Blackcaps 1974/75. Mr Iain H. Leach of 18 Burness Avenue, Alloway, Ayr, KA7 4QB, is collecting records of Blackcaps in Scotland this winter. He would like full details, especially date, place, habitat and food.

Scottish Ringing Report. An annual ringing report is planned for *Scottish Birds*, starting with 1973. Would readers with details of interesting recoveries during 1973 and 1974 send them to Mr A. D. K. Ramsay, 14 Camesky Road, Caol, by Fort William, Inverness-shire.

The British Library of Wildlife Sounds (BLOWS)

Now that BLOWS has made five years' progress it is felt that the attention of zoologists can justifiably be brought to its existence. Its purpose is two-fold: to build up as large a collection as possible of both published and unpublished recordings of animal sounds; and to enable scientific workers to make use of this material. Commercially published gramophone records currently held by the Library amount to 170 sets comprising over 450 discs which contain approximately 10,000 recordings (or 'cuts') covering some 2500 animal species. Unpublished recordings consist of duplicates of the natural history section of the BBC sound archive (4000 cuts of 1000 species), and recordings on tape (over 1500 cuts of nearly 700 species) contributed by individual recordists of wildlife sound. These last are concerned mainly with European, Antarctic and African species, particularly significant acquisitions being the complete collections of the late A. G. Field's recordings of British birds and of Dr Lancelot Tickell's recordings made in South Georgia, and a copy of the first series of the late Myies North's African bird sound recordings. There have recently been a few contributions from the Argentine, New Zealand and Australia. To date the vast majority of recordings are of birds, but the collection does include many amphibian, mammal, insect, reptile and even fish sounds. Anyone with documented tape material is invited to write to BLOWS at the British Institute of Recorded Sound, 29 Exhibition Road, London SW7 (telephone 01-589-6603). In certain circumstances blank tape can be provided by the Library for bona fide recording projects in return for an undertaking that copies of the material will be deposited. For example, tape was provided for a recent successful British Ornithologists' Union expedition to the Mascarene Islands.

Gramophone records cannot be lent but they can be listened to at the Institute. Copies of tape recordings can be supplied for a nominal copying fee to anyone wishing to use them for private research. Enquiries about any aspect of wildlife sound are welcome. Interested persons are invited to write to the Library for a free leaflet which gives details, or to purchase the special issues of *Recorded Sound* (the Institute's quarterly journal) devoted entirely to wildlife sound: No. 34, April 1969 and No. 54, April 1974 (Price 60p each post free). Visitors are welcome at the Library. They should make an appointment by letter, or by telephone between the hours of 11.00 and 5.30 on Wednesday, Thursday or Friday.

JEFFERY BOSWALL, PATRICK SELLAR

*Honorary Advisers to BLOWS
British Institute of Recorded Sound*

The Scottish Ornithologists' Club

TWENTY-SEVENTH ANNUAL CONFERENCE

UNIVERSITY OF STIRLING

24th - 26th January 1975

PROGRAMME

Friday 24th January

4.30 - 9 p.m

Conference Office in the Murray Hall of Residence, University of Stirling, open for members and their guests to register and collect name cards and Annual Dinner tickets.

- 6 - 7 p.m. Supper in the MacRobert Centre Restaurant.
 6.15 p.m. Meeting of Council.
 8.15 to 9.15 p.m. FILM AND SLIDE PROGRAMME in Lecture Theatre over Link Bridge (see 10 on plan). At 9.15 p.m. details of excursions on Saturday afternoon will be given.
 9.30 p.m. Meeting of Local Recorders.
 9.15 p.m. to midnight Lounges in the MacRobert Centre are open for informal discussion and refreshments (late licence).

Saturday 25th January

- 8.45 to 9.15 a.m. Conference Office in the MacRobert Centre open for registration.
 9.20 a.m. Official opening of the Conference by the President, Dr George Waterston, OBE, FRSE, LI.D., in the MacRobert Theatre.
 9.30 a.m. LECTURE, "The Seabirds of Britain and Ireland" by Mr Stanley Cramp, O.B.E.
 11 a.m. INTERVAL for coffee and biscuits.
 11.30 a.m. LECTURE, "Shetland: the Birds and the Oil" by Mr Bobby Tulloch
 1 p.m. INTERVAL for Lunch.
 2 p.m. EXCURSIONS by private cars leaving the car park behind the Murray Hall of Residence. Details will be posted on the Conference notice board.
 2.30 p.m. MEETING of members of the R.S.P.B. in the Lecture Theatre over the Link Bridge (see 10 on plan), to which members of the Club and their guests are invited.
 4.30 to 5.30 p.m. MEETING of participants of the Birds of Estuaries Enquiry and the Wader Study Group to which all interested in Waders are invited.
 5.45 p.m. 38th ANNUAL GENERAL MEETING OF THE CLUB in Lecture Theatre.
 Business :
 (1) Apologies for absence.
 (2) Approval of the Minutes of the 37th Annual General Meeting of the Club held in Dunblane on 27th October 1973 (see *Scot. Birds* 7: 425) and the Special General Meeting of the Club held in Edinburgh on 9th April 1974 (see *Scot. Birds* 8: 39).
 (3) Matters arising from the Minutes.
 (4) Report of Council for Session 37.
 (5) Approval of Accounts for Session 37.
 (6) Appointment of Auditor.
 (7) Election of new Members of Council.
 The Council recommends the election of J. K. R. Melrose and Miss V. M. Thom to replace R. H. Dennis and Miss M. P. Macmillan who are due to retire by rotation.
 (8) Consideration of the proposed amendment to the Constitution recommended by Council :
 4. MANAGEMENT AND OFFICIALS (g) Annual General Meetings.
 That in the sentence "The Club shall hold an Annual General Meeting in October each year to

receive the Report of Council, Statement of Accounts, and to elect the Council and Office Bearers." the words 'in October each year' be deleted.

(9) Any other competent business.

7 for 7.30 p.m. ANNUAL DINNER in the restaurant of the Pathfoot building (dress informal).

Sunday 26th January

9.30 a.m. to

12.30 p.m.

A series of short lectures on ornithological research in Scotland will be given during the morning.

Mr B. Pounder will talk on the results of the Club's EFFLUENT ENQUIRY of which he was the Organiser. This will be followed by talks on research being carried out by members of the staff of Culterty Field Station, Aberdeen University.

Mr A. Anderson on FULMARS,
Dr H. Milne on EIDER DUCK,
Dr J. B. Nelson on GANNETS and
Dr I. J. Patterson on SHELDUCK.

11-11.30 a.m.

1 p.m.

2 p.m.

INTERVAL for coffee and biscuits.

INTERVAL for Lunch.

EXCURSIONS (informal), leaving the car park behind the Murray Hall of Residence.

WEEKEND EXCURSION TO DUMFRIES

The annual weekend excursion to the Solway goose grounds has been arranged with the County Hotel, Dumfries, from Friday 21st to Sunday 23rd February 1975.

Accommodation: inclusive terms £10.85 (including service charge and V.A.T.) as follows: bed on Friday 21st; breakfast, packed lunch, dinner and bed on Saturday 22nd; breakfast and packed lunch on Sunday 23rd. Dinner on Friday night is £2.35 extra per person (including service charge and V.A.T.). A limited number of rooms with private bathroom are available for the additional charge of £1.18 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. Members should also advise the Hotel in advance if they require Dinner on the Friday night.

Those not staying at the County Hotel are invited to attend an informal meeting at the Hotel on Friday at 8.30 p.m., when details of the weekend excursions will be announced. An informal programme of slides will be shown on the Saturday evening. Members or Guests who may have slides of interest are asked to bring them to the Hotel, and to contact the Club Secretary on the Friday evening to discuss their inclusion in the programme. A selection of books from the Bird Bookshop will be taken to the Hotel for sale during both evenings. It is advisable to bring warm clothing, gum boots if possible, and thermos flasks for the excursions.

STIRLING BRANCH, CAIRNBAAN WEEKEND

The Stirling Branch are organising another weekend birding excursion to West Argyll. Arrangements have been made with the Cairnbaan Hotel, Lochgilphead, Argyllshire (tel. Lochgilphead 2488), to provide

bed and breakfast on Friday and Saturday, 14th and 15th March 1974, dinner on Saturday and packed lunch on Saturday and Sunday, for the inclusive charge of £10.50. VAT and 10% service charge are extra. All members are welcome. Bookings should be made direct with the Hotel. Please notify the organiser, T. D. H. Merrie, West Faerwood, Dollar, Clackmannanshire FK14 7PT, when you have confirmed your booking. If further information is required please contact the organiser (tel. Dollar 2566) or send s.a.e. if writing.

WINTER EXCURSIONS

AYR BRANCH

Saturday 1st February TURNBERRY. Leader : R. H. Hogg. Meet Algin-ate Works layby 10 a.m. or Turnberry 10.30 a.m. Bring picnic lunch.

Saturday 1st March MARTNAHAM LOCH (by kind permission of Colonel Bryce-Knox). Leader : R. M. Ramage. Meet Wellington Square, Ayr 2 p.m. or Martnaham Loch 2.30 p.m.

For further details contact the Ayr Branch Secretary, R. M. Ramage, 57b St Quivox Road, Prestwick, Ayrshire KA9 1JF (tel. Prestwick 79192). Send s.a.e. if writing.

DUNDEE BRANCH

Sunday 23rd February STORMONT LOCH. Leader : J. E. Forrest.

Sunday 23rd March WESTHAVEN. Leader : P. N. J. Clark.

Sunday 20th April GLENLETHNOT. Leader : D. B. Thomson.

All excursions are by private car leaving City Square, Dundee at 10 a.m. For further details contact the Dundee Branch Secretary, Mrs A. Noltie, 14 Menteith Street, Broughty Ferry, Dundee DD5 3EN (tel. 0382 75074). Send s.a.e. if writing.

DEEDS OF COVENANT

In May the Secretary wrote to all members who pay their subscriptions by Banker's Order and asked if they would consider signing a Deed of Covenant. The response to this appeal was very gratifying with over 100 new Covenants signed by the end of September. After submitting the Covenant Form, each member has only to sign a Certificate of Deduction of Tax once—during the first year of covenant—and this is sent to members by the Secretary. Anyone who would like to sign a Covenant, which enables the Club to reclaim £1.48 on a £3.00 subscription, should write to the Secretary for details.

Council is most grateful to all members who signed a new Covenant for the increased subscription rate, as well as to those who have covenanted their subscription for the first time.

AYR BRANCH SOCIAL EVENING

The Ayr Branch will hold a Social Evening in the St Nicholas Hotel, Ayr Road, Prestwick, on Wednesday 19th March 1975, at 7.30 for 8 p.m. Probable cost £1.50 per person, inclusive of buffet supper and coffee. Competitions, raffle and bar. Apply to the Ayr Branch Secretary, R. M. Ramage, 57b St Quivox Road, Prestwick, Ayrshire KA9 1JF.

Vivat Ornithologie

Address to "Our Guests" at the Annual Dinner - 1973

By Dr IAN D. PENNIE (with apologies to William Dunbar)

I that in peace was and quietness
Am trublit noo tae mak' address
Tae this assembled companie
Vivat ornithologie !

The Wallace here upon my richt,
The Sheriff Clerk—a waesome sicht—
Likewise cannot merrie be
Vivat ornithologie !

Welcome ye strangers fae the sooth
Tae this fair land o' muckle drouth,
And may ye hae great pleasantrie,
Vivat ornithologie !

There's ane o' birds kens ilka thing
Fae Liverpool—Professor King
He kens forbye fit gars them flee,
Vivat ornithologie !

And some are here fae Aberdeen
And some fae Glasgow cam' thestreen
And a' as fou as fou can be,
Vivat ornithologie !

And ane there wis fae Ireland came,
I hope he's left his bombs at hame,
That we may sleep mair easilie,
Vivat ornithologie !

A gentleman richt straucht and manly
Fae London cam'—the noble Stanley
Cramp—and greetings unto thee,
Vivat ornithologie !

And there is ane ye canna' dodge
Bold Peter Conder fae the Lodge
Himsel' a bird o' raritie,
Vivat ornithologie !

And ane fae Bedford sittin' there
The mighty Sharrock o' the Square
Wha sired twa bairns and an atlas tae,
Vivat ornithologie !

And though there's mony mair tae boot
If I say mair I'll get pitten oot !
Sae Health tae the Guests fae the SOC
Vivat ornithologie.

S.O.C.

BIRD BOOKSHOP



21 REGENT TERRACE
EDINBURGH EH7 5BT

Tel. (031) 556 6042

Some new books in stock

- Natural History of Loch Lomond *Glasgow Univ.* 50p
Cairngorms *Nethersole-Thompson & Watson* £3.50
Cairngorms Recreation Map *Glasgow University* 50p
Guide to the Birds of Wales *Saunders* £2.50
Scarce Migrant Birds of Britain & Ireland
Sharrock £3.80
Fair Isle Bird Report 1973 50p
Shetland Bird Report 1973 50p
Migration of the Swallow *Ingram* £1.80
Flight Identification of European Raptors
Porter et al. £4.80
Buzzard *Tubbs* £4.75
Swans of the World *Wilmore* £4.50
Guide to Animal Tracks & Signs
Bang & Dahlstrom £2.95
Highland Animals *Stephen* £1.50
Thorburn's Mammals *Thorburn* £3.95
Collins Countryside Series each £1.95
 Birds *Perrins*
 Woodlands *Condry*
 Life on the Seashore *Barrett*

WRITE FOR OUR CURRENT BOOKLIST

ALL BOOKS SENT POST FREE

NOTICE TO CONTRIBUTORS

1. General notes (not of sufficient importance to be published on their own as Short Notes) should be sent to the appropriate local recorders for inclusion in their summary for the annual Scottish Bird Report, not to the editor. A list of local recorders is published from time to time, but in cases of doubt the editor will be glad to forward notes to the right person.

2. If not sent earlier, all general notes for January to October each year should be sent to the local recorders early in November, and any for November and December should be sent at the beginning of January. In addition, local recorders will be glad to have brief reports on matters of special current interest at the end of March, June, September and December for the journal.

3. All other material should be sent to the editor, D. J. Bates, 21 Regent Terrace, Edinburgh, EH7 5BT. Attention to the following points greatly simplifies the work of producing the journal and is much appreciated. Contributions should be on one side of the paper only. Papers, especially, should be typed in duplicate if possible, with double spacing and wide margins. Proofs will normally be sent to authors of papers, but not of shorter items. Such proofs should be returned without delay. If alterations are made at this stage it may be necessary to ask the author to bear the cost.

4. Authors of full-length papers who want copies for their own use MUST ASK FOR THESE when returning the proofs. If requested we will supply 25 free copies of the issue in which the paper is published. Reprints can be obtained but a charge will be made for these.

5. Particular care should be taken to avoid mistakes in lists of references and to lay them out in the following way, italics being indicated where appropriate by underlining.

DICK, G. & POTTER, J. 1960. Goshawk in East Stirling. *Scot. Birds* 1: 329.

EGGELING, W. J. 1960. *The Isle of May*. Oliver & Boyd, Edinburgh and London.

6. English and scientific names should follow *A Species List of British and Irish Birds (B.T.O. Guide 13)*. Initial capitals are used for English names of species (for example, Song Thrush, Long-tailed Duck) but not group names (for example, thrushes, diving ducks). Scientific names should be used sparingly (see editorial *Scottish Birds* 2: 1-3). When used they should follow the English name, underlined to indicate italics and with no surrounding brackets.

7. Dates should normally be in the form "1st January 1974", with no commas round the year. Old fashioned conventions should be avoided—e.g. use Arabic numerals rather than Roman.

8. Tables must be designed to fit into the page, preferably not sideways, and be self-explanatory.

9. Headings and sub-headings should not be underlined as this may lead the printer to use the wrong type.

10. Illustrations of any kind are welcomed. Drawings and figures should be up to twice the size they will finally appear, and on separate sheets from the text. They should be in Indian ink on good quality paper, with neat lettering by a skilled draughtsman. Photographs should either have a Scottish interest or illustrate contributions. They should be sharp and clear, with good contrast, and preferably large glossy prints.

1975 ORNITHOLIDAYS (Regd)

(WESSEX TRAVEL CENTRE)

*Holidays organised
by Birdwatchers
for Birdwatchers*

SW Spain	Isles of Scilly
Yugoslavia	North Wales
Lake Neusiedl	West Sussex
Majorca	Weymouth
Camargue	Golspie
U.S.A.	Islay
Ethiopia	New Forest
Orkney & Shetland	Solway
Farne Islands	



1975 details of the Ornitholidays programme available now; particulars sent on receipt of 3½p stamp to:

LAWRENCE G. HOLLOWAY **ORNITHOLIDAYS** (Regd)

(WESSEX TRAVEL CENTRE)

**44 ALDWICK ROAD, BOGNOR REGIS, SUSSEX,
PO21 2PW. Tel. 21230**

MEMBER OF THE ASSOCIATION OF BRITISH
TRAVEL AGENTS

Bird and Highlands & Islands Books

ANTIQUARIAN, SECONDHAND AND NEW

DAVID WILSON

95 WORLD'S END LANE, WESTON TURVILLE, AYLESBURY

Libraries and single books purchased, Inspection and collection
by arrangement.
Occasional catalogues.

St Kilda Shetland Orkney Hebrides — Natural History

BIRDS ON STAMPS

Crested Tits, Wildfowl, Birds of Prey and extinct and exotic Birds
now available on stamps.

All natural history subjects available, particularly Flowers,
Butterflies and Animals.

Collect these beautiful stamps with Approval Selections from:

A. GRAINGER, 42 Lee Lane East, Horsforth, near Leeds.

DORNOCH CASTLE HOTEL

A.A. * R.A.C. * R.S.A.C.
'Ashley Courtenay' and 'Signpost' Recommended

Retaining the romance of a Castle and the
homely charm of a country house combined
with the amenities of a modern hotel, our
guests receive a warm welcome and a first-
class service.

Conveniently situated for the Dornoch Firth, Tain Bay, Ederton
Sands, Skibo Estuary and Loch Fleet as well as many interesting
moorland, mountain and forestry areas, Dornoch has much to offer
the observer of wild life.

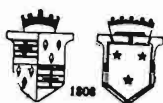
A new wing of bedrooms with private bathrooms and extended
public rooms greatly enhances the existing comfort of this hotel.
Early and late season reductions offered for 1974.

Illustrated brochure of Hotel and tariff (also special golfing terms)
gladly sent on request to

Resident Proprietors, IRENE and STUART THOMSON

Telephone : Dornoch 216





SUTHERLAND ARMS HOTEL

**GOLSPIE
SUTHERLAND
SCOTLAND**

Telephone : Golspie 216

Situated on the main North Road near the sea, Golspie offers invigorating open air holidays to all.

In addition to its unique golf course, it has fine loch fishings, sea bathing, tennis, bowls, hill climbing, unrivalled scenery, including inexhaustible subjects for the field sketcher and artist and is an ornithologist's paradise. It is, indeed, impossible to find elsewhere so many natural amenities in so small a compass.

The astonishing diversity of bird life in the vicinity has been well known to ornithologists for many years, but it is still possible to make surprising discoveries in Sutherland.

The Hotel is fully modern, but retains its old world charm of other days, and enjoys a wide renown for its comfort and fine cuisine.

Fully descriptive brochures, including birdwatching, will gladly be forwarded on request. Central Heating.

Proprietor, Mrs F. HEXLEY
Garage & Lock-ups available

A.A. R.A.C. R.S.A.C.

**GREENLAND
WHITE-FRONTED GEESE**
(and many other migrants)
visit **GALLOWAY** in
Winter — why don't You?

Situated on A713 near Loch Ken. B&B, evening meals.
Open all year.

Phone Crossmichael 232

Mrs GARROD,
3 Main Street, Crossmichael,
Castle Douglas,
Kirkcudbrightshire

ISLE of MULL

Looking across the Sound of Mull to the Morvern Hills beyond.

Comfortable Accommodation in a small guest house run with bird watchers in mind. Dinner, bed and breakfast. H&C and radiators in all guest bedrooms. Use of reference books.

Open Easter until mid-Oct.

**RICHARD & ELIZABETH
COOMBER,**

*Staffa Cottages
Guest House,*

**TOBERMORY,
ISLE OF MULL.**

Tel. 2464

11th SEASON OF

SWANS BIG GAME & BIRDS SAFARIS

VISITING THESE NATIONAL PARKS
AND GAME RESERVES

Nairobi, Lake Naivasha, Lake Nakuru, Samburu, Isiolo, Tsavo,
Amboseli, Lake Manyara, Ngorongoro, Serengeti, Mara and
Aberdare in Kenya and Tanzania.

GUEST LECTURERS

accompany each Safari and their expert and personal knowledge of East Africa—its animals, birds, history, peoples and customs—provides an unrivalled opportunity, not only to view the ever decreasing wildlife in its natural habitat, but also to give an insight into the problems of its preservation and the conservation of land needed by Africa's developing nations. A holiday that can open up new vistas of interest.

DEPARTURES

Feb. 6, 13, 20, 27; Mar. 6; June 26; July 17;
Aug. 7, 28; Sept. 18; Oct. 9, 30; Dec. 18.

21 days £515

12-page full colour brochure available

SWANS SPECIALISED SAFARIS

237 (P20) Tottenham Court Road,
London, W1P 0AL.

Telephone 01-636 8070

C.A.A. Licence ATOL 189B



John Gooders spots a Kestrel hovering over the Bank

"The trouble with being a bird-watcher" writes John Gooders, celebrated ornithologist and author, "is that you never know where and when the next interesting bird will appear. When I'm in the field it's easy—my 10 x 40B Carl Zeiss binoculars are simply the best in the world.

But there are occasions when a more discreet look is called for—that's when the 8 x 20 Dialyt come into their own.

As small as a cigarette packet, they slip easily into the tiniest pocket without as much as a bulge. Performance-wise they're just incredible, the equal of most other manufacturers' "normal" glasses—and small enough for me to take anywhere."



Treat yourself to a pair of 8 x 20 Dialyt Binoculars, and you'll never go anywhere without them. Size 88mm x 60mm, weight only 135 grms, they really are the equal of much larger instruments. £59.05 + VAT, including leather pouch.

8 x 20 Dialyt by

ZEISS of West Germany

Send for full details to the sole UK importers—



Carl Zeiss (Oberkochen) Ltd.,
Degenhardt House, 31-36 Foley St., London W1P 8AP. 01-636 8050.

WHICH BINOCULAR?

Since the turn of the century we have been a family business of binocular specialists and telescope makers, and consequently feel qualified to advise on the right choice of instruments. Moreover you can be sure that any instrument purchased from us has undergone stringent alignment and other tests in our own workshops.

Mr Frank's popular book on how to choose and use binoculars is available at 20p incl. postage.



Top prices
offered in
part exchange

**SEND
FOR NEW
ILLUSTRATED CATALOGUE
CHARLES FRANK LTD.**

**144 INGRAM STREET : GLASGOW
TEL. 041 - 221 6666**



We stock all makes, but one binocular which we can particularly recommend is the Frank/Nipole 8 x 30 which, complete with case costs only £15.12. Not only do we ourselves recommend this binocular, it also carries a strong recommendation from The Royal Society for the Protection of Birds, and each glass carries the seal of approval of the Game Conservancy. Our Free 42 page catalogue illustrates hundreds of Binoculars & Telescopes including the larger 10 x 50 Frank/Nipole binocular, complete with case at £21.60.

FREE COMPARISON TEST

Test any Frank/Nipole binocular free for 7 days. Should you decide, however, on a binocular other than the Frank/Nipole make, we can promise a substantial price reduction at least equalling any other offer which you may bring to our notice. This offer also applies to Telescopes.