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THE WILDFOWL TRUST

1954–1956

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AND HUGH BOYD

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THE WILDFOWL TRUST

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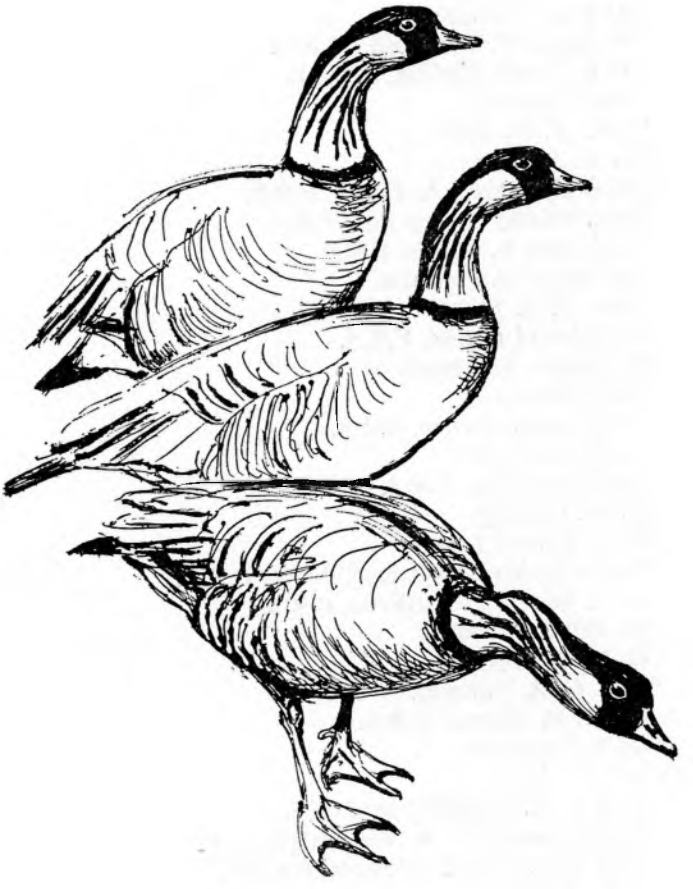

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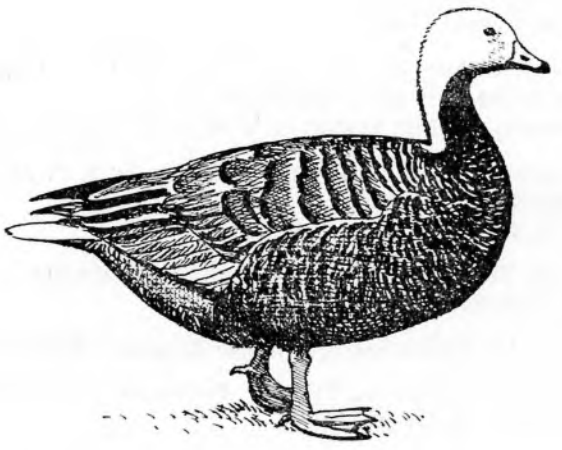
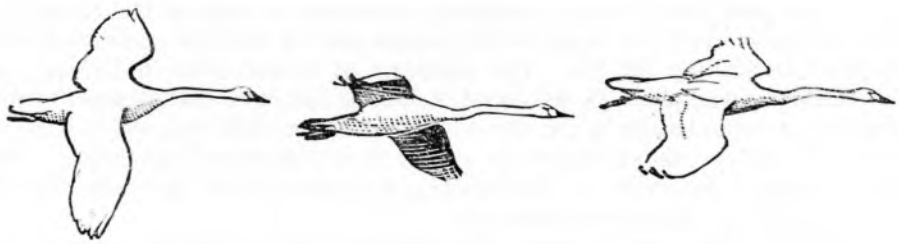




REPORT

THIS is the third Trust Report in succession to appear belatedly. Unlike its recent predecessors it covers a period of two years instead of one. Only in this way does it seem possible to dispose of the increasing lag between events and their recording and to permit the future production of Annual Reports that are both annual and up-to-date.

On 20 April 1956 the Trust was honoured by a visit from the Queen, our Patron. Her Majesty spent nearly an hour and a half of a glorious spring morning among the ducks and took a number of photographs with her own camera, including shots of her Trumpeter Swans.

The period May 1954 to August 1956 dealt with in this Annual Report has seen continued expansion along each of the three main lines of the Trust's activity. The importance of the Trust's research programme has received increasing outside recognition as the results of our earlier work have become known. The Nature Conservancy has been enabled to make financial contributions on a larger scale than hitherto and other, non-governmental, bodies have also offered valuable assistance, although most of our scientific work continues to be paid for by the Trust itself. In the educational field the value of the Trust's Collection has been recognised by a spectacular increase in the number of Schools and organised parties visiting Slimbridge. This number rose from 374 in 1953 to 464 in 1954 and 719 in 1955. The recreational value of the Collection and the wild birds on the estuary has also been reflected in a great increase in the number of visitors, to about 40,000 in 1954, more than 90,000 in 1955, and over 120,000 in 1956.

The numbers of wild geese seen at Slimbridge in 1954–56 show no such striking increases, but the ringing of geese and ducks, there and elsewhere, has expanded considerably. In the season 1955–56 1144 geese and 5882 ducks were newly ringed by the Trust, or by ringers collaborating with us.

The population study of the Pink-footed Goose, discussed at some length in the Seventh Report, continues to be the main Trust investigation. This Report includes brief accounts of the results of comparatively small-scale ringing of Greylags (pp. 51–54) and White-fronted Geese (pp. 80–84). These are perhaps most valuable for the indications they give of the general resemblances between the population dynamics of all three species, despite the differences in their breeding places and migration routes and the extent to which they are pursued by man, in this country and abroad.

Graham Cooch's study of the Blue and Lesser Snow Geese of North America provides a very important parallel to our Pinkfoot inquiry and we are very pleased to be able to publish his account of the technique of catching these geese during the flightless period of the moult (pp. 58–67).

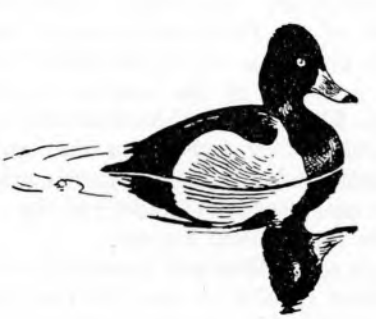
We are glad, too, to have obtained permission to reprint the report by F. C. Bellrose and T. G. Scott on the present state of wildfowl conservation in North America (pp. 68–71). The problems of conservation in Europe are essentially similar, although the social, historical and legal backgrounds to the practice of conservation in the two continents are so different, and it is most desirable that we should learn all we can from American experience. The short paper on the problems of restocking with hand-reared ducks (pp. 91–95) is an attempt to apply such experience.

It is hoped that later Reports will contain surveys of wildfowl conservation in other countries. The assessment of the potentialities of north-west Russia as a home for breeding ducks (pp. 86–91) is a step in that direction.

This is not a scientific journal, although it endeavours to maintain scientific standards of accuracy and impartiality. Accordingly, we do not need to remain always wholly serious and can find room for the informal and even the downright lighthearted. It would be pleasant to think that the researches of Messrs. Brownlow and Maxwell (pp. 96–98) on the language of rocket-netting will add to the vocabulary of a larger audience.

A substantial part of this Report is devoted to the list of Trust Members. The merit of such lists has been questioned, especially by those Members accidentally omitted from, or incorrectly cited in, them, but the length of this one surely constitutes important evidence of the strength of interest in wildfowl, and its low rate of turnover shows that such interest is not ephemeral.

In the *Seventh Annual Report*, p. 214, the occurrence of a wild drake Ringed-necked Duck on the Rushy Pen pond in March 1955, was briefly reported. Since this was the first recent European occurrence of this species it seems proper to repeat the note of its appearance in the appropriate volume of the Report. The bird, first seen by Mr P. Scott on 12 March 1955, remained for only three days.



WILD GEESE AT THE NEW GROUNDS 1954-56

THE season 1954–55 was rather a poor one by Slimbridge standards. The largest number of geese present at one time was only 3900, and only five species were recorded, three of these being represented by single individuals. 1955–56 seemed likely to be no better, until arrivals at the end of February carried the maximum number of geese up to at least 5000 (a total equalled in 1953–54 but never excelled) and the number of species and subspecies recorded up to seven.

GREY LAG GOOSE (*Anser anser*)

1954–55: One first-winter bird seen between 8 and 28 February 1955, and again from 23 to 28 March 1955.

1955–56: One first-winter bird, 17 February 1956.

EUROPEAN WHITE-FRONTED GOOSE (*Anser albifrons albifrons*)

The changes in numbers of this race, the predominant goose at Slimbridge, are shown graphically in Figure 1. The two seasons show a generally similar pattern, with numbers increasing slowly until the end of January, large influxes and erratic comings and goings during February and early March and a rapid departure in the middle of March, save for a very few loiterers. This was also the case in 1953–54, but reference to graphs published in earlier Reports *Fourth Annual Report*, p. 6 for the seasons 1946–51 and *Sixth Annual Report*, p. 8 for 1951–53) will show that in the past ten years the pattern of arrival has changed considerably. The dates of first arrival have not altered in a consistent

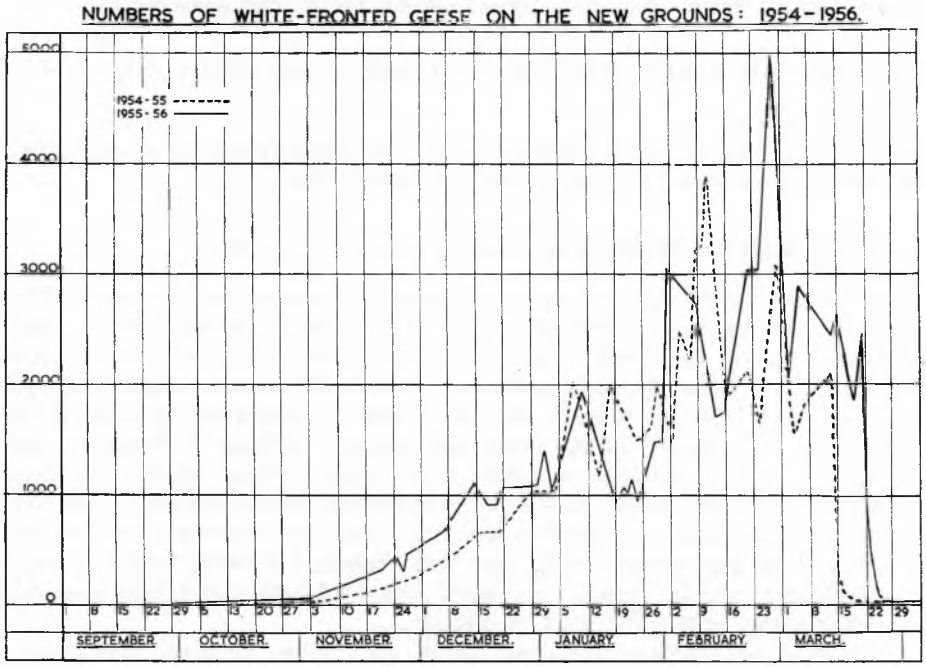


Fig. 1

way, and the numbers in October and November have always been relatively small. Only in 1951 did the total exceed 1000 in October and in all other years this figure was not attained until the end of November or later. But from 1946 to 1950 there were always big increases in December, usually about Christmas. In 1952–53 this was carried to unusual extremes so that the December and early January numbers were larger than those later in the winter. But in 1951–52 and from 1953–54 onwards the December and early January arrivals were comparatively small, and it now looks as if the greatest numbers are to be expected in February and early March.

The relations between this changing pattern and the occurrence of Whitefronts elsewhere in Britain and the effects of weather and other possible causes will be the subject of a more extensive analysis elsewhere. Here it may be sufficient to note the value of long series of counts in providing detailed evidence of the existence of shifts in seasonal distribution, which constitute one of the major difficulties in investigating changes in the numbers of wildfowl populations.

1954–55. The first Whitefronts arrived on 9 October 1954, the latest date so far recorded. The greatest number estimated to have been present was 3900 on 11 February 1955. There were over 3000 present also on 8–10 and again on 28 February. The last three Whitefronts left on 28 March 1955, a fortnight after the main departure.

1955–56. One arrived on 27 September 1955; numbers remained below 50 until 3 November. Maximum of 5000 seen on one day only, 27 February 1956, more than 3000 present on 1 February and from 21 February (perhaps earlier also) to 1 March. Main departures 22–25 March 1956, at least a week later than in any previous year. A small remnant, dwindling to six, remained until 15 April 1956 and two of these (one apparently unable to fly very well) stayed throughout the summer, departing some time after 13 August, on which date they were seen flying again after being flightless for at least three weeks.

GREENLAND WHITE-FRONTED GOOSE (*Anser albifrons flavirostris*)

1954–55: None.
1955–56: A pair, 9 and 10 January 1956. An adult apparently of this form, but mated to a typical *albifrons*, 24 and 25 March 1956.

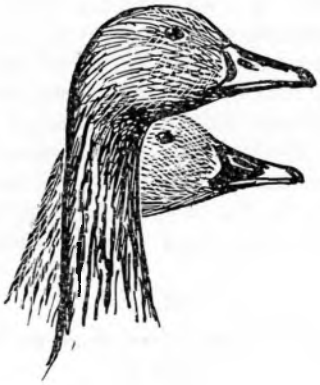
LESSER WHITE-FRONTED GOOSE (*Anser erythropus*)

1954–55: An adult, seen on four days between 13 January and 13 March 1955.
1955–56: At least six, perhaps eight. The first to be seen was a large juvenile: this was identified 10 and 23 January, 28 February and 7 March 1956 (by which date it was in adult plumage). A second juvenile, small, was seen on 23 January 1956. A juvenile seen on 11 and 12 March may have been the same bird, but seemed rather paler and larger. Between 8 February and 12 March 1956, 12 records of adults were made. These referred to four, or perhaps five, individuals. One, a rather small adult male, seen 6 and 7 March, was mated to a female *A.a. albifrons* with two young, but these were not hybrids. The three other adults were single: one seen between 8 February and 2 March; one 7 March; one 12 March. An adult seen 11 March could have been the second of these, or possibly the first juvenile.

Accepting the minimum of six individuals, the number of Lesser Whitefronts seen at Slimbridge since December 1945 is 30.

BEAN GOOSE (*Anser arvensis*)

1954–55: None.
1955–56: Two. One, first-winter, with a predominantly black bill, 29 February and 9 March 1956. One with a mainly yellow bill, 9 March 1956.



PINK-FOOTED GOOSE (*Anser brachyrhynchus*)

1954–55: Fourteen arrived 19 September 1954. Four separate increments increased the total to 114 on 9 October. During the rest of October and November, counts varied between 92 and 120 (6 November). Over 80 remained until 19 December, on 20th there were 55, but thereafter only one or two were seen, with the exception of a flock of 18 on 7 January 1955. Latest record, one 2 March 1955.
1955–56: Three arrived 14 September 1955. Increased to 72 on 28th (but there may have been departures as well as arrivals during the interval). Thereafter fluctuated between about 60 and a maximum of 94 (25 November) until 1 January 1956, 51 on 2 January, 44 on 3rd, three on 9th. Only one for most of the rest of the season (until 25 March), but 14 on 24 and 27 January, 24 on 28 January, six on 27 February and 1 March, three on 2 and 7 March.

BARNACLE GOOSE (*Branta leucopsis*)

1954–55: One 19 December 1954–13 March 1955. An apparent Barnacle × Whitefront hybrid, which could well have been the same bird as that recorded in February 1954, was seen between 3 January and 13 March 1955.
1955–56: One seen 11 March 1956. It is not possible to be sure that this was not a full-winged bird from the collection, but the tame flock (now numbering 13) showed no inclination to consort with the wild geese in the two recent winters, unlike their behaviour in 1953–54.

Occurrences of Scarcer Species of Geese 1946-56

The completion of ten seasons' observations provides a suitable opportunity for reviewing the occurrences of geese on the New Grounds (although little further will be said here about the European White-fronted Geese).

Pinkfeet have appeared annually in autumn, to leave again in late November or December—with only occasional stragglers later. First arrival dates have fallen between 14 September (1955) and 13 October (1951), six of the ten dates

lying between 19 and 24 September. Main departures have occurred as early as mid-November (1948, 1951) and as late as the first week in January (1956). Seasonal peaks have been at various times between 14 October (1947) and 25 November (1955)—usually numbers have remained near the maximum for several weeks, so that no particular significance can be attached to the peak date. The maxima have varied between 58 (1948) and 122 (1947). It may be recalled that during the 1930s the maximum numbers seen at the New Grounds were very much higher, varying between 550 in 1935 and 1250 in 1933 and 1934. Between 1938 (maximum 650) and 1941 (maximum 55) an abrupt fall occurred, though there are no details for 1939 and 1940. In the period 1941–46 the peak numbers lay between 55 and 110 (1943), that is at the same level as in recent years. There is no obvious relation between the size of the annual flock and the proportion of juveniles it contains, so that it probably does not comprise a completely isolated unit, returning year after year without additions from outside. The

TABLE I

Numbers of scarcer species and subspecies of geese seen on the New Grounds, 1946–56

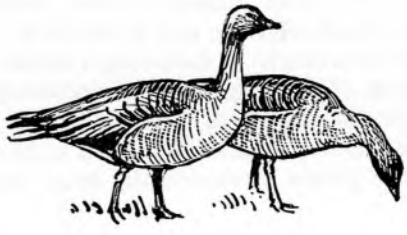
	1946 –47	1947 –48	1948 –49	1949 –50	1950 –51	1951 –52	1952 –53	1953 –54	1954 –55	1955 –56	Total	Age 1st w.	Older
Greylag ..	1	—	1	2	—	—	1	3	1	1	10	5	4
Greenland Whitefront ..	1	—	—	5	15	2	6	—	—	3	32	9	23
Lesser Whitefront ..	3	—	1	3	6	2	2	4	1	6	28	7	21
Bean	5	2	1	2	2	1	3	1	—	2	19	10	6
Light-bellied Brent ..	1	—	—	—	—	—	—	—	—	—	1	—	1
Dark-bellied Brent ..	1	1	—	—	—	1	—	6	—	—	9	6	3
Barnacle ..	3	—	—	1	1	—	2	4	1	1	13	3	3
Red-breasted ..	—	—	—	—	—	—	—	1	—	—	1	1	—
Total number of vagrants ..	15	3	3	13	24	6	14	19	3	13	113	41	61
Number of vagrant species or races represented ..	7	2	3	5	4	4	5	6	3	5	—	—	—

view that 'strangers' must be incorporated is supported by the presence of ringed birds in the flock. Only one Pinkfoot has ever been ringed at Slimbridge. (A number captured elsewhere in Britain have been released at Slimbridge, but there is no evidence that they have returned here in later years.) Most of the rings seen have been those used in Þjórsárver, Central Iceland, in the summer of 1953. Whether strangers join the 'Slimbridge group' in summer or in winter remains to be discovered: and until more geese are ringed at Slimbridge the places which the group visits after leaving here each winter remain unknown.

The numbers of other species and subspecies of geese seen on the New Grounds since September 1946 are shown in Table I. These numbers are all very small, but two species (Lesser Whitefront and Bean) may be considered regular, having

been found in nine of the ten seasons. These, and the Barnacles, differ from the remainder in that many of the individuals appearing are attached to Whitefronts, behaving as if they belonged to family parties, or were paired to Whitefronts. These three species are liable to encounter Whitefront flocks in their breeding-places, or places visited for the summer moult, as well as on passage, while the remaining species probably do not. All three have provided examples of adults paired to Whitefronts though only Bean × Whitefront and Barnacle × Whitefront have been identified at Slimbridge. (It may not be possible to recognise Whitefront × Lesser Whitefront hybrids.)

In the *Second Annual Report* (p. 16) it was suggested that strays are usually young birds. From the right-hand column in Table I it will be seen that 41 of 102 strays which could be classified by age were in their first winter. Field-counts and rocket-netting catches have shown that in the grey geese the proportion of first-winter birds in large flocks averages rather more than 30% (annual variation ranging from 20 to 46%). The observed proportion of young birds amongst the stray grey geese (31/85 = 36%), at Slimbridge is only a very little above average, so that the hypothesis scarcely remains tenable.



GOOSE RINGING IN 1955

Pink-footed Geese

An expedition with rocket-netting equipment spent most of October 1955 catching and ringing Pinkfeet in Scotland and England. Ten catches were made: one in Kinross, one Perth, one Midlothian, one Berwick, two Dumfries, two Yorkshire, two Lincolnshire. The total catch was 1295. 1144 geese were marked for the first time. Recaptures included six marked in Iceland in 1951 and 67 caught in Iceland in 1953, as well as 54 caught in previous years in Britain. Several recaptures had been handled on more than one occasion previously.

This was the sixth season of the Pinkfoot study. We continue to be very grateful to a very large number of people for their assistance as members of the netting team, or for permission to operate on their land, or for technical assistance.

The average catch in 1955 (130) was substantially lower than it had been in 1954 (197). This fall seems to have been due partly to the introduction of nets made of heavier thread than that used previously. These nets take longer to settle after being fired over the geese and so allow a larger proportion of the birds in the catching area to escape. The new nets have the advantage of being less easily damaged. Experiments are in progress to increase their catching efficiency.

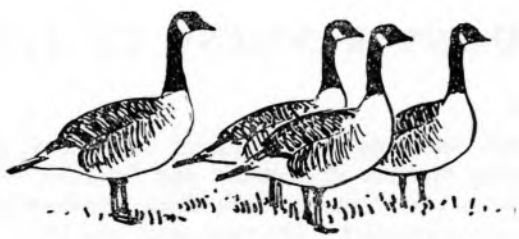
Technical innovations in 1955 included new rings of thicker and harder metal, extensive modification to the electrical equipment used to fire the rockets, decoys made of plastic materials, and the use of recorded goose calls in order to attract geese into the catching area. Both the plastic decoys and the recorded sounds proved unsuccessful and these techniques need further development.

Canada Geese

Two 'round-ups' of moulting Canada Geese were made in June 1955. On 18 June, at the invitation of Lord Gretton, 108 were caught at Stapleford Park, Leicestershire. Thirty were ringed and released again (together with 16 marked at Stapleford in 1953). The others were removed.

On 23 June a similar but less successful round-up was carried out at Swinton, Yorkshire. Twenty-one adults were ringed and released and 35 goslings (the entire seasons production) were removed.

The surplus geese taken from Stapleford and Swinton were released in Anglesey, Staffordshire, Pembrokeshire and Hyde Park. This method of conservation by redistribution seems to be becoming a regular activity of the Trust. The artificial distribution of a species may be condemned by the purist who likes to pretend that the distribution of large animals in a country like Britain can remain uninfluenced by human activities. But to us the artificial scattering of populations that have grown inconveniently large seems preferable to their destruction.



DUCK RINGING 1954-56

In 1954 the Trust assumed a large measure of administrative and financial responsibility for duck ringing in Britain. In the last two seasons systematic ringing has been undertaken at eight stations. Brief accounts of the activities at each are given below, and the number of ducks marked are recorded in Tables I and II. The 1955–56 total of 5882 (including ringing at the smaller stations) is the highest number of ducks yet ringed in any European country in one season.

It will be noted that all the ringing stations are in the southern half of England, and Wales. There is urgent need for ringing to be undertaken farther north, and in Scotland and Ireland. Unfortunately, the Trust is not at present able to spend more money on operating ringing stations.

ABBERTON

This station, near Colchester, Essex, is operated by Major-General C. B. Wainwright, C.B. It had a comparatively meagre catch in 1954–55, but a quite outstanding one (3636 ducks) in 1955–56. The traps are operated throughout the year, and many thousands of birds other than wildfowl are also marked (see 7th Annual Report, pp. 25–28).

ABBOTSBURY

The decoy at Abbotsbury, Dorset, was established in 1656. Since 1937 a proportion of the annual catch has been ringed and released. The decoy is owned by the Earl of Ilchester and operated for him by Mr F. Lexster, who carries out the ringing. The annual catch in recent years has been small, the decoy being a difficult one to operate. Forty-five Mallard and 165 Teal were ringed in 1955–56.

BERKELEY NEW DECOY

This is the Trust's own decoy, at Slimbridge. The 1954–55 catch here was only a slight improvement on the disappointing one of the previous season. An exceptional feature was the complete failure to catch Teal. Only one was captured during the whole season, and that had been ringed in the previous

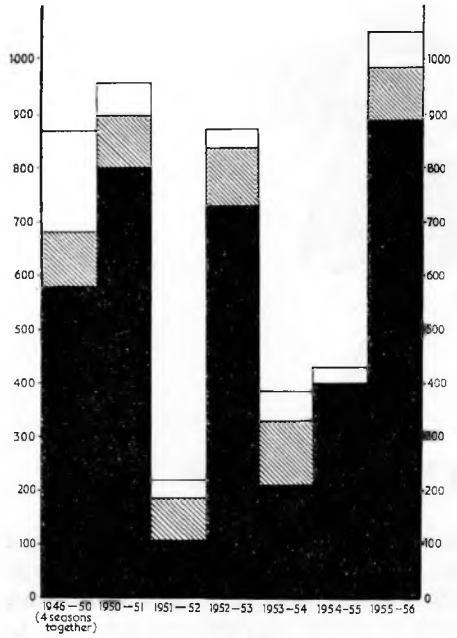


Fig. 1.—Ducks newly-ringed in Berkeley New Decoy, 1946–56. Black columns show numbers of Mallard marked; hatched columns Teal; and the unshaded columns the totals for all other species together (Wigeon, Pintail, Gadwall, Shoveler, Garganey and Shelduck).

year. Yet the numbers and movements of Teal in the nearby estuary were not abnormal.

1955–56 provided a record catch (1047 ringed), this being the first time that more than 1000 ducks have been marked there in a season. The total number of captures was very much higher (1716), but the large number of ducks caught for a second time included very few marked in previous years. The histogram (Figure 1) shows how great a preponderance of Mallard there is in the catch. In 1955–56 the number of Teal ringed (95) returned to a normal level. The increase in the total catch was probably due largely to heavy baiting of the pipes being continued until Christmas. In earlier years few ducks were taken after October.

BOROUGH FEN DECOY AND DEEPING LAKE

Mr Billy Williams, who operates this ancient decoy for the Trust, continues to be dogged by bad luck. The early part of 1954–55 was quite successful, but a heavy snowfall in January 1955 broke down all the pipes and stopped catching just at the time when the largest hauls of Teal were expected.

Mr Williams worked exceptionally hard to rebuild the decoy by the beginning of August 1955, but the season 1955–56 proved even more disastrous. The decoy dog, Amber, had to be destroyed. The early autumn take of Mallard was unusually small—apparently because of the poor success of the local breeding population. And in January 1956 another heavy snowstorm again wrecked the pipes, just at the onset of the cold spell which produced record catches at Abberton and which might have done the same for Borough Fen.

The Trust is negotiating for a 21-year lease of the decoy.

Mr C. Dandridge is now operating traps at Deeping Lake, near Borough Fen, in collaboration with Mr Williams. The ducks caught there in 1954–55 and 1955–56 are included in the Borough Fen totals in Tables I and II. All the diving ducks listed were captured at Deeping Lake.

TABLE I

Ducks ringed at principal ringing stations in England and Wales, 1954–55

Species	Abberton (Essex)	Slimbridge (Glos.)	Borough Fen (Northants)	Orielton (Pembroke)
Mallard	287	399	741	18
Teal	355	—	667	35
Wigeon	192	7	14	4
Pintail	7	4	3	—
Shoveler	12	7	33	—
Garganey	2	—	—	—
Gadwall	—	13	1	—
Tufted Duck	16	—	20	2
Pochard	5	—	3	—
Smew	1	—	—	—
Shelduck	—	2	—	—
	877	432	1482	59

TABLE II

Ducks ringed at principal ringing stations in England and Wales, 1955–56

Species	Abberton	Slimbridge	Borough Fen	Orielton
Mallard	326	886	254	26
Teal	3123	95	61	434
Wigeon	108	8	20	25
Pintail	10	21	6	1
Shoveler	5	29	8	10
Garganey	7	2	1	—
Gadwall	1	6	—	—
Scaup	4	—	—	—
Tufted Duck	48	—	2	19
Pochard	4	—	—	—
	3636	1047	352	515

HOW HILL, LUDHAM

By C. A. and M. R. Boardman

This ringing station is situated on the Norfolk Broads in the valley of the River Ant a few miles from the coast. A great many ducks use the Broads during the winter as resting grounds throughout the daytime and flight at dusk to feed on the neighbouring marshes. Thus it is especially favourably located for carrying out ringing operations.

The ringing of ducks was begun here in 1936, at which time very little such work was being undertaken, with the notable exception of Orielton Decoy in Pembroke. Since that date ringing has continued spasmodically up to the present time, and in fact has taken place during ten seasons only. None could be done during the war years, and in several others it could not be undertaken for one reason or another.

Since 1936 668 Mallard and 98 Teal (all wild birds) have been ringed. Of these 30 have been recovered on the continent of Europe and 161 in Great Britain (including Eire), making a total of 191 recoveries. It has taken a long time to get a recovery from behind the Iron Curtain, but a Teal ringed here in September 1951 was reported recently as having been recovered near Leningrad in October 1953. Sometimes there is a considerable time lag in the reporting of recoveries. For instance, a Mallard was ringed here in 1937, shot in Sweden in 1940, and reported in 1950! This delay may have been the responsibility of Hitler.

In addition to these recoveries several ducks ringed here have been recaught in subsequent seasons.

The ducks are caught by gamekeeper Robert Smithson in traps he has made on their feeding grounds, and he also puts on the rings. It is not proposed to describe these traps in detail but there are three of them erected in shallow water. The best catches are usually made in frosty weather when ice can be broken and removed only near the traps which are baited with grain.

It has not been possible to do as much ringing as one would have liked, but what little has been done has been well worth the effort—in other words, the recoveries have been sufficiently numerous and interesting.

It has been found impracticable to begin ringing until the end of the shooting season and so most of it is done in the month of February. This seems to work out very well because it is at this time of year that ducks find it hardest to get sufficient food, and are therefore more easily enticed into traps than at other times of the year. Furthermore, what can be more beneficial to the duck population than to feed as many as possible near its breeding time especially during hard weather. In the great freeze-up of 1947 at least 200 Mallard were kept alive here on weed seeds and odd scraps. So hungry did they become that they used to flight to the food in the early afternoon in broad daylight and undoubtedly without this source of nourishment many would have starved to death.

The ringing has been confined to Mallard and Teal because although many other species occur here they are much less numerous and a great deal more difficult to catch.

MILEHAM

By Philip Wayre

Nearly 300 ducks have been ringed at Mileham in Norfolk during the four seasons 1951–55. Originally used for flighting duck, the pool is situated in the centre of a large arable field, and being some way from a road or any buildings, it is secluded. It is roughly half an acre in extent and oval in shape, the northern end is deep but the southern end, where the traps are situated, is shallow. This end dries out in summer and grass grows, which, when flooded in winter, attracts ducks. There is no cover round the pool, but during successive cleaning-out operations, the spoil has been left round the edges and now forms quite a high bank sheltering the water. No ducks have been shot here for the last eight or ten years.

The first trap was built in December 1951 and is 8 feet square and 6 feet high, and has three 'funnel entrances,' the whole thing being made of 1½-inch mesh wire netting over a frame of ash poles. A second trap was added later with two more funnel entrances, this trap being about 12 feet × 5 feet × 4 feet high. Water level round the traps varies according to the rainfall, but it is usually from 6 inches to 2 feet from November to April. No ducks have been caught when there has been less than 6 inches of water in the traps.

Feeding is carried out daily according to the number of ducks using the pool—about one and a half pails of barley being the average. This is scattered in the shallow water, and the funnels into the traps are liberally baited. Barley is always used for food. No decoys are used in the traps.

The traps are normally worked from about November to the end of March if water conditions allow, but most winters there are times when the whole pool is frozen hard and no ducks can be caught.

Normally very few ducks are caught during moonlight periods. The opposite is the rule if the water is frozen but the area in, and around, the trap kept free of ice. Under these conditions good catches have been made under the moon. Several catches of over 20 ducks have been made in one night and the record to date is 30 Mallard and one Teal. This was on a night of a full moon with the pit partly frozen over. The traps are tended in daylight.

Numbers of ducks using the pool are counted in at evening flight about every month, and vary from as low as 20 to a peak of well over 100. Largest numbers are usually reached in January. After ringing has been going on for a few weeks each season, the number of recaptures increases daily, until often the majority of ducks caught have already been ringed.

Ducks only use it as a feeding place by night, and it is at least four miles from any large water where they normally rest in the daytime.

Summary of Ducks caught from 1951–52 to 1954–55

Season	Species	Sex	Number Ringed	Recaptures	Number Caught
1951–52	Mallard	Male	5	0	16
	Mallard	Female	2	0	14
	Teal	Male	0	0	22
	Teal	Female	0	0	10
		Total ringed	7	Total caught	62
1952–53	Mallard	Male	50	36	86
	Mallard	Female	38	20	58
	Teal	Male	4	7	11
	Teal	Female	4	1	5
		Total ringed	96	Total caught	160
1953–54	Mallard	Male	59	94 (Both sexes)	153
	Mallard	Female	62	—	62
	Teal	Male	0	1	1
	Teal	Female	0	0	0
		Total ringed	121	Total caught	216
1954–55	Mallard	Male	24	15	39
	Mallard	Female	32	22	54
	Teal	Male	2	3	5
	Teal	Female	2	2	4
		Total ringed	60	Total caught	102

From the total of 284 ducks ringed there have been 45 recoveries to date, and of these 13 have been from abroad. Two Mallards ringed in February 1954 were shot within three days of each other in April the same year, one near Leningrad and the other on the Volga.

Of the total of 540 ducks caught in four seasons, 256 have been caught during dark periods and 284 during moonlight periods.

NOTE.—No ducks were caught at Mileham in 1955–56 because the pond was dry until January, and Mr Wayre was away after that.

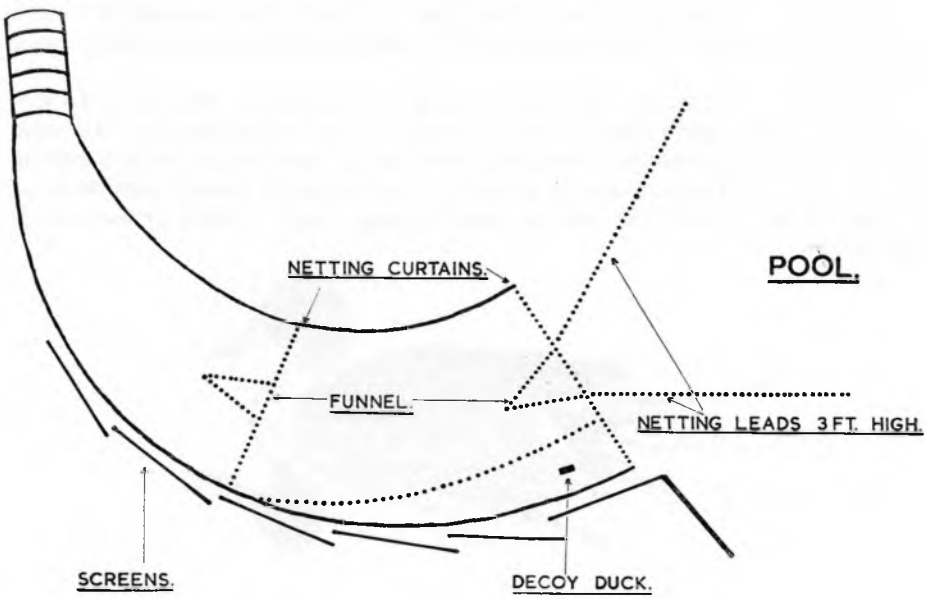
ORIELTON, 1955-56

By R. M. Lockley

One thousand and six birds were caught at Orielton in the winter of 1955–56, of which 470 were retraps. Wildfowl newly-ringed were 536, made up of 434 Teal, 26 Mallard, 25 Wigeon, 19 Tufted Duck, 11 Coot, 10 Shoveler, 8 Moorhen, 1 each Pintail, Snipe and Manx Shearwater. This is a modest increase on

recent seasons when the decoy was left almost abandoned because of lack of local interest and funds, and a supervisor. Recoveries have been as interesting as ever, with many from the Baltic and Russia.

The traps were repaired in August 1955. The one pipe which has survived years of neglect and occasional snowfalls, was, as an experiment, made into an automatic trap by netting over the front and putting a small funnel trap-entrance at water level. This was later improved by putting a further netting trap-partition half-way up the pipe to prevent the trapped ducks flying back at speed against the netting at the entrance to the pipe. It was successful, and also rendered catching in the end box much simpler. Once trapped in the entrance half, ducks soon swam upstream through the second funnel into the narrow end. A decoy duck lived happily in a lane of water and land netted off on one side of the pipe (see sketch) : receiving a feed of grain each evening, it quacked to good purpose, and almost lured in a dozen Whooper Swans during the cold spell of early spring 1956. This 'pipe-trap', with four small lakeside traps, caught over 1000 waterfowl.



The new owner of the Decoy Lake, Mr David Mason, has permitted ringing to continue as before. A small executive committee has been formed by the Council of the West Wales Field Society to advise on and manage the Decoy; serving members are W. A. Cadman, A. L. Johnson, R. M. Lockley and Peter Scott. The advice of Mr Scott, and the generous assistance of the Wildfowl Trust in securing the adoption of all the ducks recently ringed is gratefully acknowledged.

Before flowing into the Decoy Lake the stream which feeds it supplies three large ponds on the contiguous walled estate of Orielton itself, a wooded and agricultural property of 260 acres which is a private nature reserve and research station owned by the writer. On these ponds we have a collection of wild, pinioned and wing-clipped waterfowl, including Canada, Pinkfeet, Greylag,

Lesser Whitefront, Ross's Snow, Ashy-headed, Barnacle and Upland Geese, and various species of duck. This collection has begun to attract flights of wild duck, especially in winter.

Visitors wishing to see Orielton in its early stage of development as a wildfowl refuge will be welcomed if they communicate with the writer at (two words only!) Orielton, Pembroke.

THE DUCK ADOPTION SCHEME

Under this scheme, on payment of five shillings, the subscriber is allotted a duck (or goose, if preferred) and given particulars of its species, the number of its ring and the date and place of ringing. If the bird is later recaptured or recovered the subscriber is notified of the date and place of recovery : and all subscribers receive for the next two years, after paying a subscription, a summary annual report of interesting recoveries.

Members wishing to adopt ducks or geese should write to The Assistant Secretary, The Wildfowl Trust, Slimbridge, enclosing five shillings for each bird. Adopted Duck Tokens (analogous to Book Tokens) are available, price six shillings.

The scheme fortunately continues to retain its popularity. In 1954 and 1955, the seventh and eighth years of its existence, the gross incomes received were £763 and £789 respectively. After the deduction of the costs of administration and of the annual report sent to adopters these represent annual contributions of about £500 towards the cost of duck ringing, nearly a third of the annual expenditure.

RECOVERIES OF RINGED DUCKS

In earlier Reports all recoveries of ducks ringed at Slimbridge, and later at Borough Fen, were presented in tabular form. But now that ringing at other stations comes within our purview the volume of recoveries has become too great to make the publication of complete lists practicable. Since the publication of selected recoveries may be very misleading to the student of migration or of population problems it seems better to avoid this practice and attempt instead to summarise the results of ringing in the form of reports on particular species. (The paper at pp. 47–51 is the first example.)

Complete records of all recoveries are kept both at the headquarters of the Bird Ringing Committee of the British Trust for Ornithology, in the British

Museum (Natural History), and at Slimbridge. Details of some recoveries, particularly from abroad, continue to appear in the annual accounts of ringing published by the B.T.O. in *British Birds*. The latest such report (R. Spencer 1955: *British Birds* **48**: 461–498) includes a map illustrating the distribution of ringed Teal recovered abroad in 1954.

For the benefit of students not able to consult the original sources, the Trust hopes to be able to publish from time to time 'complete' recovery lists. Since the expense of printing such lists is heavy it will probably be necessary to limit them to a small number of duplicated copies.

WILDFOWL COUNTS IN THE BRITISH ISLES

By G. Atkinson-Willes

THE Wildfowl Count season of 1954–55 proved to be the most successful so far. A record number of waters were counted regularly, 40 more than in the previous season, and a peak total of almost a quarter of a million wildfowl were observed. This most satisfactory progress is best demonstrated by Table I which shows the number of waters covered regularly each month throughout the season and the number of those for which occasional or sporadic returns have been received.

TABLE I

The Progress of Wildfowl Counts in the British Isles

	1948–49	1949–50	1950–51	1951–52	1952–53	1953–54	1954–55
Regular Counts:							
England	185	242	219	368	327	345	400
Scotland	37	50	53	85	77	91	93
Wales	7	7	3	7	6	14	16
Ireland	—	—	—	18	39	36	17
	229	299	275	478	449	486	526
Occasional Counts:							
England	253	163	166	137	124	105	141
Scotland	86	37	52	42	39	22	32
Wales	5	6	7	5	5	9	11
Ireland	—	—	—	12	3	6	3
	334	206	225	196	171	142	187
Total Regular and Occasional Counts ..	573	505	500	674	620	628	713

The response to the request for information on wildfowl on minor waters is reflected in the increase in the number of occasional counts. Last season 122 waters were covered for the first time, 53 of them regularly, bringing the total of waters for which information of varying quality is available to about 1225.

THE RESULTS OF THE 1954–55 COUNTING SEASON

In order to make the fullest use of the record number of regular counts in 1954–55, the results for eight species of common wildfowl are examined for this single season. The species selected are Mallard, Teal, Wigeon, Pintail, Shoveler, Pochard, Tufted and Goldeneye.

It cannot be too strongly emphasised that the wildfowl count results do not in any way represent a census of the total numbers of the species resident or wintering in the British Isles. Only 526 of the many thousands of waters in the country are visited regularly, but, as many of the main wildfowl habitats are covered, it is maintained that fluctuations and trends in the populations on them will reflect similar trends in the total population of the country.

Before considering the records of the eight species, the reliability of the counts on each of the nine set dates must be assessed. The figures are based on a sample of 526 waters, 146 coastal and 380 inland, and although all these are classed as 'regular', in fact some were not visited on one or more occasions. In these cases an estimated figure based upon the remaining counts has been inserted, and this, naturally, is a serious source of possible error. The number and size of these interpolated estimates have a direct bearing on the reliability of the count in question, and it has been decided, rather arbitrarily, that an average of more than one interpolation in ten counts must render the grand total for that month open to suspicion. Similarly if the sum of the interpolations in any one month amounts to more than 10% of the grand total, the possible error is too great to be acceptable.

The size of the interpolations, being dependent on the nature of the uncounted waters and on the habits of the various species, must be considered individually, but the number of interpolations on each date remains constant. Table II below shows in the left-hand column the size of the full samples, and in the remaining columns the number of uncounted waters on each date, for which interpolations have been made. The numbers in italics amount to more than one-tenth of the sample.

TABLE II

Number of Uncounted Waters in 1954–55 Sample

1954–55	Sample Size	Aug. 1	Aug. 29	Sept. 26	Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20
England and Wales	377	*153*	*108*	*75*	21	8	20	19	35	33
Scotland	133	*37*	*23*	*20*	9	10	7	*33*	*54*	14
Ireland	16	*16*	*10*	2	—	—	—	2	1	4
Total	526	*206*	*141*	*97*	30	18	27	54	*90*	51

(Cumberland, Northumberland and Durham are included with the Scottish returns)

Summer holidays resulted in a large number of counts being missed in August and September. This will always be the case, it is feared, but the returns which do come in carry much useful information on the numbers of juveniles present, and may later be used in a survey of breeding habitats. From October onwards a high proportion of waters were covered except in Scotland in January and February when appalling weather and road conditions prevented many counters from reaching isolated places.

In the diagrams, recording the numbers of the eight selected species, which follow, the counts for 24 October, 21 November and 19 December may be regarded as reliable, unless the size of individual interpolations is too large to be acceptable. On 23 January the numbers of waters uncounted in Scotland was high, but over the country as a whole not too high. This unfortunately was not so on 20 February when an average of one water in six of the national sample went unvisited. The March count is adequate.

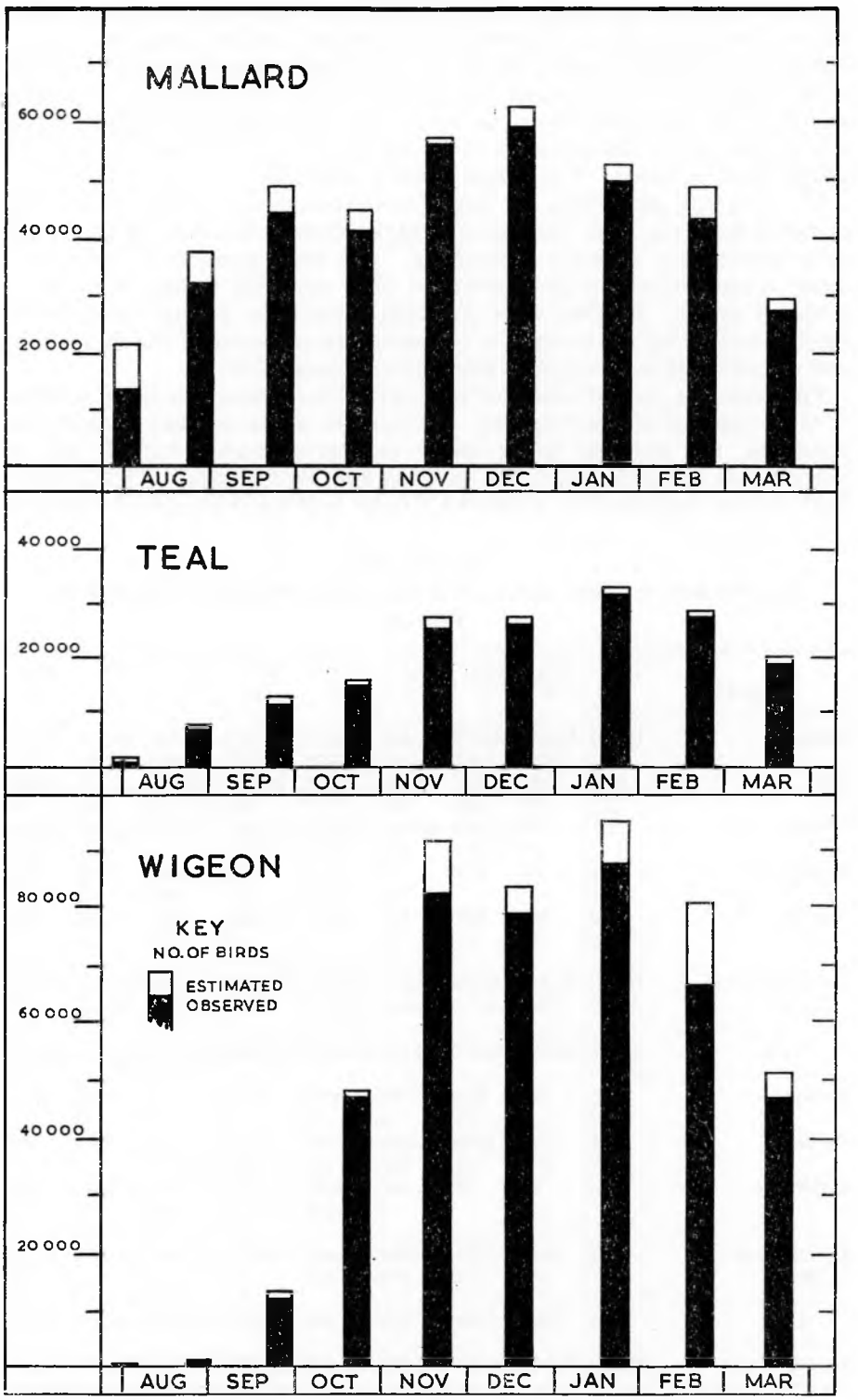
The diagrams themselves are largely self-explanatory. The black portions of each column represent the number of birds actually observed, and are reliable data, subject only to errors in counting. The white portions at the head of many columns represent the numbers of birds estimated to have been on the unvisited waters. In some cases they alter slightly the pattern shown by the black columns, but are thought to represent a truer picture of the fluctuations, and to make adjoining columns more closely comparable.

For those who prefer to compare statistics Table III shows the actual numbers of birds observed and interpolated; for those to whom columns of figures are anathema, the diagrams which follow are recommended, but all may be interested in the grand totals for dabbling and diving ducks. The figures in light type are the numbers interpolated, those in bold type were actually observed.

TABLE III

The Numbers of Eight Species of Wildfowl Recorded in the British Isles 1954–55

1954–55	Aug. 1	Aug. 29	Sept. 26	Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20
Mallard	**14,391**	**32,061**	**44,118**	**41,861**	**56,235**	**59,067**	**49,715**	**43,733**	**27,024**
	7095	5937	5163	3211	1219	3635	2900	4645	1825
Teal	**1230**	**6699**	**11,768**	**14,675**	**24,935**	**25,370**	**30,781**	**27,145**	**18,607**
	377	445	664	602	1290	993	1185	625	745
Wigeon	**257**	**990**	**11,688**	**47,501**	**82,745**	**79,355**	**88,279**	**66,605**	**46,910**
	3	20	417	577	9185	4045	6495	13,575	4665
Pintail	**8**	**63**	**157**	**749**	**1071**	**1932**	**2602**	**4455**	**4172**
	10	—	—	12	25	150	100	40	30
Shoveler	**258**	**425**	**569**	**897**	**1201**	**1259**	**1096**	**1800**	**1696**
	220	114	83	81	5	100	127	9	32
Dabbling Ducks ..	**16,144**	**40,238**	**68,300**	**105,683**	**166,187**	**166,983**	**172,473**	**143,738**	**98,409**
	7705	6516	6327	4483	11,724	8923	10,807	18,894	7297
Total	**23,849**	**46,754**	**74,627**	**110,166**	**177,911**	**175,906**	**183,280**	**162,632**	**105,706**
Pochard	**575**	**755**	**962**	**2705**	**5579**	**7839**	**6376**	**4008**	**3445**
	15	2	109	45	35	49	55	45	65
Tufted	**1276**	**2191**	**2260**	**3478**	**7307**	**9222**	**7463**	**7862**	**7602**
	615	497	265	550	162	88	250	295	296
Goldeneye	**4**	**45**	**62**	**446**	**1444**	**1150**	**1105**	**1004**	**1358**
	—	—	—	5	130	8	140	184	41
Diving and Sea Ducks	**1855**	**2991**	**3284**	**6629**	**14,330**	**18,211**	**14,944**	**12,874**	**12,405**
	630	499	374	600	327	145	445	524	402
Total	**2485**	**3490**	**3658**	**7229**	**14,657**	**18,356**	**15,389**	**13,398**	**12,807**
GRAND TOTAL ..	**26,334**	**50,244**	**78,285**	**117,395**	**192,568**	**194,262**	**198,669**	**176,030**	**118,513**


MALLARD
60 000
40 000
20 000
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
TEAL
40 000
20 000
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
WIGEON
KEY
NO. OF BIRDS
ESTIMATED
OBSERVED
80 000
60 000
40 000
20 000
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR

THE DABBLING DUCKS

MALLARD (*Anas platyrhynchos*)

The pattern of the seasonal fluctuation in the numbers of Mallard recorded in the British Isles which is shown in the upper of the diagrams opposite coincides closely with the results of other seasons. The late November-early December peak of previous years is present, and the subsidiary peak in early October is also noticeable. The count at this date in 1954–55 is admittedly unreliable owing to the high number of interpolations, but it will be seen that on 26 September more birds were seen on the 429 waters covered than on the 496 visited on 24 October.

The pattern of the results from the various areas, which have been incorporated in the diagram, is similar to those of previous years. In Scotland there was a November peak of c. 15,000, but the subsidiary peak in February, apparent in other years, was, if present, masked by bad weather and poor cover. In England and Wales a peak of over 46,500 was recorded on 19 December, about 6000 more than on the preceding and following dates. In Ireland, in spite of a smaller sample than usual, a marked peak of 1800 birds was once more recorded in October.

TEAL (*Anas crecca*)

The numbers of Teal recorded in the Wildfowl Counts have not been published hitherto, but the results of the 1954–55 season are of the same order as those in previous seasons. It will be seen that the peak total of just over 30,000 amounts to about half that of the Mallard and to a third of that of the Wigeon. These proportions do not *necessarily* indicate the relative sizes of the populations of the three species, but they may do so. The numbers of Mallard and Wigeon are spread fairly evenly over the country, but the Teal population seems to be concentrated in the south and Midlands of England. Less than one-tenth of the Teal were observed in Scotland and north England, compared with a quarter of the Mallard and Wigeon.

WIGEON (*Anas penelope*)

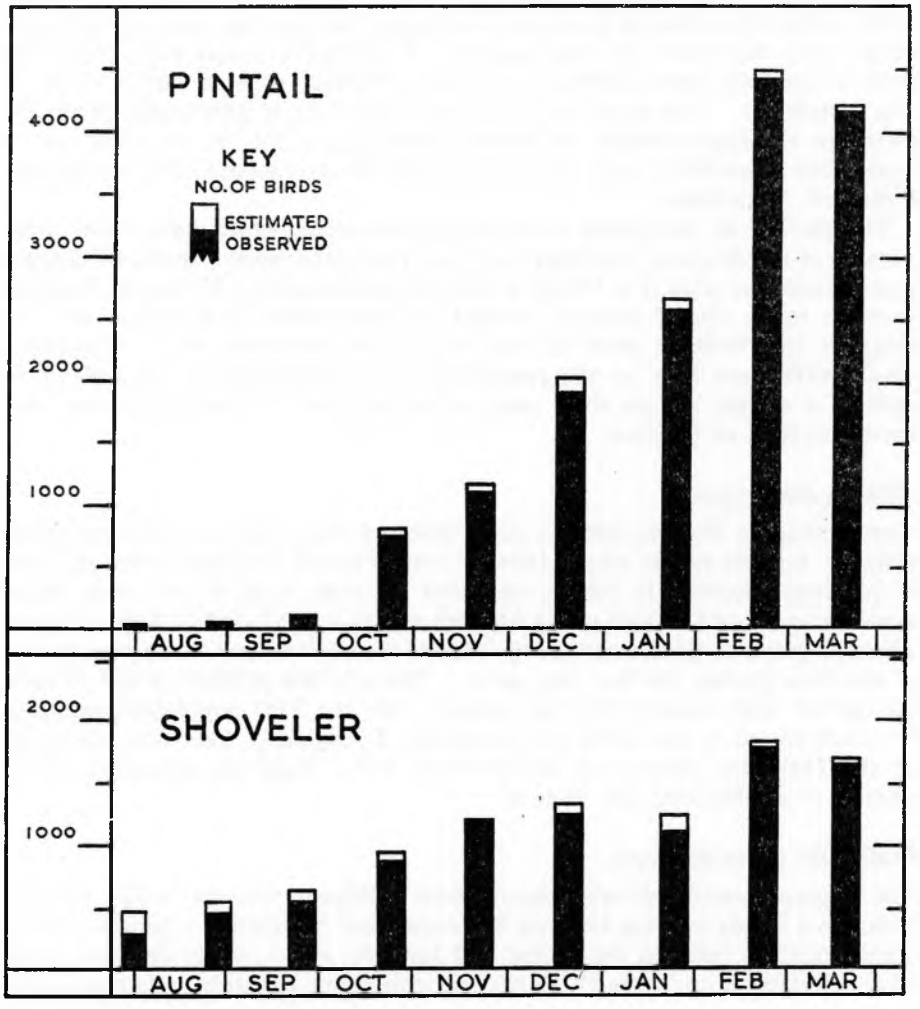
The diagram opposite showing the numbers of Wigeon recorded during 1954–55 indicates a steady increase between September and November, a period of fairly stable numbers between November and January, and a steady decrease thereafter. Reference to Table IV shows that this result conceals variations in the

TABLE IV

Wigeon in the British Isles, 1954–55

	Sept. 26	Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20
England and Wales ..	*3136*	13,448	49,994	52,647	66,428	53,842	40,613
Scotland	*3926*	23,426	*25,819*	19,768	19,200	*18,883*	8331
Ireland	5043	11,204	16,117	10,985	*9146*	7455	*2631*
Total..	12,105	48,078	91,930	83,400	94,774	*80,180*	51,575

records from different parts of the country. In it are given the numbers counted in England and Wales, Scotland and Ireland. Figures in italics contain an unduly high proportion of estimates, and may be unreliable.



It will be seen that in England and Wales there was a sharp increase between October and November, no real change between November and December, but that a further marked increase took place in January. In Scotland the peak level was reached early, in October, and thereafter there was a slow decrease until February. In Ireland the peak is most noticeable in November. It is thought that the Irish figures and their effect on the national total must be treated with reserve. The cover there is limited, being confined mainly to the north-east, and the November peak may represent no more than an influx of birds, concentrated at the time of arrival, but later dispersed over the remainder of the country into uncounted areas.

PINTAIL (*Anas acuta*)

The diagram of the numbers of Pintail observed in the British Isles in 1954–55 is of great interest in that it indicates something of the habits of a bird of whose movements comparatively little is known. The majority of the winter population is thought to be concentrated on less than 25 favourite resorts of which possibly the largest, in the N.W. Midlands, is not counted regularly. It is known, however, from sporadic reports that this flock is normally several thousand strong. In past years large numbers have been recorded as early as mid-October, and it will be appreciated that the inclusion of records for this flock might materially alter the pattern presented in the diagram.

In Table V are shown the numbers of Pintail observed in various parts of the country, and in the left-hand column, the number of localities in which more than 100 birds at the peak were recorded.

TABLE V

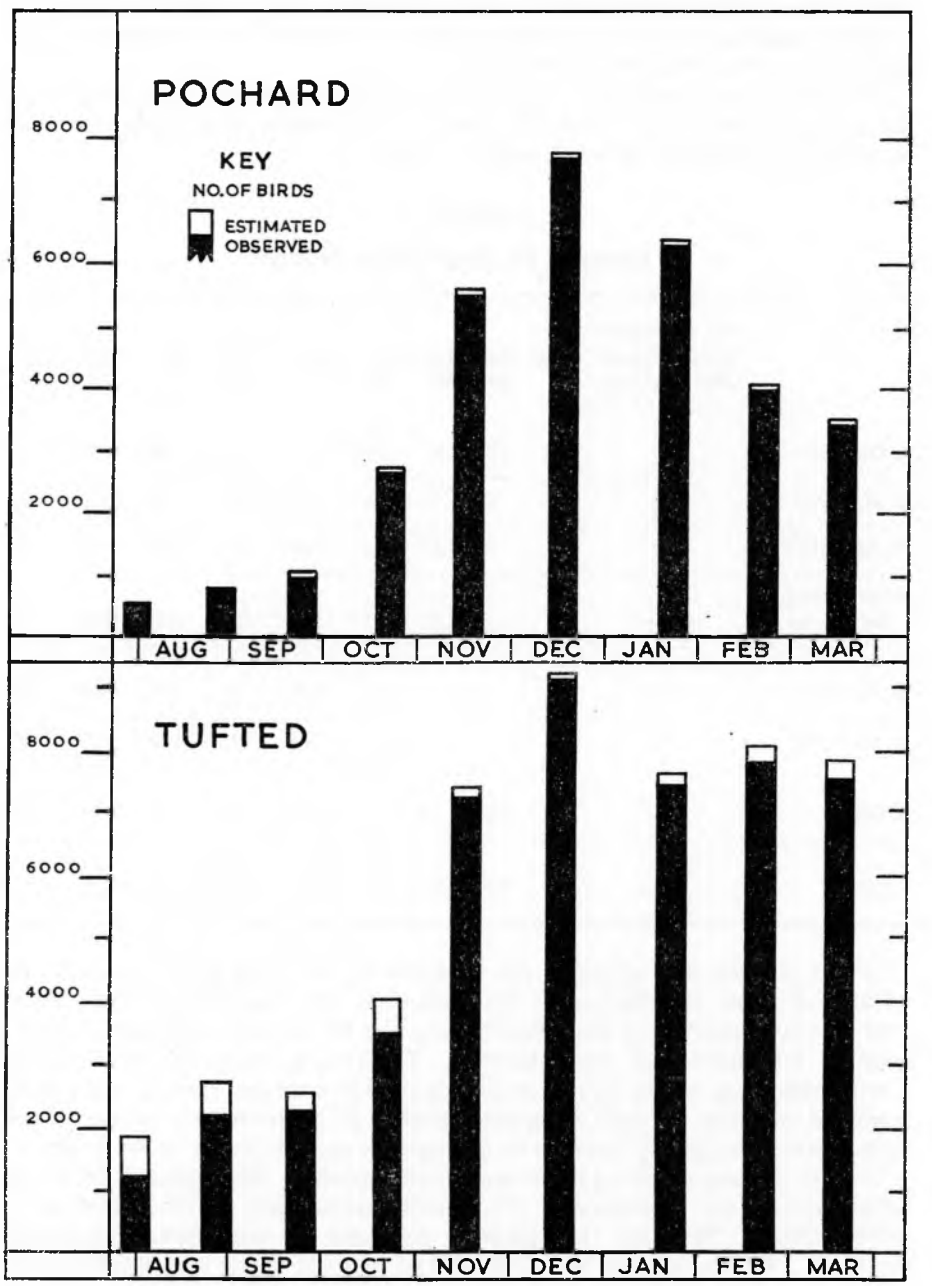
Pintail in the British Isles, 1954–55

	No. of Waters carrying more than 100 birds	Aug. 1	Aug. 29	Sept. 26	Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20
S. England ..	9	12	21	63	280	367	789	1345	609	401
E. Midlands ..	2	6	2	7	19	95	551	409	2918	3302
W. Midlands	2	—	—	43	143	196	471	305	284	144
E. Scotland and the Border ..	1	—	—	35	111	116	105	200	142	83
W. Scotland ..	2	—	—	—	15	104	10	260	305	145
N. Scotland ..	1	—	—	4	90	44	91	100	120	92
Ireland ..	1	—	40	5	104	174	65	90	117	35
Total ..	18	18	63	157	762	1096	2082	2709	4495	4202

It will be seen that although the numbers of birds are generally small, the number of places on which more than 100 birds were recorded is high. Moreover, on three-quarters of the inland waters, and two-thirds of the coastal waters counted, no Pintail at all were observed. This stresses the point that to obtain a true indication of the status of Pintail in this country, records are needed from the majority of their favourite resorts. If observers are aware of any such places, it might be possible to arrange for special counts to be made.

In spite of these rather cautious comments, however, the results of the counts follow closely the summary of the Pintail's movements in the *Handbook of British Birds:* 'Numbers of passage migrants in most years apparently small. . . . Return passage very well marked in some years, mid-March to end

of April . . .' They differ only in one respect from the suggestion in the Handbook that Pintail occur inland 'fairly often, but irregularly and in very small numbers.' The majority of the birds recorded in the East Midlands area in February and March were on freshwater flooding in the Fenland of Cambridgeshire. I. C. T. Nisbet, the Wildfowl Count Organiser, states in *British Birds*, **47**, p. 396, that this has now been a regular habit since 1946–47.



SHOVELER (*Anas clypeata*)

The *Handbook of British Birds* suggests that the British population of Shovelers is composed of a complex combination of summer residents, passage migrants and winter visitors. British breeding birds are summer residents arriving with passage migrants in late February and March and leaving in August and September. Some emigrate, others disperse within Britain. Passage migrants and winter visitors arrive on the East coast, probably from Holland, Denmark and N. Germany from mid-September to November and some pass to Ireland. The return passage in spring is much better marked than the autumn passage, and takes place between the end of February and the end of April, but mostly in March.

Such an account could explain almost any fluctuations shown in the results of the wildfowl counts, and it is evident that a specialised study of the species is needed if further detailed information is to be forthcoming.

THE DIVING AND SEA DUCKS

POCHARD (*Aythya ferina*) **and TUFTED** (*Aythya fuligula*)

One of the most interesting points brought out by the Wildfowl Counts results is the low numbers of diving ducks observed, compared with the numbers of dabbling ducks. Of the eight species under review Tufted are, second to Mallard, the duck most frequently recorded on inland waters and Pochard are the fourth most widely distributed, but they are also the species least often seen on salt water, where the big concentrations of dabbling ducks are found. Moreover, flocks of over 500 of both Pochard and Tufted are rare, and the number of waters carrying over 100 birds was found to be only 19 for Pochard and 30 for Tufted.

It will be seen that for both species a peak was reached in mid-December after a swift increase from the summer level which may reasonably be supposed to consist largely of breeding birds. After December a decrease in numbers is indicated but care is needed in interpreting this trend. Diving ducks, being dependent on deep open water for their food supply, are more vulnerable to frost conditions than the majority of the dabbling ducks, which can often find adequate food in shallow fast-flowing streams or by grazing, and which may be content to roost on the ice. In the cold weather of January and February 1955, therefore, the apparent decrease in numbers of Pochard and Tufted might represent no more than a concentration of the birds onto open waters not included in the cover of the counts. In addition estimates of the numbers on unvisited waters, of which there were many at this time owing to snow and icebound roads, become fraught with difficulty, and hinge on the probable extent of the ice on the waters concerned.

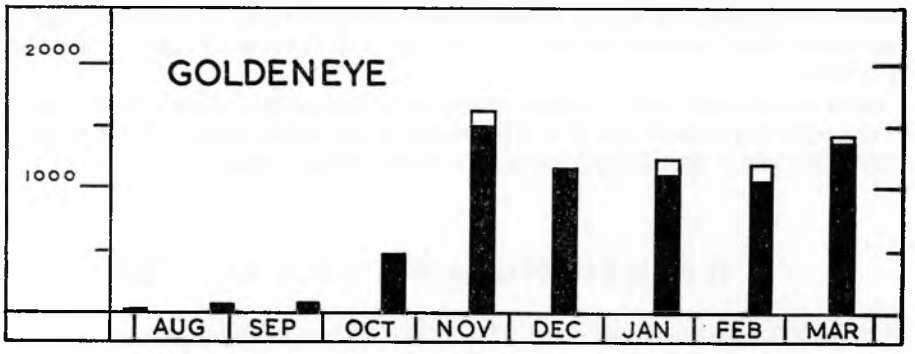
By March, however, conditions were normal and the final count which was almost as reliable as that of 19 December, provides a comparison of the populations observed in mid-winter and early spring.

GOLDENEYE (*Bucephala clangula*)

The numbers of Goldeneye recorded in the Wildfowl Counts are the smallest of the eight species considered here, but they are not the species most seldom seen. At one time or another during the 1954–55 counting season Goldeneye

were recorded on just over 40% of both inland and coastal waters, being more widely distributed than Pintail and Shoveler inland and than Pintail, Shoveler, Pochard and Tufted on the coast.

It will be seen that numbers increased sharply in November and remained more or less constant throughout the remainder of the winter. The majority of the October birds were recorded in Scotland, and a peak of over 800 was reached there in November. A steady decrease in Scotland after November was balanced



by a steady increase in England and Wales which reached a peak of over 900 in March. In Ireland the trend to a peak in February was interrupted only by a sudden increase in November due to the record of 100 birds in one locality. As this increase was not reflected on any of the other Irish waters counted, it is thought that it may have been no more than a fortuitous concentration without real significance.

THE DISTRIBUTION OF EIGHT SPECIES OF WILDFOWL IN THE BRITISH ISLES

Whilst the figures in the preceding section were being collated an aspect of the secondary uses to which the Wildfowl Counts can be put was disclosed. A record was kept of the numbers of coastal and inland waters on which each of the eight species were observed on one or more of the count dates of the 1954–55 season, with the idea of discovering not only how many ducks were seen, but also how often. The results are interesting, but must be regarded as preliminary, as the data has been used only in its most general form. A water has been recorded as 'occupied' whether it carried one bird on one occasion, or some hundreds throughout the season. Nor has any attempt been made at this stage to classify the types of habitat on which the presence or absence of birds was recorded. This will follow later, but the preliminary results in Table VI, which shows the percentage of coastal and inland waters 'occupied' by each of the eight species, may give an idea of the relative frequency with which they are likely to be seen. The results are based on the counts from the 136 coastal and 374 inland waters covered in England, Scotland and Wales. The Irish returns have not been included in this study as it was felt that the sample was too small to be representative.

TABLE VI

The percentage of a Sample of 136 Coastal and 374 Inland Waters Occupied by Eight Species of Wildfowl on One or More Count Dates during 1954–55

	Coastal	Inland		Coastal	Inland
Mallard	96·8	97·0	Shoveler	37·3	34·7
Teal	82·5	56·2	Pochard	12·7	59·9
Wigeon	94·4	69·5	Tufted	30·2	74·3
Pintail	38·8	22·5	Goldeneye ..	41·2	42·5

For southern England this study has been carried a step further, and the percentage of coastal and inland waters occupied on each of the count dates has been determined. Based on a sample of 71 coastal and 131 inland waters drawn from the area lying south of the line Lowestoft—Luton—Stafford—Swansea, the results are related to the number of birds recorded in the area. The three early counts have been omitted as so many waters were not visited, but the remaining counts are considered to be reliable.

From Table VII, in which these figures are set out, information can be derived on the movements and build-up of the winter populations in the southern counties. In many cases the information is no more than confirmation of what was already known or suspected. For example, the March dispersal of Mallard is well shown by the sharply falling numbers and the increase in the number of inland waters occupied, and the spread of diving ducks to the coast in January is to be expected as a result of frost inland. Even the fact that these simple items of common knowledge can be expressed in numerical form is important.

TABLE VII

The Numbers and Distribution of Eight Species of Wildfowl on a Sample of 202 Waters in Southern England

Southern England 1954–55 ..	Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20	Sometime During Season
MALLARD Total Numbers	**17,078**	**17,046**	**18,033**	**18,799**	**16,392**	**8266**	
Percentage of Waters Occupied — Coast	70	72	68	71	74	74	96
Percentage of Waters Occupied — Inland	86	85	87	82	82	92	97
TEAL Total Numbers	**5543**	**11,737**	**12,829**	**16,424**	**11,442**	**6528**	
Percentage of Waters Occupied — Coast	40	61	56	70	70	61	90
Percentage of Waters Occupied — Inland	36	47	45	57	62	40	76
WIGEON Total Numbers	**6541**	**18,998**	**27,140**	**38,127**	**23,914**	**11,292**	
Percentage of Waters Occupied — Coast	55	66	69	82	77	76	91
Percentage of Waters Occupied — Inland	18	30	32	40	39	34	54
PINTAIL Total Numbers	**280**	**367**	**789**	**1345**	**609**	**401**	
Percentage of Waters Occupied — Coast	8	14	13	24	23	21	45
Percentage of Waters Occupied — Inland	3	5	3	15	15	5	25

TABLE VII—*continued*

Southern England 1954–55 ..		Oct. 24	Nov. 21	Dec. 19	Jan. 23	Feb. 20	Mar. 20	Sometime During Season
SHOVELER	Total Numbers	**499**	**570**	**916**	**880**	**1230**	**964**	
Percentage of Waters Occupied	Coast	6	20	18	23	21	20	43
	Inland	12	16	17	19	18	18	34
POCHARD	Total Numbers	**1336**	**4147**	**5124**	**4869**	**2359**	**1742**	
Percentage of Waters Occupied	Coast	1	3	6	11	14	7	15
	Inland	24	44	45	34	40	40	64
TUFTED	Total Numbers	**1848**	**4660**	**6065**	**5636**	**5726**	**1544**	
Percentage of Waters Occupied	Coast	3	6	7	21	14	15	29
	Inland	44	54	61	52	53	69	81
GOLDENEYE	Total Numbers	**13**	**329**	**249**	**514**	**432**	**512**	
Percentage of Waters Occupied	Coast	—	6	6	14	13	13	25
	Inland	3	13	8	11	10	10	24

More interesting, though, is that in some cases the inferences to be drawn from the figures are not entirely what one would expect. It is surprising to find that in most months Shovelers were more likely to be seen on coastal waters than inland, that early in the season Goldeneyes are more common inland, and only later in the year tend towards the coast; and that Pintails, like Teal, remain spread over as large a number of waters in February as at any time in the season despite a big reduction in numbers. The extent of the spread of Wigeon inland may come as a surprise, and it is interesting to note that the percentage of inland and coastal waters occupied by them fluctuates in much the same proportion from month to month.

More important than any of these inferences, though, is the evidence that at no one time are all the resorts of a species in use. In the right-hand column of Table VII are shown the percentage of the waters counted which were occupied at one time or another during the season. It will be seen that in no case, except in that of Pochard on the coast, do the percentage of waters in use at any one date come near to the percentages occupied sometime during the season. This might suggest that at certain times of the year one type of habitat is more popular than another, but at the moment there is no means of demonstrating this, although in due course, 'Operation Waterlog,' the proposed study of the ecology of wildfowl habitats, will, it is hoped, provide the answer to this problem.

WATERFOWL COLLECTION AT SLIMBRIDGE 1955-56

THE BREEDING SEASON 1955

By S. T. Johnstone

THE feature of the breeding season was the striking effect of cold weather on the well-being of the young birds. Frost in February and March may well have reduced considerably the hatchability of the Ne-Ne eggs, all 31 of which were laid during a period when the cold was so extreme that some African Black Duck eggs were split open before they could be collected.

The very wet April and May caused flooding of nests and indeed several sitting boxes suffered in this way. This latter occurrence may have had a bearing on the unfortunate rise in the incidence of Aspergillosis. Pathogenic mould was found in a number of fertile eggs that failed to hatch and a relatively large number of goslings succumbed to mycosis. In 1956 the use of sawdust for nest making in the sitting boxes has been discontinued in favour of peat moss impregnated with a fungicide.

The two pumping systems installed in the spring of 1954 have enabled us to provide relatively fast-flowing water through the rearing pens. By this means we have got rid of the concentration of water fleas (*Daphnia pulex*). This had been the host of *Acuaria uncinata*, a worm inhabiting the proventriculus and causing wasting and subsequent death. We are pleased to report that not a single case of *Acuaria* was recorded in 1955.

It was a great relief to those concerned with the rearing when cold and wet ceased and the long warm sunny days of June and July appeared as a panacea to all ills save the losses from predators. Few of the early ducklings remained, but the late-hatched birds survived to make 1955 the second best breeding season. Even though the subsequent hot weather made it very difficult to keep fresh lush grazing, a figure of 142 goslings reared is higher than any previous year.

Seventy-five forms of waterfowl nested and there were three new species among the 57 reared. Comparative figures for the years 1952-56 appear in the table.

Year	No. of kinds reared	No. of Cygnets and Goslings	No. of Ducklings	Total
1952	59	111	350	461
1953	51	137	248	385
1954	46	125	144	269
1955	57	144	270	414
1956	67	176	326	502

The new species to be reared were Greenland White-fronted Goose, Greater Magellan Goose and Ringed Teal. The last named we are particularly keen to re-establish. A fine male imported from South America with a female that had been in the collection for three years produced eleven ducklings and all seven that survived proved to be females.

In contrast to the majority of species we have tried, the North American Ruddy Duck (*Oxyura jamaicensis*) has been singularly successful in rearing its own young. Two birds hatched out broods in the Rushy Pen and in spite of the enormous competition from adult birds of a great number of species, all baby Ruddy Ducks survived, which is the antithesis of our efforts to rear them under foster mothers.

A sad incident was the loss of a brood of South American Comb Duck (*Sarkidiornis melanotos carunculatus*). We had failed to locate the nest of the laying Comb Duck and she eventually arrived on the Rushy Pen pond with seven ducklings, in early August 1955. These seemed to thrive for two or three days but then tragedy overtook them and they disappeared or were found dead. It is thought that the White-winged Wood Ducks may have been responsible as one had already been seen to attempt the swallowing of a Mallard duckling. South American Comb Ducks are not known to have hatched young in captivity previously, although a female laid in M. J. Delacour's collection at Clères in 1939.

TABLE I

Breeding Analysis 1955

Species	Breeding Pairs	Date of First Egg	No. of Eggs Laid	Infertile	Hatched	Reared
Fulvous Whistling Duck	1	13.4	31	7	24	15
Black-billed Whistling Duck	1	9.5	7	7	0	—
White-faced Whistling Duck	1	24.5	8	5	3	3*
Southern Red-billed Whistling Duck	3	19.4	54	1	11	12†
Coscoroba Swan	1	3.3	1	1	0	—
Black Swan	1	8.2	10	2	6	2
Black-necked Swan	1	19.4	6	6	0	—
Canada Goose	1	29.4	9	3	6	6
Dusky Canada Goose	2	18.4	18	11	4	3
Taverners Goose	3	24.4	15	13	2	3‡
Cackling Goose	2	29.4	4	4	—	—
Hawaiian Goose	6	8.2	31	22	6	4
Barnacle Goose	5	18.4	31	8	20	15
Red-breasted Goose	2	9.6	10	5	5	3
Swan Goose	2	14.4	13	7	8	1§
Bean Goose	1	15.6	5	1	4	4
Greenland White-fronted Goose	2	18.4	18	13	4	1
Lesser White-fronted Goose	3	1.5	15	9	5	3
Greylag	3	6.4	32	7	25	25
Eastern Greylag	1	28.3	4	—	4	4
Bar-headed Goose	4	17.4	27	14	8	5
Emperor Goose	2	3.5	17	—	5	1
Lesser Snow (White Phase)	1	22.4	5	1	4	4
Lesser Snow (Blue Phase)	3	16.4	22	10	12	11
Greater Snow	6	22.4	43	34	9	2
Ross's Goose	5	5.5	37	12	25	11
Cape Shelduck	1	26.3	12	1	7	7
Common Shelduck	2	20.4	14	8	6	6
Egyptian Goose	1	30.3	8	8	0	—
Orinoco Goose	3	15.4	23	13	10	9
Abyssinian Blue-winged Goose	1	20.7	4	3	1	1
Ashy-headed Goose	2	19.4	12	2	7	2

TABLE I—*continued*

Species	Breeding Pairs	Date of First Egg	No. of Eggs Laid	Infertile	Hatched	Reared
Ruddy-headed Goose	1	24.4	4	4	—	—
Greater Magellan Goose	1	3.4	13	4	4	3
Upland Goose	2	—	11	6	5	4
Cereopsis Goose	1	20.12	8	7	1	—
Andean-crested Duck	2	10.4	18	8	6	4‖
Marbled Teal	3	10.5	31	12	19	14
Versicolor Teal	2	1.4	15	2	7	2
Puna Teal	1	25.5	6	6	—	—
Bahama Pintail	2	30.5	18	1	14	4
Pintail	3	21.4	29	14	15	2
Falcated Duck	1	10.6	6	5	1	—
Chestnut-breasted Teal	1	26.5	8	5	3	3
Indian Spotbill	1	15.5	8	4	4	1
Australian Grey Duck	1	20.4	3	3	—	4¶
Philippine Duck	5	26.4	58	12	30	18
African Yellowbill	2	21.4	11	5	6	5
African Black Duck	1	26.2	4	4	—	—
Gadwall	1	2.5	9	3	6	6
Wigeon	4	30.4	40	11	26	18
Chiloe Wigeon	2	20.5	15	3	12	10
Blue-winged Teal	1	1.6	5	5	2	2
Cinnamon Teal	3	3.5	35	8	26	12
Garganey	1	1.5	16	—	9	4
Argentine Red Shoveler	1	23.4	7	5	1	—
Cape Shoveler	1	24.4	12	1	11	3
European Shoveler	3	2.5	27	9	16	6
Ringed Teal	1	30.4	15	4	11	7
Red-crested Pochard	3	4.4	26	8	18	9
Rosy Bill	2	20.5	8	4	3	3
Southern Pochard	1	?	7	3	4	4
Canvasback	2	12.5	15	—	15	9
European Pochard	1	20.5	8	1	7	7
Redhead	3	25.4	29	11	13	9
Tufted Duck	2	1.6	8	3	3	1
Scaup	2	16.5	16	4	12	6
Mandarin	3	29.4	27	4	15	13
Carolina	?	23.3	137	54	54	28
South American Comb Duck	1	?	—	—	7	—
European Eider	3	3.5	14	5	8	3
Barrows Goldeneye	1	20.5	4	4	—	—
North American Ruddy Duck	3	9.5	25	6	13	12
Red-breasted Merganser	2	19.5	17	17	—	—

*Hybrids.
†8 reared by parents.
‡1 reared by parents.
§Hybrid.
‖Reared by parents.
¶4 reared by parents.

THE BREEDING SEASON 1956

By S. T. Johnstone

It is interesting to note that the first bird to breed at Slimbridge is the Cereopsis, which usually starts to lay at Christmas time. Whilst this species is still incubating, the Ne-Nes start laying, and from then on the crop of eggs rises to a maximum in June. At the time of writing it is the first week in December and we still have young birds in brooders and one clutch of eggs is still being incubated. The Cereopsis have built their nest so that the cycle has now become a twelve-monthly one.

For 1956 it is true to say that the weather was responsible for the majority of losses. Deaths from pathogenic causes were comparatively few, but the long spells of cold and rain in June and July wrought havoc amongst the ducklings. One recalls the dismay with which we recorded over a hundred deaths in one fortnight of June.

Great efforts were made during the winter of 1955–56 to re-design the method of incubating the eggs with a view to reducing the amount of work involved in feeding and exercising the broody hens and to reduce the incidence of Aspergillosis which had increased alarmingly in 1955. The sitting boxes were raised 4 feet from the ground by means of a bank of earth contained in a concrete wall and covered with 3 inches of peat moss treated with a fungicide. The hens were exercised and fed in separate wire cages. The whole area was provided with a concrete floor and roofed in asbestos sheeting. The results have justified the effort expended in this way.

In spite of the weather we achieved the best figures so far for the number of birds, and indeed species, reared.

No. of Forms to lay	*No. of Forms Reared*	*No. of Cygnets Reared*	*No. of Goslings Reared*	*No. of Ducklings Reared*	*Total*
86	67	5	171	326	502

Seven species were reared for the first time at the New Grounds (see Table I). The Magpie Goose had not previously bred in Europe and the Bewick's Swan is the first fully authenticated record in any collection.

A new type of nesting box was put into use this year in the shape of grape barrels. In one of these, placed a considerable height above the ground, six clutches were laid, three of Chestnut-breasted Teal, a Goosander, a Carolina, and a South American Comb Duck.

First breeding of the Magpie Goose

During the summer of 1955 the Magpie Geese built a rudimentary nest in the privet hedge of their pen so that when they started similar activities in July 1956 we were not very sanguine about the possibility of their laying. However, when our old original female, which has been in England at least 20 years, commenced helping in the building of a second nest we were duly impressed. In all, seven nests were built in the tall, thick nettles around the pen, each very similar to that of a swan's—a pile of nettles, straw and twigs, hollowed on the top. Each took about two days to complete. During the last week of nest building we were delighted to see that the female was getting heavier and

heavier. Normally and during the nest building these birds remained very timid and on being approached would stride off into the undergrowth, but on 15 August the male alone was visible. When we approached the latest nest he rushed forward in defence of his mate, who raised herself to disclose the first egg. Both birds stood on guard and, with spread wings, raised tails and outstretched heads, made a great effort to defend the nest.

In all, eight eggs were laid. These were replaced each time by wooden dummies. Six dummies and two real eggs were left in the nest for four days after incubation commenced. It was found that both birds incubated and that the eggs were never left. In consequence, when they were being set under bantams the eggs were not allowed to cool and when requiring exercise, the broody was immediately replaced by another. Three eggs were infertile. The other five hatched in 28 days, seven days less than had been expected. The downy young is quite unlike any other. The head and neck is a cinnamon red, somewhat similar to that of the male Red-crested Pochard, the body a uniform dark grey with complete absence of barring and the underparts a lighter shade. The bill is enormous, yellow in colour and with a heavy nail. The lores are bare. A notable feature is the very large toes and sturdy yellow tarsus.

The babies were very aggressive one to the other and they had an insatiable desire to peck. Their diet consisted of duckweed and various pond weeds, soaked biscuit meal and fresh-water shrimps (of which they were particularly fond). A peculiar feeding habit was the high-pitched sibilant call they all made as soon as food was brought to them—reminiscent of the chirruping that passerine nestlings make when the parents approach the nest.

Three birds survived and when fully feathered at six weeks they were completely black over the head and neck and all the upper parts except the rump. The breast and belly were white. The bill had gradually turned black as feathering had proceeded; likewise the lores. The forehead was still feathered and in fact in one case there was a ridge of cinnamon down across the forehead adding to the grotesque appearance.

First breeding of Bewick's Swan

Our Bewick's Swans consist of a young male that flew into the Rushy Pen in November 1948 and a female acquired from Holland some two years later. Owing to lack of space they had been kept in what was regarded as a somewhat inadequate pen with a very small area of water. On 1 June both birds were seen to be nest-building and in the course of the next five days constructed a large heap of rushes. The first egg was laid on 6 June. Three eggs were laid and incubation was by the female only. The average size of the three eggs was 118 by 82 mm. and weight 265 gms. Two cygnets were hatched on the 30th day, the third egg was infertile. The cygnets were enchanting little things: white with an overall steely-blue sheen, the bill and legs fleshy pink. Their diet consisted of biscuit meal, small amounts of brown bread, copious amounts of duckweed, and every kind of pond and waterweed that could be obtained. The cygnets fed readily but one died when six weeks old. The remaining cygnet continued to thrive and with its parents was given access to a larger pen and an ample stretch of water. The young bird was fully feathered and capable of flight at 15 weeks. The plumage was a whitish grey, lighter than that of Trumpeter and Whooper juveniles. The bill has remained fleshy pink except at the tip, and the legs have become blotched with grey.

First breeding of Comb Duck

A South American Comb Duck had bred in 1955 but had lost its brood in a couple of days. In 1956 three South American and one of the Old World race nested. In each case the eggs were in little grape barrels that we had placed in willows some 2 to 3 feet above the ground. The eggs varied in number from six to ten and were a shiny creamish white in colour. The average size of 25 eggs was 56 by 37 mm. and average weight 44 gms.

The ducklings, by nature of their down pattern, shape and the dual colour of the tarsus, are evidently near relations of the Muscovy. The cap, back of neck and upper parts of the body are brown. The cheeks, throat, breast and underparts are yellow. There is a yellow bar on each wing and along the sides of the back. There is a brown eyestripe and the bill is brown.

The first hatching did not thrive at all and showed little inclination to feed. They soon succumbed to the cold, wet weather. Subsequent broods were given the benefit of infra-red lamps and this had a very favourable effect. They showed much more interest in life, fed readily, and nearly all grew to maturity.

Breeding of the Hawaiian Goose

The Hawaiian Geese did particularly well in 1956. Every female old enough laid and there were in all 62 eggs of which 22 were fertile. From these, 16 were hatched and 15 young reared. Three more were reared from a pair lent to Mr Terry Jones. 37 Ne-Nes are now alive in Europe.

Other interesting results were a brood of seven male Ringed Teal reared by their parents in our aviary, a complete reversal from 1955 when only females were reared. Eleven Cuban Whistling Duck and nine Wandering Whistling Duck and a Lesser Scaup are also worthy of mention.

We can record some success with casualties and sickness. A Whitefront brought in with a shattered wing had an amputation at the shoulder. Compound fractures of the tarsus in a Cape Shelduck and a Bar-headed Goose were successfully dealt with. One Ne-Ne was cured of a bad infection of Gapes as were several other young birds by treating with barium antomnyl tartrate.

TABLE II

Breeding Analysis 1956

Name	No. of Eggs	Infertile	Hatched	Reared
Magpie Goose	9	4	5	2*
Wandering Whistling Duck ..	29	8	17	9*
Fulvous Whistling Duck	57	13	36	12
Black-billed Whistling Duck ..	14	—	10	10*
Red-billed Whistling Duck ..	10	9	1	1
Black Swan	5	1	4	4
Bewick Swan	3	1	2	1*
Canada Goose	10	—	10	10
Western Canada Goose	17	10	3	3
Taverners Goose	25	16	7	5
Cackling Goose	4	4	—	—
Ne-Ne	62	40	16	15
Barnacle Goose	21	9	10	4
Red-breasted Goose	10	5	5	—

TABLE II—*continued*

Name	No. of Eggs	Infertile	Hatched	Reared
Swan Goose	24	14	7	7
Bean Goose	6	3	2	1
Greenland White-fronted Goose	9	7	2	—
Lesser White-fronted Goose	13	3	9	5
Grey Lag Goose	46	11	34	34
Eastern Grey Lag Goose	4	—	3	3
Bar-headed Goose	25	13	11	7
Emperor Goose	11	8	3	1
Lesser Snow Goose	34	14	14	7
Greater Snow Goose	43	30	13	1
Ross's Snow Goose	33	10	17	14
Cape Shelduck	12	5	3	2
New Zealand Shelduck	4	—	4	3
Radjah Shelduck	7	5	1	—
Common Shelduck	12	3	7	4
Egyptian Goose	6	6	—	—
Orinoco Goose	21	17	4	2
Abyssinian Blue-winged Goose	10	9	1	—
Ashy-headed Goose	10	2	7	7
Ruddy-headed Goose	5	5	—	—
Greater Magellan Goose	13	4	9	6
Lesser Magellan Goose	10	—	10	7*
Cereopsis Goose	7	5	2	1
Crested Duck	11	6	3	1
Marbled Teal	50	29	21	5
Cape Teal	5	2	2	—
Versicolor Teal	30	4	25	10
Puna Teal	4	4	—	—
Bahama Pintail	39	17	19	8
Chilean Pintail	6	6	—	—
Common Pintail	18	4	14	6
Chilean Teal	5	3	1	1
Chestnut-breasted Teal	42	8	34	20
Hawaiian Duck	4	—	1	—
Mottled Duck	6	—	6	6
North American Black Duck	15	6	9	1
Grey Duck	16	3	13	7
Philippine	15	7	8	5
African Yellow Bill	7	—	7	4
African Black Duck	7	5	2	1
Gadwall	23	7	16	10
Wigeon	34	11	19	5
American Wigeon	7	5	2	—
Chiloe Wigeon	36	11	18	16
Blue-winged Teal	8	6	1	1
Cinnamon Teal	46	20	25	11
South American Cinnamon Teal	7	1	6	5
Argentine Red Shoveler	3	1	2	2
Cape Shoveler	9	2	7	—
Common Shoveler	22	11	6	—
Ringed Teal	17	1	16	11
Red-crested Pochard	38	14	24	24
Rosybill	8	2	2	1
Canvasback	8	2	6	—
Common Pochard	7	2	5	5
Redhead	29	8	18	14
Tufted Duck	7	—	7	7

TABLE II—*continued*

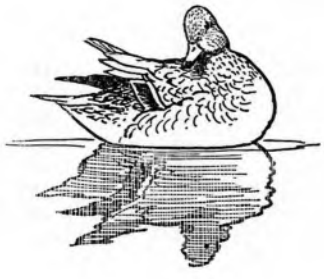
Name	No. of Eggs	Infertile	Hatched	Reared
Lesser Scaup	6	—	3	1*
Scaup	26	3	21	18
Mandarin	56	21	13	8
Carolina	68	18	42	24
Comb Duck	6	—	6	2*
South American Comb Duck	25	5	20	6*
Eider	16	10	3	—
Goldeneye	8	2	6	2
Red-breasted Merganser	18	4	11	3
Goosander	9	1	8	2
North American Ruddy Duck	15	9	5	22†

* These birds bred successfully for the first time in the Collection.
† 17 reared by parents

ADDITIONS TO THE COLLECTION 1954–56

Fulvous Whistling Duck	1 pair
White-faced Whistling Duck	3 pairs
Coscoroba Swan	1 pair
Black-necked Swan	1 pair
Bewick's Swan	1 male
Emperor Goose	2 females
Cape Teal	2 pairs
Hottentot Teal	1 male and 2 females
South African Red-billed Pintail	16 males and 4 females
Falcated Duck	2 males and 3 females
Hawaiian Duck	5 males and 4 females
North American Black Duck	2 pairs
Florida Duck	2 males and 1 female
New Mexican Ducks	2 pairs
*Chinese Spotbill	3 males and 2 females
African Black Duck	1 female
American Wigeon	1 pair
Common White Eye	1 pair
*Baer's Pochard	1 female
Lesser Scaup	1 male and 2 females
*White-winged Wood Duck	6 males and 4 females
*King Eider	1 pair
*Velvet Scoter	1 male
*Maccoa Duck	4 females

* Not previously represented in the Collection.



DEVELOPMENT OF THE TRUST'S PROGRAMME OF SCIENTIFIC RESEARCH

By G. V. T. Matthews

WHILE all aspects of the biology of the Anatidae come within our purview, those having a bearing on the conservation of the group have always had priority. It is very satisfactory to report that the Nature Conservancy have shown their recognition of the value of the work being done by making increasingly substantial grants towards the cost of the programme. These will not only enable lines of research already in being to be continued at an increasing tempo, but allow new lines to be developed. Thus we have embarked on an investigation of the use of aerial survey methods under British conditions and an investigation of the food preferences of wildfowl and allied problems.

The basic work of measuring the size and fluctuations of wildfowl populations both by ringing research and by the Wildfowl Counts continues and is reported on elsewhere in this issue. Attention is being directed to the evaluation of wildfowl habitat and its distribution in this country. Our reports will enable the Nature Conservancy to plan a system of wildfowl refuges which do not overlap in function and yet will be sufficient to ensure the maintenance of adequate stocks of birds. The techniques for the management of such refuges are being studied and methods whereby the competing requirements of wildfowl and agriculture can be reconciled are being worked out.

We are very ignorant about the incidence and importance of diseases and parasites in wild birds. A generous grant by the Nuffield Foundation has made it possible for us to recruit to the staff Dr G. Lapage, formerly Lecturer in Animal Pathology at Cambridge University. He is carrying out a general survey of the parasites of the Anatidae, and making particular researches into blood parasites. Dr Lapage is based at Cambridge where he is working in close association with Mr A. R. Jennings and Dr E. J. L. Soulsby of the Department of Animal Pathology who very kindly undertake respectively the post-mortem examinations for the Trust and identification of the worm-parasites. Continuation of the Bristol, Clifton and West of England Zoological Society's Scholarship at the University of Bristol has enabled Mr J. V. Beer to proceed with his study of the fungus disease Aspergillosis while working for a Ph.D. at that University. In addition to financing this scholarship the Bristol, Clifton and West of England Zoological Society has made a generous contribution towards salary charges in the programme.

An increasing number of workers in other scientific institutions are being provided with specimens and material for their particular researches. Professor C. Tyler of Reading University is investigating the structure of egg shells and their pores; Dr H. Lehman of St. Bartholomew's Hospital is working on the haemoglobins of the blood; Dr J. G. Harrison is making a study of the relation between skull pneumaticity and mode of life; preparations of tracheae are being made for Professor J. van Tyne and Dr P. S. Humfrey, University of Michigan, for their monographic study of this important organ; complete skeletons are sent to Dr G. Kramer, Max-Planck Institut, Wilhelmshaven, for

his studies of the mechanics of the wing and leg bones. At the Trust itself a representative collection is being built up which will be especially strong in skins of downy young. All this anatomical material, it might be mentioned, is only gathered as it becomes available through natural causes.

The gratitude of the Trust, it will have been seen, is increasingly due to financial support from outside bodies, the Nature Conservancy, the Nuffield Foundation and the Bristol, Clifton and West of England Zoological Society, and to the facilities afforded by Bristol University. But it must be emphasised that the Trust continues to bear more than half the cost of the research programme and that outside support is essentially on a *quid pro quo* basis. Continued support both indirectly by subscription and directly through the Duck Adoption scheme is thus very essential if the good work is to be maintained.

HOW TO MAKE AND USE DUCK TRAPS

By Major-General C. B. Wainwright, C.B.

Traps

I have proved two main types of trap: (i) 15 feet or 12 feet square, 6 feet high, with three funnels, and (ii) 6 feet square, 4 feet high, with one funnel. The designs of the traps are illustrated in Figures 1 and 2.

If the water level is constant so that the traps do not have to be moved, the four corner posts and the posts on each side of the funnels and the door can be driven into the ground, and no ground frame is required. As after a time the bottom will be lowered by constant trampling a moveable trap is best.

If the trap has to be moved a ground frame of 2 inch by 2 inch timber, on to which the vertical posts are bolted, must be used. The side members should be extended 1 foot at each end to act as skids. On large traps the front and back members should be extended about 8 inches at each side so that a rope can be looped round them for pulling.

Funnels

The outside is square and the top horizontal, the sides tapering to a point. The front funnel on the 12 feet trap is 3 feet $\times$ 3 feet and extends 4 feet into the traps. The side funnels are 2 feet $\times$ 2 feet and extend 3 feet 9 inches into the trap. On the 15-feet trap, the side funnels are 3 feet $\times$ 3 feet. The tapered end of the funnel is cut as shown in Figure 3, the top of the opening 6–9 inches above the water level.

Skirt

Ducks will splash away the mud and get out under the sides of a trap unless there is a skirt. A strip of wire netting 2 feet wide is attached to the side and lies flat on the ground inside the trap all the way round. In the smaller traps 1 foot on the sides is sufficient, but 2 feet is best at the front and where one steps on entering the door. A skirt is necessary in a stationary trap, although it may be trodden into the mud. The bottom of the sides of the funnels should be laced on to the skirt.

Escape Door

It is essential to have a door reaching ground level which should be left open if the trap is not going to be visited for over 24 hours, so that small birds (or ducklings) can get out; otherwise they will die. It is quite useless simply to

close the funnels: something, animal, bird, or elements, will certainly force them open sooner or later.

Netting

The best mesh for the wire netting for the whole trap is 1-inch mesh. A fairly heavy gauge is desirable, as it stands more wear and tear: round the lower part of the traps gauge 18 or heavier should be used.

Wood

Use about 2 inch × 2 inch for bottom frame and 2 inch × 1 inch for the rest. Do not paint or stain it.

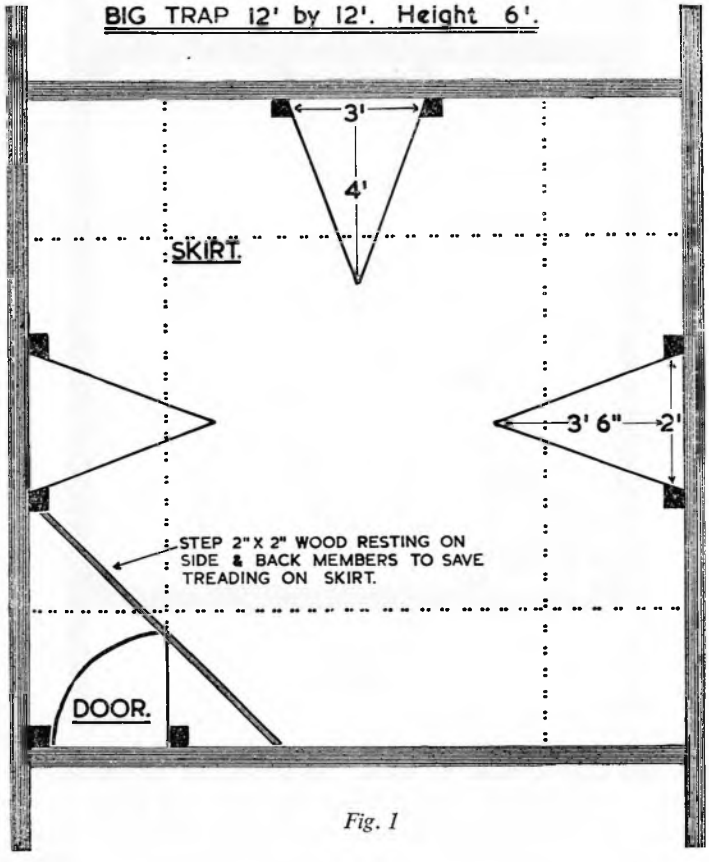


Fig. 1

Moving

As the water level changes, big traps can be moved down or up the shore by attaching a rope to the extension of the front or back members and pulling. The small traps can easily be pulled by one man.

A big trap can be moved to another site on the same sheet of water by floating it on sealed empty drums attached to the bottom frame. Small traps can be carried in a boat.

If traps may have to be moved from one sheet of water to another, it is convenient to make the larger sizes in four sections, with the top a sheet of

netting laced together which can be taken off and rolled up. The funnels should be made detachable, so that the four sides can be carried flat on a trailer or other vehicle. Six feet traps can be carried assembled.

Siting

Traps should be placed so that the front is in 1 to 1½ feet of water, with, if possible, the last foot at the back on dry land. It seems that ducks prefer traps in the open, not among reeds or other cover, which may hide some enemy.

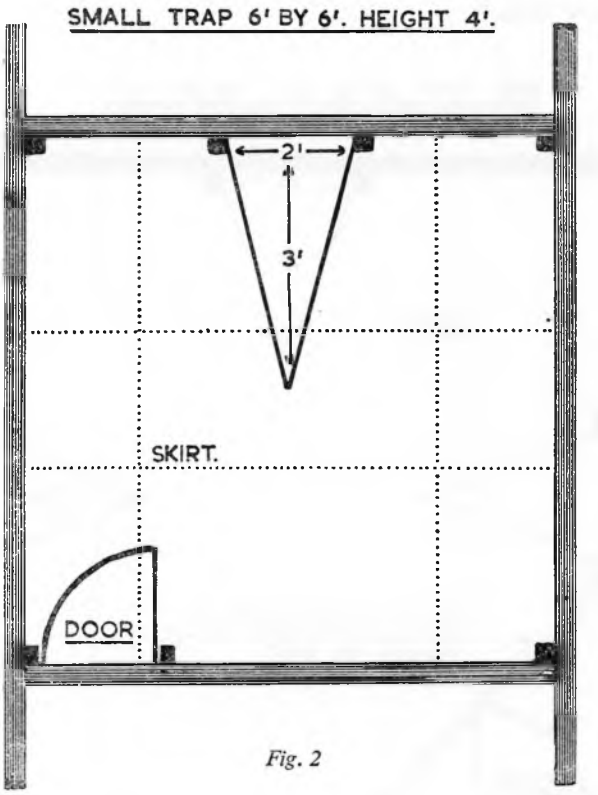


Fig. 2

Bait

Small seeds and corn should be used. Some should be placed on dry land (a small island of turfs if necessary) inside the trap and some thrown into the water inside the trap; enough will float out to bring the ducks along. *Do not* throw a lot outside the trap; you want the ducks inside, not feeding outside.

Decoys

It is as well to ring and leave one or two birds in the trap. Do not keep the same decoy too long; if possible ring new ones every day and let the old ones go. Cock Teal seem the best decoys for all species; cock Mallard are pugnacious and therefore dangerous.

Visiting

If used on large sheets of water where ducks can remain undisturbed by your approach, traps may be visited in daylight, but on small waters used in daytime

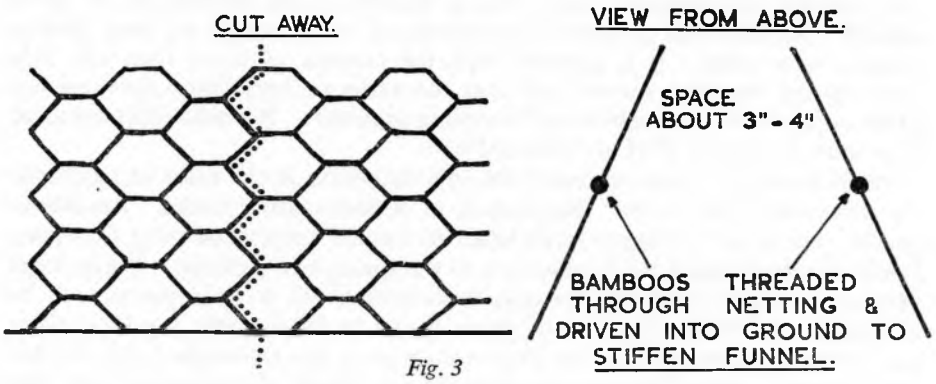


Fig. 3

they should only be visited in darkness. (At places like the pool at Mileham, described by P. L. Wayre at pp. 19-20, which ducks use for feeding at night but not in the daytime, day visiting is clearly preferable.)

Catching inside the trap

Take a supply of sacks with a wire hook attached to hang on the wire netting inside the trap and a string, also attached, with which to tie up the mouth. Catch up all the ducks inside the trap and put them into the sacks. Not more than four Mallard or six Teal should be put in one sack and Teal should never be mixed with bigger ducks. Ring those to be used as decoys and leave them in the trap. Tie up the sacks and take the other ducks away to a convenient place for ringing and recording.

Ringing

Good ringing cannot be done in discomfort. Take the sacks to a shed or some suitable shelter and ring the birds there. Ducks will remain quiet and in good condition for an hour or so in *dry* sacks which are *not too full.*

SUMMER RECOVERIES OF WIGEON, PINTAIL, SHOVELER AND TUFTED DUCK RINGED IN BRITAIN[1]

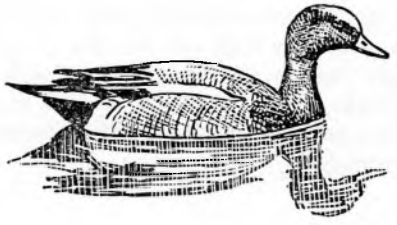
By Hugh Boyd

It has been generally accepted that only a small proportion of the ducks found in Britain in winter breed in this country and that most of the visitors come from Scandinavia, the Baltic countries and farther east. Recoveries of ringed ducks are of no great importance in establishing the limits of the breeding range and the passage routes of a species, which can be done more effectively by direct observation, but they do show how the British-wintering populations are distributed within the specific range. In this paper the summer recoveries of

[1] I am much indebted to Miss E. P. Leach, formerly Hon. Secretary, and to Mr R. Spencer, Secretary of the Bird Ringing Committee of the British Trust for Ornithology, for communicating the data from which this paper was compiled.

four species are compared with what is known of the distribution of those species. Because the number of recoveries is rather small no very precise analysis is possible. It is assumed that the months of May, June and July make up the 'breeding season' and that recoveries in April and August are less likely to show the whereabouts of 'breeding grounds'. No recoveries reported later than the end of 1955 are included here.

Small numbers do not represent the only limitation in the value of recoveries for illustrating the summer distribution of British-visiting ducks. Recoveries consist very largely of ringed birds killed by human agency and most European countries afford ducks legal protection in the spring and summer. Where legal protection is well enforced the only recoveries likely to be reported will be accidental casualties. Reports of ducks found in fishing-nets, musk-rat traps and similar devices make up an important part of the recoveries from Sweden and Finland. Most Russian recoveries do not specify the cause of death, but since some ducks are reported shot in each of the summer months it seems likely that shooting in the nesting season is not prohibited in Russia. This must account in part for the great preponderance of Russian records in the summer and may exaggerate the apparent importance of northern Russia and Siberia as the main nursery of ducks visiting Britain.



About 1500 Wigeon have been ringed in Britain, providing more overseas recoveries than for any other duck except Teal and Mallard (both ringed in much greater numbers). Figure 1 includes 51 recoveries in the months of May–July, and a further five and two in April and August respectively. Most have been obtained between 35° and 70° E and from 52° to 67° N, falling within the known area of greatest breeding-density, but with fewer in Finland and Sweden than would be expected. This presumably is due to legal protection in those countries. There is a striking concentration in the lower basin of the River Ob (*c.* 65°N, 65°E), east of the Ural Mountains. Though this is described by Isakov (in Dementiev and Gladkov, *Handbook of Birds of U.S.S.R.*, vol. IV, 1952), as an important moulting area, the recoveries were obtained in late May and early June, not in the moulting season. Although four Wigeon ringed as moulting adults in the Volga delta have been recovered later in Britain, no British-ringed birds have been reported from there. This may indicate the efficiency of the protection given to moulting ducks in the large Astrakhan reserve. One of the earliest Wigeon to be ringed in Britain (Warwickshire, October 1915) was recovered in the Uralsk district in April 1918, and an Orielton-ringed Wigeon was shot as far south as the River Don in September 1936, but it appears that relatively few of the British population 'transfer' to the southern-wintering populations which breed farther to the south and east. There are as yet no decisive indications that Wigeon marked at different ringing stations in Britain frequent different areas in summer, although those marked

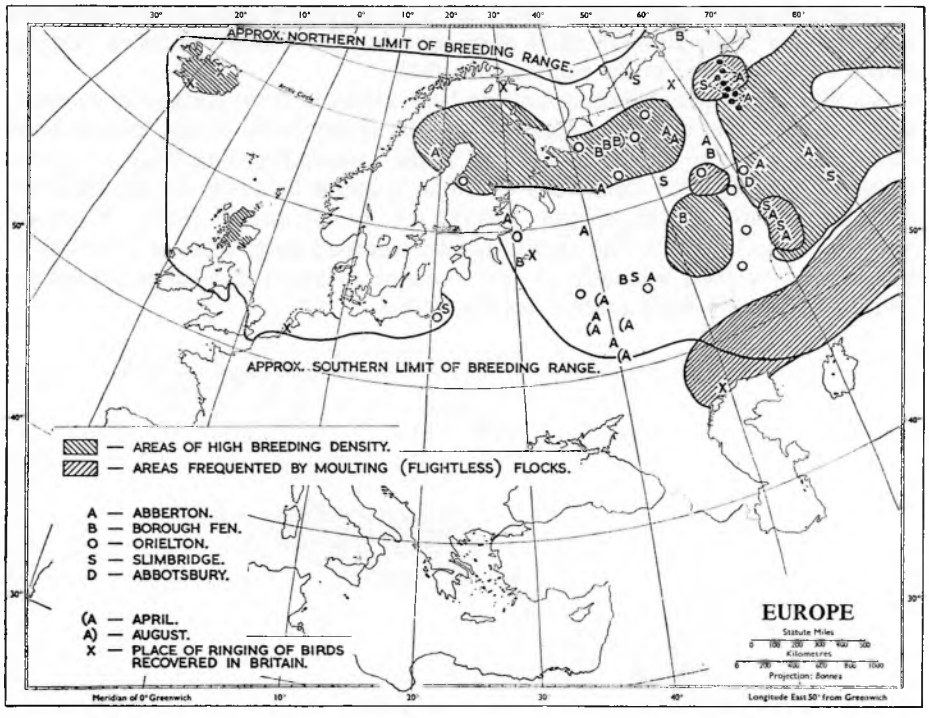


Fig. 1 Summer Wigeon Recoveries

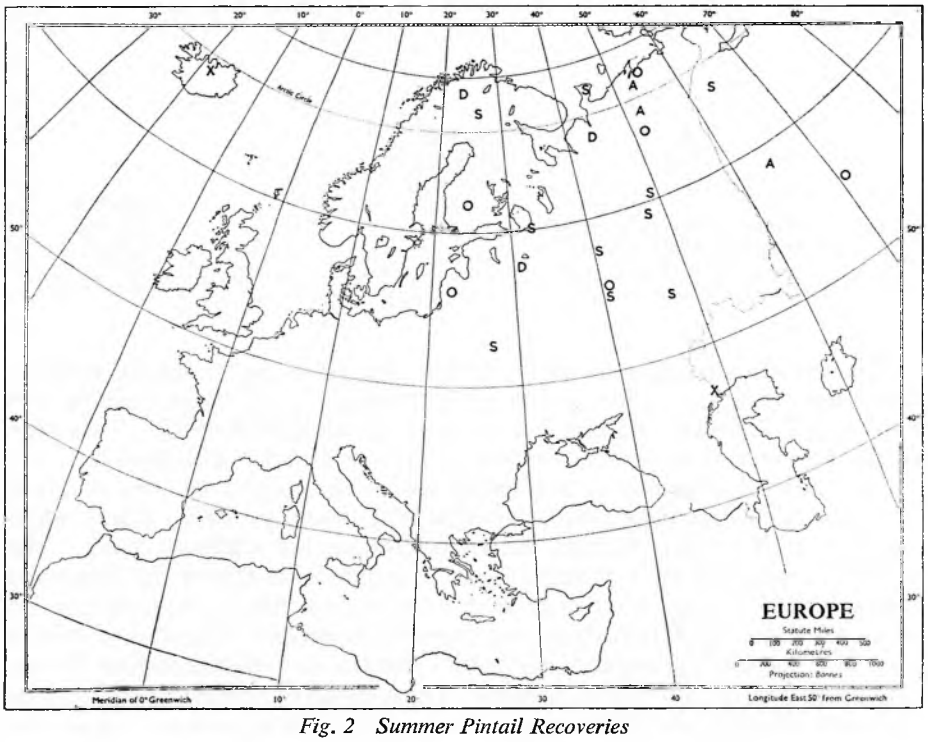


Fig. 2 Summer Pintail Recoveries

in eastern England seem rather more likely to be found east of the Urals than birds marked in the west (15 of 31 of eastern-ringed but only 7 of 26 of western-ringed birds reported in the summer months).

No Wigeon ringed in Britain has yet been reported from Iceland in summer, although about 45 ringed in Iceland have been recovered in the British Isles, which seem likely to be visited by most of the Iceland-breeding Wigeon. Since Iceland-ringed Wigeon have been found in summer in north Russia (Magnús Bjornsson, 1940: *Fuglamerkingar* V–VIII Ar., p. 39) and in winter in several places on the Continent they should not be regarded as an isolated population. But Iceland Wigeon evidently do not frequent southern and eastern England, where most British duck ringing has been done.

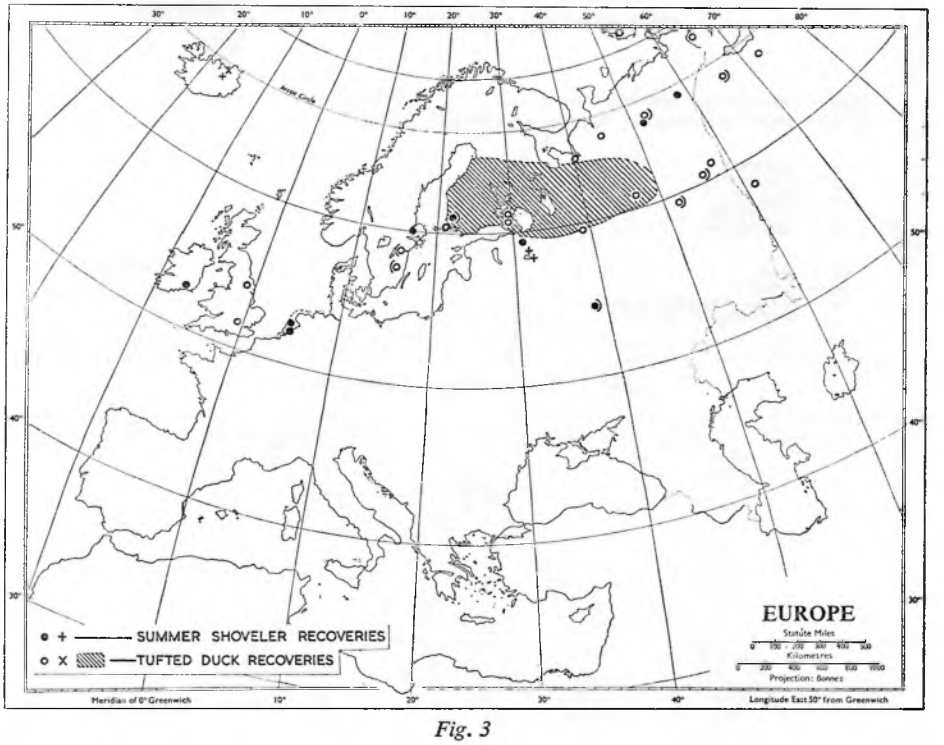


Fig. 3

The summer recoveries of the three other species to be considered here are comparatively few, because of the small numbers so far ringed (about 390 Pintail, 320 Shoveler and 565 Tufted Duck by the end of 1955). Thus they cannot be expected to provide detailed pictures of breeding distribution.

The Pintail is abundant as a breeding species throughout the area in which recoveries of British-ringed birds have occurred (Isakov, *loc. cit.*). The numbers breeding in north-west Europe, including Britain, are relatively small. The extent of the recoveries of Pintail (Figure 2) is similar to that of the Wigeon in respect of the absence of records from west of 20°E and a southern limit of about 52°N, but no British Pintail has been found beyond 72°E (known eastern limit 86°E for the Wigeon) and only 3 of 17 summer recoveries have been in Asia (compared with 22 of 57 for the Wigeon). These results of British ringing conform very well with those from Mortensen's ringing of autumn migrants in Denmark

and from the marking of moulting adults in the Volga delta (A. Landsborough Thomson, 1941, *International Wildfowl Inquiry*, vol. I, pp. 84–105). The summer recoveries of the Danish birds were from northern Scandinavia and north-west Russia, while the Volga moulting birds evidently breed mainly to the east and south of the 'Western European winter population', especially beyond the Urals. More ringing must be done before the homogeneity of the British population can be asserted with confidence, but the scatter of winter records as well as of those shown here suggests that much mixing occurs.

The summer distribution of British-ringed Shoveler differs appreciably from that of the two previous species (Figure 3). The recoveries lie in a rather narrow belt running north-east to no farther than 66°N, 58°E, with no records in Russia south of Lake Ilmen. The Shoveler breeds over a very wide range in Europe and Asia, without being very numerous except in a region between 35°E and 90°E and 48°N to 55°N. Apparently birds from that part of the U.S.S.R. do not visit Britain extensively, our immigrants coming only from the northwestern extremity of the Palearctic range of the species.

The Tufted Duck ringed in Britain in winter have included some British-breeding birds, but most recoveries have come from northern Russia (southern limit about 47°N). The scatter of these recoveries accords well with the distribution of the species according to Isakov (*loc. cit*). He indicates an area of high density in southern Finland and the adjacent area of Russia (shaded in the map). Seven of the 21 recoveries plotted here were marked in London, by the London Natural History Society, and 12 in Essex. Others marked in Britain as ducklings have been recovered here in winter, as have some marked in Iceland, and it is likely that the preponderance of immigrants from the north-east suggested by the map is not a reliable representation of the composition of the total British winter population, although it may well reflect that of the London area.

The three maps all convey the impression that the populations so far sampled (i.e. largely those of south and east England) come principally from north-west Russia and Finland.

RECOVERIES OF BRITISH-RINGED GREY LAG GEESE

By Hugh Boyd

FIFTY Greylags were ringed in Iceland between 1932 and 1938 (*Fuglamerkingar* I-XV Ár, published by Náttúrugripasafnið, Reykjavik, 1932–51). Thirteen were recovered. All had been ringed as juveniles. They had been captured in five localities in the north and three in the south of Iceland and were also widely scattered when found in Britain: eight in Scotland (Orkney one, Inverness one, Perthshire three, Dumfries two, Wigtown one) and five in Ireland (Wexford four, Kilkenny one). It could be inferred that the Iceland-breeding population

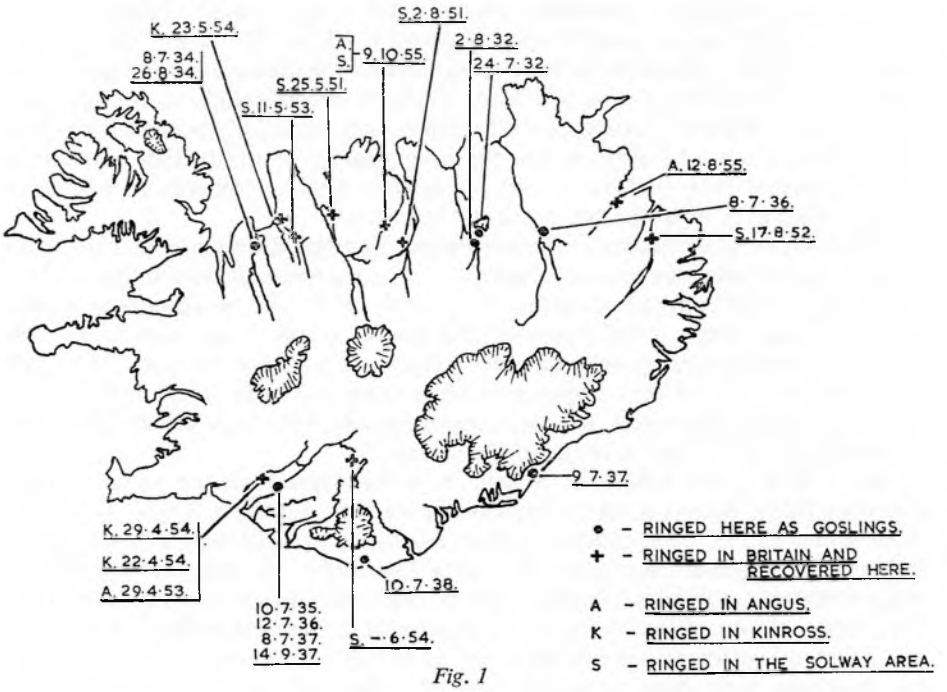


Fig. 1

winters in Britain and probably nowhere else and that though the breeding population consists, of necessity, of rather small widely-scattered colonies, the inhabitants of the various colonies probably do not remain segregated in winter.

The Trust has not attempted to ring Greylags in Britain in a systematic way, but between March 1950 and November 1953 431 were caught, yielding 84 recoveries so far. Most of these have been published in earlier Annual Reports. There have been 12 overseas recoveries of these British-ringed Greylags, all from Iceland. The map (Figure 1) shows the distribution of these and also the places where the Iceland-ringed juveniles were ringed. The plotted localities are remarkably widely distributed amongst the areas known to be frequented by the species. Eight of the 12 recoveries have been in April, August or October. This possibly causes the recoveries to over-emphasise the peripheral distribution of the species in Iceland. In fact the Greylag *nests* farther inland for the most part, although not deep in the interior where it is replaced by the Pinkfoot, but lives nearer the coast before and after the breeding season. Since the human inhabitants of Iceland are largely concentrated in coastal areas it is inevitable that the geese are particularly liable to be shot at these times, although legally protected between 31 March and 1 August. The main values of these recent recoveries lies in the additional evidence they provide for the view that the Iceland population may be regarded as a single one.

This, too, is the merit of the recoveries within Britain of British-ringed birds, which are summarised by localities in Table I. Nearly all the major wintering localities have yielded recoveries, even though Greylags have been ringed in only four. The number of recoveries is too small to permit any detailed analysis of the kind attempted for Pinkfeet (*Seventh Annual Report*, pp. 107–122), but it is perhaps worth noting that there is so far no indication at all that older

Greylags have been more attached to the locality where they were caught than those ringed in their first winter. Some of the geese, caught in January and March, could not be classified by age. Of those that could be and have since been recovered, 42 were adults and 24 first winter. Amongst recoveries in the winter of ringing nine of 23 adults were taken near the place of capture, as compared with nine of 15 first-winter birds. This shows that much wandering occurs (as in Pinkfeet, for which the proportion of both adults and first-winter birds recovered in the same season near where ringed was about half). Recoveries in later years show a similar tendency for Greylags ringed when young to be no more likely than older ones to be found where ringed (4 of 9 first-winter, 7 of 19 adults). This result, which needs confirmation, is in direct opposition to that for Pinkfeet, which showed that those marked in their first winter were much less likely than older birds to recur in the same area in later years.

The recovery series (Table II), though small, is apparently able to provide a fairly precise estimate of the annual death-rate, using the method recently devised by Haldane (*Acta XI Congressus Internationalis Ornithologici*, pp. 454–458. Basle, 1955) which is applicable to data like these in which the series are still incomplete because some of the marked birds are still alive. The death-rate is calculated to be 23·1% ± 2·19%, similar to the estimated death-rates of Pinkfeet, 26·0% ± 1·6% (*Seventh Annual Report*, pp. 99–106) and Whitefronts, about 28% (see pp. 80–84).

TABLE I

Summary of Recoveries within Britain of British-ringed Grey Lag Geese

Where Recovered	Number Ringed	Where Ringed			
		Angus	Kinross	Solway	
		88	218	123	Dumfries 81 Kirkcudbright 42
	Total Recovered				
Cromarty	1	—	1	—	
Moray	2	1	—	1	
Angus	4	2	—	2	
Perth	10	3	7	—	
Fife	6	1	5	—	
Kinross	8	—	7	1	
Lothians	1	—	1	—	
Dumfries	9	1	1	7	
Kirkcudbright	7	1	3	3	
Wigtown	12	2	6	4	
Westmorland	1	1	—	—	
Lancashire	1	—	—	1	
Co. Down	4	—	3	1	
Co. Clare	1	—	—	1	
Co. Dublin	1	—	1	—	
Co. Louth	2	1	—	1	
Co. Wexford	2	—	1	1	
Total	72	13	36	23	

TABLE II

Recovery Series for Iceland-ringed and British-ringed Grey Lag Geese

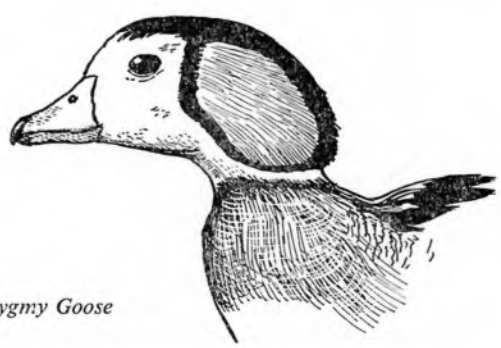
Marked	No. Marked	Recovered (years after marking)						
		0–1	1–2	2–3	3–4	4–5	5–6	6–7
Iceland 1932–36 ..	50	7	3	1	1	0	0	1
Britain 1950–51 ..	47	5	4	4	0	1	—	—
Britain 1952	88	8	2	6	—	—	—	—
Britain 1953	296	37	18	—	—	—	—	—
	481	57	27	11	1	1	0	1

UGANDA

New Year 1956

The Director was invited by the Trustees of the Uganda National Parks to open a new Safari Lodge at Paraa in the Murchison Falls National Park. He was accompanied by Mrs Scott and in the course of a fortnight an impressive list of 145 *species of birds was identified and many others were seen which were not. The Director submits the following report.*

OUR first introduction to Uganda birds was a day spent with the distinguished naturalist Dr Sandy Haddow of the Virus Research Institute. He showed us Crowned Cranes and Pelicans, Open-billed Storks, Hornbills, Touracos, the marvellous scarlet shrike known as the Black-headed Gonolek, two species of Bee-eaters, three of Sunbirds, and the delicate blue Fairy Flycatcher. But the climax of the day came during a canoe trip along the shores of one of the numerous arms of Lake Victoria which surround Entebbe. There is a fringe of papyrus swamp round these shores and outside it some thin rushes mingled with the beautiful purple waterlily. It was here that we came upon three African Pygmy Geese, *Nettapus auritus*. There is no doubt that the drake is among the most beautiful of all waterfowl. The back and crown are glossy green, the breast and flanks are rich pale chestnut, and the side of the head, which is white, has a large pale green patch edged smartly in black. This lovely pattern is set off by a bright orange bill. In flight there is a conspicuous white wing



African Pygmy Goose

bar and the bird is somehow reminiscent of a drake Goldeneye, but it also has a clear affinity with Mandarins and Wood Ducks in that the wings are not raised far above the horizontal. One of the males we found again two or three times and it flew each time a few hundred yards along the shore. Later I saw some more Pygmy Geese at the Sailing Club nearer to Kampala—but they were always in twos and threes, and it seems that they were much less numerous than formerly, though no reason for the reduction has been suggested except, perhaps, just the general extension of the human population in the area and the advent of firearms.

Two days later we motored with our host, Ralph Dreschfield, who is Chairman of the Trustees of the National Parks and Attorney-General of Uganda, to the new lodge in the Murchison Falls Park. In this park it was the trip on the Nile in a launch which provided the best view of the animals and birds, including such Anatidae as we saw. Hippo, elephant, buffalo, waterbuck and Uganda cob were in good numbers, there were troupes of baboon, a few smaller monkeys and one or two rhinoceroses. A star bird was the Shoe-billed Stork and there were Goliath Herons and three species of Ibis. The banks were lined with a great profusion of crocodiles and we saw an occasional Nile Monitor. All these wonderful creatures at close quarters are unimaginably exciting when one has never seen them before in the wild state. The first close-up view of an African elephant seems to lose none of its thrill from the hundreds of films one has seen of them. This first sight of the African 'big game' animals is still, to any naturalist, breath-taking in its impact and must inevitably make a conservationist of anyone with any imagination at all. And among these great animals were familiar birds—familiar wildfowl known so well from collections, Spurwings, Egyptian Geese, Comb Ducks and familiar waders, perhaps the very same birds which we might have seen in England, Greenshanks, Ruffs, Common Sandpipers. The Spurwinged Geese were in twos and threes, a comparatively light race with quite a lot of white on the body. The Comb Ducks were in parties of up to a dozen, with almost as many males as females. We came upon a flock of about 30 White-faced Tree Ducks whose faces were stained dark brown so that they looked quite unfamiliar.

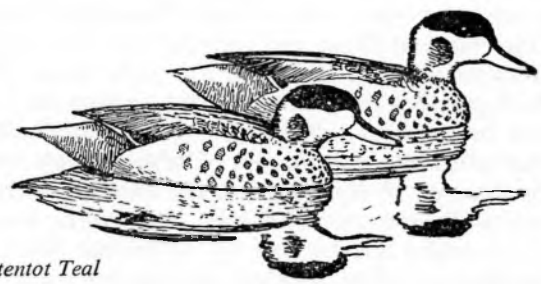
We spent three days in the Murchison Falls Park which included the opening ceremony of the new Safari Lodge at Paraa where we stayed. We fished for Nile perch in the pools below the incredible falls where the whole Nile tumbles through a cleft in the rock only 19 feet wide. Some big Nile perch of more than 30 lb. were caught while we were there, but the larger of the two I caught was only 10 lb. Near Boligi in the Park we saw big herds of antelope, including reedbuck, many warthogs, and some of the huge and improbable Ground Hornbills. We were also introduced to the spectacular Carmine Bee-eater. Here also we confirmed a previous identification of the Glossy Ibis, not apparently previously recorded in the Park.

In Ankole we went on safari to some artificial lakes ('dams') in order to see the ducks there. This was a three-day trip during which we were well looked after by Major John Blower, of the Game Department, and his wife. Our camp was set under a great Euphorbia tree near a dam called Kanyanya. A few miles short of it on another dam were quantities of ducks—Red-billed Pintails, White-backed Ducks, South African Pochard, Garganey, four European Pintails, and a single drake European Wigeon. On the slopes above this dam was a herd of game—zebras, kob and topi.

On the larger dam at Kanyanya White-backed Ducks were the most numerous followed by South African Pochards and Garganey (the drakes all still in eclipse

plumage). We had with us a very small fibreglass dinghy in which Ralph Dreschfield, John Blower and I set out at night with a lantern to try to catch some ducks. We managed to pick up a White-backed Duck, and we got very close to many Garganey, some Red-billed Pintails, and to one male Pygmy Goose, which could have been caught had we had a landing net.

During the next day we made a suitable net, but we were no more successful that night, though once again we got quite close to a pair of Pygmy Geese.



Hottentot Teal

We had ascertained during the day that there were two pairs on the dam. We had also seen Yellowbills which looked like the Abyssinian race and Hottentot Teal, which had a very characteristic behaviour under the influence of the light. They swam away at a better speed than we could normally make in pursuit (noisily rowing) and if by any chance we did catch up with them they flew ten yards and settled again. On neither of the nights was the sky overcast and on the second night we prowled on in the little boat until after moonrise, but the total catch for both nights was two White-backs, one of which was a half-grown young one and was immediately released. For most of this trip we had with us Archdeacon Bawtry, a most experienced ornithologist whose information and identifications were invaluable.

We visited two more dams near Mbarara. One was very large and had great flocks of Garganey and Southern Pochard with a little flock of Spurwings on the far side. It was near here that we saw a flock of more than 200 Crowned Cranes and watched their dancing display. The other dam was an old water-course dammed up, long and narrow and winding. It was here that we saw the most colourful picture of the whole trip. The surface of the water was largely covered with the purple water-lily. Where the water was open it reflected a brilliant yellow flower growing in great profusion along the far bank. Hottentot Teal were everywhere in springs of a dozen or 20, and among them and the beautiful chestnut-coloured Jacanas were eight glorious Pygmy Geese. It was an unforgettable spectacle.

From Ankole we motored to the Queen Elizabeth National Park, where we stayed with the Director and Chief Warden Mr Rennie Bere. The assemblies of waterbirds on the beaches along the Kazinga Channel and at the mouth of the Nyamagasani River were most impressive—two species of Pelicans, Cormorants, Wood Ibis, Marabou, Stilts, Herons, Gulls, Terns and Egyptian Geese in great mixed flocks. It was especially impressive to watch from the stationary motor-boat a group of a dozen elephants at less than 20 yards range with Egyptian Geese feeding round their feet.

The crater lake of Kikorongo had a flock of about a thousand Flamingos on it, and they were packed together swimming in the centre and feeding from the surface where the water is apparently quite deep. This was unexpected to

me. There were hippo in the lake, quite a lot of ducks—Garganey, Southern Pochard, Common Pintail and Knobnose (Comb Ducks)—and a great profusion of waders—Stilts, Greenshanks, Ruffs, Common Sandpipers, Wood and Marsh Sandpipers and a lot of Curlew Sandpipers. The setting of all these interesting birds with the pink bar of Flamingos across the calm lake and the reflections of the Ruwenzori foothills behind them was strikingly beautiful.

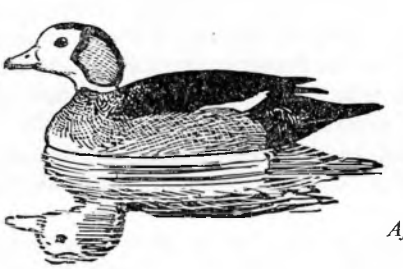
One night in our cottage in the camp at Mweya (the Safari Lodge of the Queen Elizabeth Park) we were woken by a curious 'champ–champ–champ.' Outside the window in the bright moonlight was a hippo which fed past within five feet of us and was followed by a second. Not far from the lodge on the following day we were lucky enough to be able to watch a pride of lions at close quarters from a Land Rover. There were three lionesses and a lion and they looked golden and serene in the afternoon sun with a background of the Ruwenzori. We watched them for more than an hour and saw interesting features of their behaviour, including copulation.

The last picture of wildfowl in Uganda which I must describe is a flock of about 200 Egyptian Geese grazing next to the little village of Katwe. They were close to the shore and some of them were swimming in family parties on the lake. They paid no attention to the Land Rover, and we watched and photographed them grazing on the sparse brown grass in quite a closely-packed formation. Those who keep Egyptian Geese in captivity usually respect their aggressive temperaments by isolating them in pairs, and it was therefore interesting and unexpected to see them feeding in close company just as one might see the Whitefronts on the Dumbles.

Fourteen days is a distressingly short time to spend in any country—but in Uganda with so many wild animals which were quite new to us, it was especially sad. Nevertheless it was amazing how much we were able to see. We returned with a small but select consignment of creatures for the London Zoo, including a potto, some lungfish (in polythene bags), two species of Agama lizards, two chameleons, some beautiful yellow and black tree frogs, some toads, a giant water scorpion, praying mantises, a stick insect, some long-headed grasshoppers, and a giant millipede. Unfortunately the one White-backed Duck could not be persuaded to start feeding and did not survive.

We are tremendously grateful to our hosts, the Hon. Ralph Dreschfield, Chairman of Trustees of the Uganda National Parks, Mr Rennie Bere, Director and Chief Warden of the Parks, and also to Colonel Bruce Kinloch of the Uganda Game Department for giving up so much of their time to make our fortnight such a success.

The Director has since been appointed an Honorary Trustee of the National Parks of Uganda.



African Pygmy Goose

MASS RINGING OF FLIGHTLESS BLUE AND LESSER SNOW GEESE IN CANADA'S EASTERN ARCTIC

By Graham Cooch, Canadian Wildlife Service

SUMMARY

THE capture of large numbers of moulting adult Snow Geese and their goslings on Southampton Island is described. The method of capture, adapted from a long-established Eskimo technique, resembles that used for catching flightless Pink-footed Geese in Iceland.

In the three summers 1952–54, 15,000 geese were ringed on Southampton Island and at a colony at Eskimo Point, North-West Territory. Over 10% have already been recovered. These recoveries, and live recaptures, have provided much information on the migration pattern of the species, on the areas in which these populations are most heavily shot, and on the extent of return to the breeding colony in succeeding years.

The third known colony of the species is on Baffin Island. It is hoped to ring geese there in the summer of 1958.

This ringing programme will make possible detailed studies of the population structure. Preliminary calculations suggest many similarities between the structure of the Snow Geese population and that of the Pink-footed Goose.

The number of Blue and Lesser Snow Geese (*Anser caerulescens*),[1] breeding in the eastern Canadian Arctic exceeds 800,000, of which about 350,000 are Blue Geese. Because of the colonial nesting of these birds and difficult travelling conditions, the location of the breeding grounds of the Blue Goose remained an enigma until 1929. In that year Mr J. Dewey Soper (1930) discovered a vast Blue Goose breeding ground at Bowman Bay, Baffin Island (see Figure 2), successfully culminating an eight-year search. The following year Dr G. M. Sutton (1931) reported a colony on Southampton Island. A third colony has

[1] Although the A.O.U. check-list retains the Snow Geese in the genus *Chen*, and treats Blue and Lesser Snow as distinct species, more recent work indicates that they are colour phases of a single species (Delacour, *Waterfowl of the World*, vol. I, 1954).

since been found south of Eskimo Point, N.W.T. (Gavin, personal communication 1955). Almost the entire eastern Arctic population of the species breeds in these three colonies. The most complete discussion published to date is that of Manning (1942).

Even though the major breeding grounds of Blue and Lesser Snow Geese have been known for more than 20 years, little had been learned of their life history. In 1952 the Arctic Institute of North America sponsored a long-term study of Blue and Lesser Snow Geese at Boas River, Southampton Island (63° 40′ N, 86° 10′ W) (Cooch 1953). An important phase of the study was the ringing of a large sample of birds on the various breeding grounds. From this sample, it was hoped to gather data on migration routes, winter range, mortality, areas of hunting pressure, and population changes.

Family groups of geese congregate in large flocks as the time of post-nuptial moult approaches. Eventually loose bands of up to 500 pairs and their progeny are to be seen scattered over the flat, featureless tundra. Although flightless, they are able to run with great speed and agility. It is possible for a man to run down individual birds, but an attempt to capture large numbers in this way would lead only to frustration. Scott and Fisher (1953) have created a vivid word picture of the futility of making a mad dash at moulting geese, even with the advantage of being mounted on horseback. The improbability of being able to make a mass capture on foot by such means is apparent.

Before the white man came, Eskimos in Arctic North America had developed an efficient method of capturing flightless geese by driving them into rude stone pens. Horing (1937), Steffanson (1929), Soper (1928), and Hantszch (1914) all refer to Eskimos rounding up geese during the post-nuptial moult. These drives were frequently made in conjunction with caribou (*Rangifer arcticus*) hunts. Since the last caribou on Southampton Island were extirpated in 1946,

thus eliminating the reason for visiting remote goose colonies, the Eskimos no longer trap geese. Evidently the same thing has happened on Baffin Island (Soper 1930). On Southampton Island knowledge of the methods used formerly is now limited to one family of Eskimos.

The Eskimo technique is simple but effective. A trapping drive is initiated by a group of men walking on a course nearly parallel to that of a large flock of geese. The birds see figures loom up through the heat haze, but, unless it becomes immediately apparent that these figures are coming directly toward them, they merely walk slowly away from the disturbance. If approached directly, many escape. The technique is to approach them indirectly, leaving a man behind from time to time to check their retreat in his direction. The drivers, still walking, try to keep the birds slowly circling in one general direction, otherwise they take fright and scatter. The process is continued until one man is left walking. It is often necessary for one driver to run quickly ahead of the flock to complete the circle. The drivers left behind from time to time remain hidden until it becomes apparent that one member has 'headed' the flock and that the geese are now starting to run back toward their original feeding area. No matter which way the geese turn, their progress is blocked by figures suddenly looming up on the horizon. They become confused and make for the largest gap between the men. Gaps are closed by running directly across the path of the geese; this is relatively easy because of the illusion of speed created by men running on the horizon. Finally the geese become completely muddled and give up. They stand in a vast milling mob, chattering so loudly that vocal communication among the drivers is difficult.

The birds are now under control. All the drivers begin to close in on the flock, except one who acts as a 'Judas Goat.' He walks off in the direction of the corral, never looking back. The birds move away from the encircling drivers and follow the one who is apparently retreating.

When the man leading the flock reaches the corral he walks through the entrance and climbs out at the end. The geese crowd into the pen.

The Eskimos made some long drives by this method. On Southampton and Baffin Islands they still tell of drives of several days' duration, which stopped when the geese were tired, and continued later until the destination was reached. It was possible, thus, to lead a small flock into a tent. This was actually accomplished in 1952 when a small flock was needed for study purposes.

The stone corrals (*kugees*) in which the Eskimos trapped their birds were not very imposing structures. Scott and Fisher (*ibid.*) have described and illustrated corrals found in Iceland, which do not differ appreciably from corrals seen by me. Maunder (1852) reports that natives in certain parts of Siberia used a similar technique in goose trapping.

Many explorers have noted the presence of stone corrals in areas far from present breeding concentration. Some have stated that perhaps these indicated that the areas were used for breeding in the past. However, this may not be a correct interpretation, as, on the basis of information given me by Eskimos on Southampton Island and corroborated by experience, the *kugees* were often built at camp sites and the geese were moved there from areas many miles away.

One method used in ringing in 1952 and 1953 (Cooch 1953) took advantage of the extensive tidal flats of the Bay of God's Mercy. Two or three men walked out on to the flats at low tide until out of sight of camp. They then walked parallel to the high-tide line until they believed a large segment of

the flock had been headed off. This party was aided by the presence of a small rocky island a few hundred yards from the high-tide line, which permitted the men to approach unobserved by the geese and provided vantage points for estimation of position and numbers of birds. A second party of two men remained at camp until it was believed that the coastal party had proceeded far enough. Then they proceeded to a pre-arranged point two miles inland. Here they divided forces. One man walked along a course parallel to that

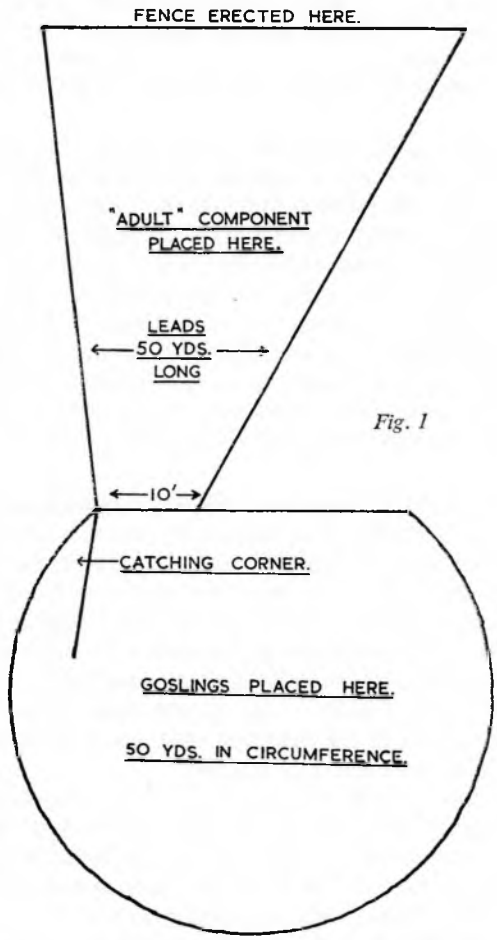


Fig. 1

taken by the coastal party, the other walked slowly in the general direction of the island. Eventually, the two parties came in sight of one another, or at least saw the geese moving away from the coastal party on the horizon. Thus the flock was trapped between the two groups almost before they sensed their presence. Vigorous running was required only in the first few minutes after the coastal party reached shore. Once the birds had been headed off, they were driven to the pen quite easily.

Results which are almost beyond belief can be obtained by using this method. On two occasions, in 1953, over 15,000 birds were surrounded. However, such large captures are not desirable and in these cases resulted accidentally from imperfect timing.

Construction of an adequate holding pen was simple (Figure 1). The corral, 50 yards in circumference, and leads 100 yards long were at first made of sections of 1-inch mesh heavy nylon netting, 4 feet high. The net was held upright by 5-feet bamboo poles, supported firmly with rocks and clay sods. Nylon netting proved completely unsatisfactory. Geese continually became enmeshed in it and were sometimes injured in their attempts to escape. Furthermore, bills and tongues of Blue and Lesser Snow Geese are sharply serrated and are quite capable of cutting through nylon. A large number of birds escaped by cutting a few strands of the netting. To combat this loss and reduce injury to trapped birds, the central receiving pen was reinforced with 1-inch mesh poultry wire, 24 inches high. A small 'V' inside the larger pen was used to trap small segments of the flock for ringing.

The trap now used is of all-wire mesh construction. Leads have been reduced to 50 feet and the bamboo poles replaced with aluminium tubing. Scott and Fisher (*ibid.*) have correctly pointed out that the leads are not necessary. They can, however, be put to other use and serve as auxiliary holding pens.

We still have much to learn about the best way to ring large numbers of geese without destroying too many in the process. Close confinement of large numbers of geese is dangerous for them. Young birds may be knocked over and trampled, become fatigued, or die of shock. The rate of loss appears to increase in geometric progression with each additional hour the birds are kept in the pen. The worst loss experienced occurred on 1 August 1952 when 78 young and 19 adults were lost from a flock estimated to be 4000 birds.

In 1953, Mr T. W. Barry and the writer devised a modification of the technique which permitted mass trapping with little or no loss (Cooch 1955A). It is based largely on flock behaviour of herded geese and applies only to the procedure used in herding the birds into the pen. Goslings have a tendency to fall to the rear as the flock is being herded along. About half a mile from the holding pen the flock is divided by a man running through it at right angles to its line of movement. The front portion, mainly adults, is held back, and the rear portion, of which about 90% are goslings, is led directly into the holding pen, and the gate is closed. The adults in the flock are then led in between the leads, which are fenced off to make a second holding pen.

By this method the goslings are protected from trampling and pecking by adults. The goslings in the main pen can be ringed and released in approximately half the time otherwise needed. Once the main pen has been cleared, additional goslings are brought in from the flock between the leads. This is possible because the goslings tend to congregate in one area in the mass of penned birds. Furthermore, they usually select the area nearest to the mass of goslings in the main holding pen. Additional gosling flocks are brought into the main holding pen several times until only adults remain to be ringed. When the goslings have been released they usually remain in the vicinity of the pen. Every time an adult female is released, one or more young follow her. In this manner the number of birds deprived of 'parental' protection is greatly reduced.

In 1953, separate captures of 1694, 1722 and 3719 birds were accomplished without the loss of a single bird in the pens. In small captures earlier in the season as many as 5% of the goslings had been casualties.

In a species such as Blue and Lesser Snow Geese, where family groups are so important to survival, it is quite right to be concerned about the effects of

breaking up families, and confining and segregating them according to age, colour phase, and sex. For three weeks before driving was attempted in 1952, a flock of 50 pairs of geese and their young was kept under constant surveillance. It was possible to positively identify every family group because of mixed mating of Blues with Snows, variation in plumage, the number of goslings per brood, and the number of Blue- or Snow-type goslings per brood. These birds were trapped and ringed on July 21 1952 between 12.00 and 14.00 hours. Fortunately, flocks of moulting geese return to the same area from which they were driven. Thus, when a check was made on the feeding birds at 08.00 July 22 1952, all family groups were reassembled. It had been interesting to watch stray young approach a family, be rejected, proceed to the next pair, and so on until finally accepted. Adults separated from their mates or progeny kept up an incessant clamour, but once the family unit was partially reassembled, calling stopped. It is not safe to assume that such complete reassembly of family units will occur when larger masses of geese are driven over long distances. However, my experience has been that at least 90% of family groups are reassembled after each drive. Then, too, goslings at this stage of development are large enough to fend for themselves and require no brooding. Unattached young band together and form self-sufficient units where rate of survival is high.

Scott *et al.* (1952), Scott and Fisher (1953), Boyd and Scott (1955), and Scott *et al.* (1955) have derived population estimates of Pink-footed Geese (*Anser brachyrhynchus*) on the basis of recapture of ringed birds during successive ringing attempts. This is not possible when dealing with Blue and Lesser Snow Geese. As mentioned previously, flocks return to their original feeding area after being released from the ringing pen, and birds driven from one area and ringed are seldom recovered in another area. Thus it is possible to capture a large sample of birds each day and get less than 1% rate of recapture.

The Trust expeditions to Iceland and Spitsbergen utilised a portable pen which was erected after the geese were under control. This is practical when some form of transportation is available but difficult under conditions such as those existing at Boas River. It has the advantage that geese are not fatigued by long walks before being confined. During some drives in 1952 and 1953, birds were driven as far as ten miles. This would have been especially hard on goslings and was therefore attempted only with flocks of non-breeding birds.

It is unfortunate that time did not permit the sexing of all the birds banded. However, all were aged and a small sample (100 each category) were sexed.

Non-breeding adults and sub-adults enter the post-nuptial moult in early July and regain their powers of flight before adults with young begin their post-nuptial moult. Thus it was possible to ring samples of sub-adults by making drives in mid-July and of breeding adults and goslings by drives in early August.

The problem of keeping records when one's assistants are Eskimos who speak little English, is difficult. To avoid confusion and reduce the length of time required for ringing, all rings were opened on the day before the drive. A maximum of four categories was available on any drive if the birds were not sexed, i.e., adult Blue, adult Lesser Snow, juvenile Blue, and juvenile Lesser Snow Geese. Drives for sub-adults required only two categories. Each Eskimo was assigned to ring birds of one category only. Any birds ringed previously or difficult to place in a category were referred to me. Birds were ringed in series of 1000 or more, but rings were not necessarily placed on the birds in

numerical sequence. At the end of the day, unused rings were subtracted from the total number of rings opened for each category. The difference represented the number of birds ringed on that day. Rings which remained unused were used first on the next drive and recorded as having been used on that day.

The use of untrained personnel has resulted in an error of identification of juveniles of one-half of 1%. Considering the number of geese which have been ringed during this project (15,000) the use of the system described above seems justifiable.

It is a happy coincidence that two research projects, one in Iceland and Spitsbergen, the other in Canada, should evolve independently a practical method of ringing large numbers of flightless geese. Since the winter of 1952, data on modification in technique and results obtained, and notes of general interest, have been freely exchanged.

Some of the results of the Trust ringing programme are already published. The study has been greatly aided by rocket trapping in Scotland and England. This is accomplished after the flight from Iceland, but prior to intensive shooting. It provides a clearer understanding of seasonal population structure, selective mortality, and local movement than is possible under North American conditions.

The difficulties involved in analysing data on North American waterfowl are many. The large number of birds involved, the vast area over which they are found, and the kill in regions where transportation is limited, all serve to confuse the interpretation. However, some obvious results of this mass trapping programme are available.

One immediate result was the discovery that birds from Southampton Island and Eskimo Point had a different migration pattern from those breeding at Bowman Bay, Baffin Island. This newly-discovered route follows the west coast of Hudson Bay to Cape Henrietta Maria. After a month of feeding along

Fig. 2

the coast, the birds fly south and south-west to Minnesota and South Dakota. They may in some seasons stop in this area but more often continue on directly to their winter range in east Texas (Cooch 1955B). The Baffin Island birds migrate through James Bay and south to Louisiana via the Mississippi River Valley.

The 1700 to 2300-mile autumn migration, from Hudson and James Bays to the Gulf of Mexico has been accomplished in 60 hours and at an altitude of 5000 feet (Cooch 1955B). However, such long flights at such great altitudes are more characteristic of the Baffin Island population than of the Southampton Island geese.

Three areas of heavy 'hunting pressure' occur along the 3000-mile flight of geese from the breeding grounds to Texas. These are on the Hudson Bay coast of Ontario and Manitoba, in South Dakota, and in east Texas. Ring recovery from the wintering area accounts for nearly 50% of total recoveries. Unfortunately, a large number of rings taken annually by the Cree Indians of northern Ontario are not turned in. A programme of education is now under way there and this, it is hoped, will lead to a higher proportion of rings being recovered in the area.

A total of 1579 rings (10.5%) have been returned since 1952. These returns, tabulated by year of ringing and recovery, are presented in Table I and Table II.

TABLE I

Recovery of Ringed Blue Geese during Hunting Season 1 September–10 January

Year of Ringing	Place Ringed	Age Class	Year Recovered			Total Recovered	Total Ringed
			1952	1953	1954		
1952	Boas R.	Adult	28	32	27	87	552
1952	Boas R.	Juvenile	73	12	15	100	1148
1953	Boas R.	Adult	—	20	22	42	813
1953	Boas R.	Sub-adult	—	16	10	26	382
1953	Boas R.	Juvenile	—	90	13	103	1010
1954	Esk. Pt.	Adult	—	—	13	13	200
1954	Esk. Pt.	Juvenile	—	—	27	27	345
Totals ..			101	170	127	398	4450

A preliminary examination of Tables I and II indicates that the breeding population is fairly stable. This conclusion has been supported by construction of a population plot, similar to that designed by Boyd and Scott (1955).

There is good evidence that birds return to their natal area in succeeding years. Eleven ringed adult females were found using the same nests in 1952 and 1953. In 1953, 2100 sub-adults were trapped, 178 of which were recaptures of birds ringed in 1952. At Eskimo Point, N.W.T., only three Boas River birds were recaptured in a total of 2800 birds caught. Blue and Lesser Snow Geese remain together in family groups from time of hatching until the next breeding season. Family groups of adults and ten-month-old young arrive on the breeding grounds as units. Indirect recoveries (recoveries made after the first year) follow the same pattern as do first-year recoveries.

TABLE II

Recovery of Ringed Lesser Snow Geese during Hunting Season 1 September–10 January

Year of Ringing	Place Ringed	Age Class	Year Recovered			Total Recovered	Total Ringed
			1952	1953	1954		
1952	Boas R.	Adult	25	19	29	73	327
1952	Boas R.	Juvenile	253	55	53	361	2973
1953	Boas R.	Adult	—	105	84	189	2224
1953	Boas R.	Sub-adult	—	46	42	88	1182
1953	Boas R.	Juvenile	—	295	60	355	2789
1954	Esk. Pt.	Adult	—	—	22	22	321
1954	Esk. Pt.	Juvenile	—	—	93	93	734
Totals ..			278	520	383	1181	10,550

The recovery data are still incomplete. The Baffin Island population, estimated to contain 350,000 birds, has not been sampled. This was attempted in July 1956, but conditions prevented the colony being reached. A further attempt will be made in the summer of 1958. Until this has been accomplished, further discussion of the available data is not desirable.

It is hoped that eventually all species of geese breeding in Canada's Arctic will be studied in as great detail as Pink-footed populations in Iceland, Spitsbergen, and the British Isles.

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WILDFOWL CONSERVATION IN NORTH AMERICA SINCE 1945

By Frank C. Bellrose and Thomas G. Scott

(This article is reprinted from the December 1955 issue of the *Wilson Bulletin* [vol. 67, no. 4: pp. 310–312], with the kind permission of the authors and of Dr Keith L. Dixon, Editor of the *Bulletin*, and Dr Robert A. Pierce, Chairman of the Conservation Committee of the Wilson Ornithological Society. It was presented as a contribution from the Conservation Committee of the Society, which is one of the leading ornithological organisations in the United States, with a membership drawn from all over the country. We feel that this authoritative summary of recent developments in wildfowl conservation in America will be of considerable interest to everyone concerned about similar problems on this side of the Atlantic.

Since this report was written for an American audience, it makes use of some terms likely to be unfamiliar to British readers. Where their meaning may not be evident from the context, we have attempted to clarify these terms in footnotes.

When first published, the report was entitled 'Waterfowl Conservation in the Decade following World War II.' We have changed the title, but the substance of the report is reprinted without alteration.—ED.)

DURING the decade following World War II, the pressures growing out of an increasing human population have added progressively to the difficulty of and need for waterfowl conservation. Moreover, the events taking place during these ten years have contributed little to suggest that the waterfowl conservationist's road will be any less difficult in the future.

Waterfowl conservation during this period may be reviewed from three points of view: (1) administration, (2) management, and (3) research. As herein considered, administration embraces the political philosophy and financing of waterfowl management; management includes manipulation of waterfowl populations and habitat; and research concerns the gathering of facts upon which to base the management programme.

Administration [1]

The formation of state conservation agencies into councils for each of the four North American flyways [2] has been a significant development in waterfowl

[1] *Administration.* There are in North America two national governmental conservation agencies, the U.S. Fish and Wildlife Service and the Canadian Wildlife Service. In addition nearly all the individual states and provinces have their own conservation organisation, and there is a similar two-tier system of law-enforcement officers. The functions of Federal and State organisations inevitably overlap, but the difficulties to which this sometimes lead are far outweighed by the advantages of a well-co-ordinated programme on a continental scale.

[2] *Flyways.* As a result of ringing studies it became apparent that waterfowl (and other migratory species too) in North America confine their migratory movements to rather well-defined geographical regions. These have come to be called 'flyways.' As stated above, there are four: Atlantic, Mississippi, Central and Pacific, each of vast extent. Definite lines cannot be drawn to mark the boundaries of any particular flyway, and parts of some populations are continually shifting between the different zones, but what was originally a biological discovery has proved to be an administrative convenience.

conservation. Each flyway council provides a means of formulating regulations tailored, within limits, to the needs of the individual flyway, and, to a lesser extent, to the needs of each state in the flyway.

As an adjunct to each council, the waterfowl biologists within each flyway may serve as a technical group which is available for consultation by the council. This technical group may also act as an agency through which the research activities of the flyway can be co-ordinated.

The flyway council system creates one potential danger to waterfowl conservation: it may tend to form a pressure group seeking unwarranted changes in hunting regulations. Members of the councils must endeavour to insure that the welfare of the waterfowl remains of primary concern.

Under new leadership, the U.S. Fish and Wildlife Service appears to be following a liberal attitude toward restrictions on waterfowl hunting. When the continental waterfowl population declined in 1953 and 1954, the Service not only adhered to the 1952 regulations [3] on length of season and bag limit for the Mississippi Flyway, but, in 1953, increased the length of season five days for the Atlantic and Pacific Flyways and, in 1954, added an additional five days on the Pacific Flyway. At the same time, the Service permitted California to conduct an experimental feeding programme. The result: hunters in Ohio and Maryland have clamoured for similar privileges.

Whether the present liberal policy toward hunting regulations will affect waterfowl populations adversely remains to be seen. In 1953 and 1954 unusually mild weather prevailed over much of the United States during both hunting seasons, thereby tending to limit the kill of waterfowl. With favourable hunting weather, however, an excessive kill of the breeding stock may take place. Within the memory of living men, such unusually severe slaughters have taken place on at least two occasions. The possibilities appear especially dangerous in the Mississippi Flyway where a large portion of the waterfowl which winter there are relatively accessible to the hunter when concentrated. Thus, it seems apparent that the margin of safety guarding our waterfowl population under present administrative policies is paper-thin and that perhaps we are close to being guilty of gambling with the future of our waterfowl resource.

The philosophy of previous administrations of the U.S. Fish and Wildlife Service toward regulating the kill of waterfowl was voiced by Dr Ira N. Gabrielson, former Director of the Service, in a talk on 24 May 1955 in Washington, D.C. He stated: 'Since the passage of the Migratory Bird Treaty Act, there is no question but what the administrative policy of the Biological Survey and by the U.S. Fish and Wildlife Service has generally given primary consideration for the welfare of the waterfowl resource. Since the welfare of the ducks and geese is the prime consideration, it is necessary to be somewhat *conservative* in making regulations.'

Although the Wood Duck population in the Mississippi Flyway has steadily

[3] *Regulations.* The American laws governing the timing and duration of the open season are fundamentally different from those in Britain. Annual assessments by the Fish and Wildlife Service of the breeding success of the various populations are taken as guides in framing regulations announced in August each year. These regulations, approved by the President, apply to the whole of the United States, but vary from state to state, according to the needs of the 'hunter' as well as the waterfowl. Thus the open season in the northern states is ahead of that in the south, and there are differences between east and west too. The regulations not only lay down the length of the shooting season but also prescribe bag limits (the number of waterfowl of various species that may be taken each day), and impose many other restrictions which are unknown to wildfowlers in this country.

declined in recent years, the Mississippi Flyway Council recommended that the closed season in force in 1954 be changed to permit one in the bag and in possession in 1955. The U.S. Fish and Wildlife Service accepted the Council's recommendation. In view of the precarious status of this species in the Mississippi Flyway, this decision appeared inconsistent with the need for being conservative in making regulations.

The budget of the U.S. Fish and Wildlife Service in recent years has not been adequate. This has resulted in the use of duck stamp funds for purposes other than those intended when the Duck Stamp Act [4] was passed by Congress. The Act was passed at the behest of sportsmen who had become aware of the need for obtaining and developing lands for waterfowl refuges. The funds have had to be used for activities of the Game Management Branch and the operation and maintenance of existing wildlife refuges to such an extent that only minor acreages have been purchased by the Service during the past five years. Larger proportions of these funds should be earmarked for the purchase of refuge lands in the future.

Management

One of the most pressing management problems is that of alleviating crop depredations by waterfowl in southern Saskatchewan and Alberta, and in California. Hazing by aircraft, scaring devices, permit shooting, and feeding have been used with some local success, but the affected areas have been so extensive that 'only the surface has been scratched' by the control efforts.

The draining of pot-holes in western Minnesota and in North and South Dakota has abated as a result of a change in policy by the U.S. Soil Conservation Service, but this remains as a continuing threat to the most important waterfowl breeding ground in the United States.

Many of the river basin programmes planned by the U.S. Corps of Engineers in the southern United States will drain tens of thousands of acres of overflow bottomland used by wintering Mallards and Wood Ducks. Conservationists should familiarise themselves with the recommendations of the Branch of River Basins of the U.S. Fish and Wildlife Service and then urge Congress to include these recommendations before approving any drainage project.

The state conservation agencies are to be commended for their extensive acquisition and development of waterfowl habitat during the past decade. Prior to World War II, only a few states maintained waterfowl refuges and public shooting grounds. Since the war, however, numerous states have acquired such areas for waterfowl. The acreage in state ownership now approaches that held by the U.S. Fish and Wildlife Service. Because of the large amount of waterfowl acreage being lost as a result of drainage, siltation, and industrial and real estate developments, it is hoped that state conservation agencies will continue an aggressive programme of land acquisition for waterfowl.

[4] *Duck Stamp Act.* A law approved in March 1934 (at the time when the plight of waterfowl in America appeared desperate) requiring all persons intending to shoot waterfowl to buy a one-dollar stamp each year, in addition to their gun licences. According to the Act the receipts from the sale of the stamps are to 'be set aside in a special fund to be immediately and permanently available for the acquisition and improvement of inviolate sanctuaries for waterfowl, for law enforcement, and for study and research into problems of waterfowl management' (Albert M. Day: *North American Waterfowl*, p. 151, 1949). Duck stamps now cost two dollars.

Research

Two notable programmes in waterfowl research were initiated by the U.S. Fish and Wildlife Service during the post-war years: (1) the extensive appraisal of waterfowl populations and of production of young on the breeding grounds and (2) large scale banding of adult and young waterfowl on the breeding grounds. These two programmes have added valuable information to the knowledge of waterfowl and aided in their management in North America.

Intensive research on nesting waterfowl by members of the Delta Waterfowl Station,[5] by Jerome Stoudt of the U.S. Fish and Wildlife Service at Redvers, Saskatchewan, and by biologists of Ducks Unlimited [6] have supplemented the extensive breeding grounds surveys. In our opinion, however, there is a need for additional intensive research on nesting waterfowl.

An inventory of the wetlands of the United States has recently been completed by the Branch of River Basins of the U.S. Fish and Wildlife Service. This is an important contribution toward better land management for waterfowl because it points up the relative value of existing areas for waterfowl, and the areas most in need of acquisition. It is anticipated that the Branch of River Basins will continue to refine its wetland inventory data.[7] It is hoped that eventually the waterfowl carrying capacity of every important water and marsh area will be evaluated.

Studies on two major diseases of waterfowl, botulism [8] and lead poisoning,[9] have produced some new and encouraging findings. Bell, Sciple, and Hubert (1955, *Jour. Wildl. Mgt.*, **19**, 352–357) have contributed importantly to our knowledge of avian botulism by developing their microenvironment concept and establishing that *Clostridium botulinum* type C grows and produces toxin in immature forms of insect carcases in distilled water. Evidence from intensive investigations by personnel of the Section of Game Research, Illinios Natural History Survey, has been interpreted to indicate that lead poisoning is less important as a mortality factor among waterfowl than was formerly feared.

During the fall of 1954 waterfowl biologists in every state in the Mississippi Flyway made bi-weekly estimates of waterfowl populations in their state. Upon compilation, the data provided much needed information on the migration of the waterfowl in and through the flyway. Among many values to be gained from this information may be mentioned one—that of providing for open seasons at the most judicious times.

It is believed that further investigations on the precise nature of crop depredations by waterfowl and techniques for the control of such depredations are also among the foremost research needs.

[5] *Delta Waterfowl Station:* see pp. 74-79 in this Report.

[6] *Ducks Unlimited.* A private organisation of duck hunters, who contribute substantial funds for restoring and improving breeding grounds, largely in the south of the prairie provinces of Canada, the nursery of a large part of the American duck population.

[7] *Wetland Inventory.* This programme is analogous to that being undertaken by the Trust (of which 'Waterlog' is a part).

[8] *Botulism.* A disease responsible for massive losses of ducks in late summer in some parts of America, and recently reported from the Camargue, but not found in Britain.

[9] *Lead Poisoning.* In some localities in America where shooting from fixed butts ('blinds') has been practised for many years the accumulation of lead shot on the bottom in the vicinity is so great that ducks are liable to swallow sufficient pellets to produce toxic effects. (The shot are presumably treated by the ducks as if they were seeds, or perhaps small stones, which are habitually eaten to assist in grinding food in the gizzard.) This has not so far been reported in Europe, as far as we are aware, although the necessary conditions must exist on a great many flight ponds where ducks have been fed and shot for many years.

REVIEW

Travels and Traditions of Waterfowl by H. Albert Hochbaum (pp. x, 301. Oxford University Press. 40s.).

SOME research workers pour out a continuous flow of papers throughout their working life. Others publish but seldom and when they do their productions are often the more lastingly valuable, distilled as they are from long years of accumulating data, of careful interpretation and reflection.

In 1944 Al Hochbaum published a book, *The Canvasback on a Prairie Marsh*, which was quickly recognised as an outstanding text, received the American Ornithologists' Union's Brewster Medal and has served as an important reference point for subsequent work on wildfowl biology. Now, in 1956, with this second book, Hochbaum has again performed a signal service to ornithology which will surely receive even wider recognition.

This is a finely produced book with elegant format, clear printing and delightful sketches from the author's own pen. The style is lucid, the arguments clearly and unhurriedly presented. One only regrets the breaks in the smooth flow of the narrative by long direct quotations, of generally inferior prose, taken from other authorities.

One of Hochbaum's main contentions is that migration must be considered as part of a bird's normal behaviour, not as something discrete and esoteric. He therefore first examines these usually neglected, everyday movements round the home area, and the means whereby the bird maintains itself in relation to the environment. We are treated to masterly expositions of complicated concepts. Sensory physiology and aerodynamics are explained in clear terms and by illuminating analogies to human experiences. Apart from this marshalling of published data there is the first account of experiments carried out at Delta on the flight of birds temporarily blind-folded with paper hoods. Although deprived of all visual clues such birds had apparently normal, stable flight. However, they usually flew in circles or loops and so inevitably drifted downwind. They showed no awareness of wind direction, except in momentary gusts, and would attempt to land from any direction. These observations have great relevance to the problem of bird migration in the absence of terrestial or celestial reference points, to 'drift' migration.

From this first part of the book emerges a clear picture of wildfowl as creatures of habit, adhering to regular aerial tracks though having the freedom of the air; of their ability to learn quickly and of their iron memory; of the pre-eminence of their eyes among their sense organs, superbly adapted to the detection of detail and movement; of their flying stability based on the semi-circular canals of the ear; of their keen awareness of time, based on both solar and metabolic clues.

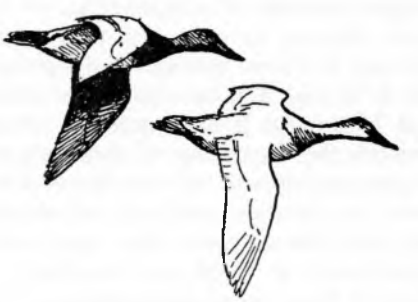
The second part of the book is devoted to a consideration of migration itself. Again, with his regard for basic facts, Hochbaum begins with the description of migration in progress—the 'visible migration' which has received so much attention in Europe during recent years (though not in the case of wildfowl). He presents clear evidence of migration in 'standard directions,' modified to some extent by topography. At the same time he stresses the apparently random 'explosion' of young birds of the year and suggests that this is converted into a southward movement by their joining up with older, experienced birds. Emphasis is laid on the tendency for wildfowl to travel in mass or at least in groups. It is inferred that there is no need to postulate innate directional tendencies such as have been demonstrated in passerine migrants.

Much space is given to discussing the means by which birds guide themselves on migration. There is a thoughtful chapter on the relativity of the distance of travel to the height and velocity of movement. It is pointed out that orientation by visual landmarks actually becomes simpler the higher and faster a bird (or man) flies for we have to deal then with general patterns and a few landmarks rather than a mass of detail. Some forms of navigation, such as those based on geo-physical or astronomical co-ordinates could only become established when swift, long-distance movements were carried out. An able exposition is given of the modern experiments and hypotheses and the conclusion is reached that some form of sun-navigation is the most likely answer. Certainly observations on wildfowl support the idea of a dependence on the sun, many examples are given of migrants refusing to start out with overcast skies. But once initiated a movement may continue through bad weather and Hochbaum is at pains to stress that the birds may well have more than one method of orientation. Recognition of visual landmarks is an important subsidiary. A strong correlation is shown between the occurrence of mass migrations at Delta and the establishment of favouring air-streams over the North American continent. Such conditions might serve to orientate randomly-wandering young birds as well as assisting old birds who knew where they were going. For the first time some interesting experiments at Delta are described. Migrating duck were subjected to the effects of 3 cm. radar transmissions. Twelve out of 14 flocks reacted as if a shotgun had been fired at them. Ducks flying locally or on the ground were apparently not affected, nor were gulls, swallows and passerines whether these were migrating or not. The experiments are considered to be inconclusive but no more suggestive of navigation with reference to the earth's magnetic field, than reaction to loud noises is evidence of navigation by sound waves.

The last part of the book is devoted to a consideration of the part that biological traditions play in the lives of wildfowl. By learning alone each new generation receives its knowledge of the location of home and winter ranges and of the routes between. These chapters are perhaps the most stimulating in the whole book, presenting a thesis which has received little attention before, and backing the conclusions with a mass of detailed examples. The way in which new traditions may be built up as the result of natural changes or by the intervention of Man are considered. Contrariwise the ease with which traditions may be broken by drainage or by over-shooting is emphasised, together with the difficulty of re-establishing a migratory population in an area from which it has gone. Traditions also have an important effect on evolutionary developments by causing smaller breeding groups to be set up than would be likely on purely geographical considerations.

This excellent book is completed by a full bibliography of more than 500 references, and by a good index. Thus to the end it continues to give us a really factual presentation of the subject. The wonder is that this has been done in such a very readable way. Some people who hurry through life may declare with irritation that the book could have been condensed. And without a doubt it could, but at what a loss. We would have had another dry authoritative text, thumbed by a few scholars, instead of a work that will not only be useful to the minority but will stimulate a wide range of readers to discover more about these fascinating problems for themselves. The descriptive passages are never purple, but clean-spoken and evocative. As but one example of the excellence of Hochbaum's style I will end with a quotation from a passage describing the bathing of ducks. 'Sometimes a mad excitement overtakes the crowd. One bird races across the surface as if the devil himself were on its tail. Then in full stride it dives. The instant it comes up it goes down again; up it comes, down it goes. All the birds in the flock may be consumed in this devil-chase, helter-skelter, this way and that, over the water and down under. After a few minutes the divings end. The flock regains composure and settles quietly to the job of preening.' The rhythm and pace of the words fit their meaning so well that the scene comes to life before us. And yet this is a book written by a scientist! Would that such excellence could become commonplace.

G. V. T. M.



A FLYING VISIT TO DELTA WATERFOWL RESEARCH STATION

By G. V. T. Matthews

In April 1955 I attended an informal conference on bird orientation held at Duke University, North Carolina, the necessary funds being provided by that university and the U.S. Office of Naval Research. As I was shortly to join the staff of the Wildfowl Trust it seemed a good thing, while in North America, to visit Delta Waterfowl Research Station in Manitoba. The Institute of Wildlife Management, Washington, most generously produced the additional funds needed to allow this deviation from track.

For one reason and another time was short and it was very much a flying visit. My impressions were mainly of people and places, so those who are interested only in birds need read no further. My Fisher Index (new species seen) was quite absurdly low.

To arrive at Idlewild airfield is a most disappointing introduction to New York—17 miles distant and giving no indication of its famed panorama. The entry road passes an alternation of cemeteries and used car dumps. Both must

undoubtedly be the largest in the world, square mile upon square mile of monumental masonry and acres and acres of vast bicoloured beetles advertised at ridiculously low prices. Car parks form a characteristic and not unattractive pattern on the American landscape when viewed from the air.

I had only a morning to 'do' New York, so my impressions are fragmentary. There is a marked contrast between fine buildings and a surrounding squalor. The United Nations Building is most impressive and not like a match-box. While endeavouring to cross the road to the waterfront I *think* I saw a real cops-and-robbers car chase ; at the very least one vast limousine backfired repeatedly at the same time as another hurtled along behind it. At Philadelphia I was nearly shanghaied by a huge individual who insisted on calling me 'sailor.' I was so flabbergasted by this that I could only say 'Sir, I am an Englishman.' Such banality served its purpose as I suffered no further molestation.

Washington, a fine city, reminded me strongly of New Delhi, even down to the flattened rotundas. Darkly brooding on the fate of our Indian capital, I was cheered by the thought that no Red Indian government would take over here. The traffic flowed with remarkable smoothness until one beetle hit another a mighty blow from behind. The foremost beetle opened its bonnet-jaw in protest, glass tinkled and a police car with a small lighthouse on its roof came wailing over to investigate. The Office of Records in its endeavours to defend the cleanliness of its porticos, was living up to its name. The cries of a distressed starling were being relayed to its not-very-impressed cogenders. Two highlights of my visit were conversations with C. R. (Pink) Gutermuth, secretary of the Wildlife Management Institute and a leading conservationist, and with F. C. Lincoln, whose books and papers on bird migration had nurtured me from the cradle.

Flying on to Richmond and thence to Raleigh-Durham, the 'plane blossomed with bird orientation experts once one of them had approached me as an obvious Englishman—because I was wearing a pullover. Professor D. R. Griffin and Dr T. H. Goldsmith from Harvard, Professor H. L. Yeagley from Pennsylvania and Professor H. B. Hitchcock from Middleburg were only too anxious to start conferring at once. At the airport, which had a real hitching-rail, I was quickly made aware that I was in the South. Searching for the 'rest rooms' I was confronted by *four* doors labelled Gentlemen, Men, Ladies and Women. And so to bed in the luxurious Washington Duke (*sic*) Hotel.

The tempo slowed to the academic for three days, conferrings from 9 a.m. through to midnight. Others present besides the 'plane load were Dr J. G. Pratt of Duke, Dr G. Kramer of Wilhelmshaven, Dr W. H. Thorpe and Dr D. H. Wilkinson of Cambridge, Mrs K. S. Rawson of Harvard, Professor L. Graue of California, Major Otto Meyer, U.S.A.A.F., and Mr Carson from Honolulu. At intervals we ranged through the Carolinas and Virginia, making experimental releases of pigeons. (I had been doing just this only a few days previously, on the other side of the Atlantic.) A valuable synthesis of ideas was achieved and many misinterpretations cleared up. Lavish hospitality was showered on us. The Duke campus is rightly regarded as a very fine one—it is modelled on our own older universities, with differences. I never really got used to the 'Coca-cola' machine which stood in the entrance, nor the way in which habitués could drain a bottle in one gulp, without repercussions. An invitation to lunch with the Vice-President conjured up, to my Cambridge-bred eyes, visions of High-table and all its elegance. It was just a little disappointing

to be shepherded through the usual self-help cafetaria and introduced later to the man a few trays ahead. But no English don could have been more courteous and punctilious in attending to his guests.

On 19 April I set out for Delta. This involved a rather devious route on one of those 'planes which plod steadily along between major towns, seldom more than an hour's flying time apart. From Raleigh-Durham we proceeded via Greenville, Chattanooga, Nashville, Louisville and Indianapolis to Chicago. By diligently stretching my legs at every stop, I could boast of having set foot in 13 of the States, and flown over four more in the five days I was there. (In Canada I 'did' four (plus two) of the Provinces.) At Chicago, having insufficient time for a night's sleep, I had arranged to meet Dr W. J. Beecher, the taxonomist, at the airport. He kindly offered to show me a 'dive' in nearby Cicero, a district more stained with the blood of gangsters than any other. After promenading past a series of night-clubs with luxurious advertisements, he decided that I would not be interested in 'that sort of thing' and we finished in a very dull bar draped by a few mildly villainous characters. As in all public places the television screen was never empty, and the inmates gazed continuously and listlessly at the appalling drivel that flickered before them. American television has not even the redeeming feature of a 'Look' programme. It does have a weather forecast feature, however, and the bar-tender, obviously classifying us as 'egg-heads,' came to inquire 'What's diss precipitation?'

On via Minneapolis and Fargo to Winnipeg, where Al Hochbaum, Director of the Delta station, was waiting to meet me. At Slimbridge we would think twice before going to Southampton to meet a visitor. It is a measure of the spaciousness of the Canadian outlook that from Delta an equivalent trip (140 miles) is genuinely considered to be a minimum courtesy, tied in with a shopping expedition and a meal in town. We drove through a dead flat plain, duller and more treeless than our Fens. Small wonder that Al, who was raised in Colorado, finds mountains haunting his dreams. Eventually we reached Portage La Prairie, the nearest town to Delta, which is some 20 miles away to the north. Two miles short of Delta the road was impassable and baggage had to be carried half a mile to a station waggon left in readiness. Actually I was lucky to have such an easy entry; during the next three months the access roads were under water.

Delta village is a cluster of wooden houses, with some 20 families. The great Lake Manitoba stretches away 300 miles to the north. East and west as far as eye can see spread the reed-beds, creeks and 'bays' of the Delta Marsh. South, more marsh gives place to the farmland plain. Were it not for the wildfowl and the people who gather there to study them one might be forgiven for thinking it a place for Eeyores, 'rather gloomy and sad.'

The research station is centred around the Kirchoffer Lodge, formerly the shooting lodge of Mr J. F. Bell, who founded the research station in 1931. At the beginning of the century King George V, then Duke of York, stayed here, a royal connection of which they are justly proud at Delta. The lodge has been converted into a comfortable hostel for visiting research workers. The permanent staff of the station and their families live in wooden bungalows clustered round the lodge. Work rooms, laboratory, library, dark room, and the like, are housed in long low buildings previously used for rearing mink.

For the past 16 years the guiding light of the research station has been Al Hochbaum. To attempt a verbal picture of his attributes and character would launch me on an eulogy which I know would be distasteful to this essentially

modest man. It was well worth journeying thousands of miles just to have the privilege of meeting him. Scientist and administrator, wildfowler and artist, no one could better fill the rôle. His skill with brush and pen can best be appreciated by studying his two books, *Canvasback on a Prairie Marsh* and the recently published *Travels and Traditions of Waterfowl.*

Al's delightful wife, Joan, is the sister of Pete Ward, who followed his father as the superintendent of the Delta Hatchery. This carries on the original function of the station—production of quantities of young wild duck for release on those marshes which had been depopulated by over-shooting. Many hundreds of eggs are collected each year from the surrounding marsh, the robbed hens renesting and rearing the second clutch themselves. The collected eggs are hatched in great incubators and the young reared *indoors.* When nearly ready to fly they are then sent to the marsh which is to be their home. At the time of my visit some 200 ducks of several species were living in one of the big hatchery buildings. These were late bred birds from the previous year kept in over the winter. Such methods are in complete contrast to waterfowl avicultural practice over here, but appear to be successful. Certainly parasites, predators and disease are much more easily controlled under such artificial conditions. Pete also is no mean artist. He was working on an ethereal composition of swans flying through clouds which is one of the few wildfowl paintings that have stirred my unresponsive soul.

A study collection of living wildfowl is maintained, purposely limited to those species which normally occur at Delta or pass through on migration. The flood-waters, which were already causing inconvenience while I was there, continued to rise in the following months and eventually broke down the fence round the collection. All the Whistling Swans, many breeding ducks and some geese escaped. However, none of the eight Trumpeter Swans left and hopes are high that they will breed particularly as some are hand-reared birds. Of these the most outstanding character is 'Daisy' from whom no woman is safe even when wearing trousers.

The floods eventually came to the doorsteps of all the station cottages, entering one of them, and surrounded the Hatchery and Lodge. They also interfered with the working of the decoy by raising the level of the pond so that the ducks could see over the screens. This decoy, built on traditional lines, was suggested and designed by Peter Scott, coming into operation in 1951 (see Fifth Annual Report). Nan Mulder, the decoyman, has generations of decoymen in his blood and his elder brother still operates the family decoy in Holland. I was regaled with many ancient photographs of olden days when decoying flourished. Nan emigrated to Canada as an agricultural worker and must be counted among the luckiest of men to find himself near the site of the only decoy to be built in the history of North America.

Frank McKinney had been at Delta nearly a year when I arrived, and had obviously settled into the place and into the hearts of the Canadians. His work as Assistant Director covered the supervision of the graduate student programme, management of the station library and finances, and the continuation of his fine work on behaviour which he started at Slimbridge. Everyone has been shocked and saddened by the recent tragic death of his wife Brenda.

Al, Frank, Pete and Nan form the permanent staff nucleus at Delta. During the long winter months the Lake and Marsh are frozen, November to February, the wildfowl have migrated south, and there is little field-work at the station. Last winter nearly nine feet of snow blanketed the area. But with the melting

of the snow and ice the birds return and so do a number of biologists who come to study them. The majority are from American or Canadian universities, carrying out postgraduate research on problems of wildfowl biology that have interested them. The other category is 'Federal men,' professional biologists in the employ of the government conservation organisations. Thus, the international team which covers the breeding areas of the duck by air and ground surveys meets here at the beginning of May each year. Thereafter they determine as best they can the success of the breeding season, and on their reports the very tight restrictions on shooting are adjusted for the autumn.

Many of the workers had not yet reached Delta when I was there, but I was fortunate to meet a number. Graham Cooch was on his way through to continue his studies of Snow Geese in the far North (see p. 58). With him was his newly acquired wife, fresh from the City and about to spend months living with Eskimos! But if Eskimos are susceptible to charm she will have been all right. Alex Dzubin came in from his research area in the 'pothole' country 100 miles west of Delta. There he has been working on long-term breeding studies, and on such problems as the home range of ducks. Jim Teer had just arrived to continue his investigation on the behaviour of nest-predators, particularly crows and skunks. He also had an attractive wife with him. Martin Moynihan, as yet unpaired, was looking remarkably English with a briar pipe, so his long spell at Oxford, studying behaviour under Tinbergen, has had some effect. He was looking into the breeding behaviour of Franklin's Gull to complete a comparative monograph on the Gulls. Another bachelor was Helen Hays (not the actress), up from Cornell to study the breeding behaviour of the Ruddy Duck. I couldn't help feeling that she could have done this with much greater ease at Slimbridge. To impose on the credulous ducks Helen had brought a model male Ruddy equipped with a moveable head. The bill could be made to beat on the breast in a realistic fashion by means of a small electric motor mounted inside the body and operated from the bank. Other workers whom I was not fortunate to meet in person include Bob Smith, investigating the breeding behaviour of the Pintail; Lloyd Keith, studying the ecology of wildfowl on artificial impoundments; S. T. Dillon, working on the ecology of large marshes; Mike Milonski aiming to understand the degree of nesting success on agricultural land and carrying out orientation experiments, and Robert Klopman, following the flock behaviour of Canada Geese. The latter is coming to England to continue his work this year.

Although the ice on the lake had broken up before I arrived, the floes had piled up along the shore in a great barrier 20 feet high and stretching as far as the eye could see. I really felt I had received an introduction to the frozen North, and yet Delta and Slimbridge are almost precisely on the same latitude. The water in the marshes was ice-free and Al took me on a fascinating canoe trip through the reed beds and the scatter of excited ducks just back from the south. I particularly fell for the wholly delightful little Buffleheads, and quite realised why there is always agitation at Slimbridge to get specimens into the Collection. Although they are not uncommon, they, like the Hooded Mergansers, for one reason and another, have for years eluded us.

Most of the time was spent in discussion with the various personnel of the station, finding out how and why things were done. I have found the background of knowledge I gained in that way of great value when considering the expanding research programme at Slimbridge. The second evening I was required to give out information, instead of sucking it in, at a seminar in the

Hall of the Lodge. These informal gatherings are a regular feature of station life and are found to be both popular and useful. One of the workers, or a visitor, delivers a short discourse on the progress of his own work and the rest of the people then discuss and criticise it at some length. I found it a very stimulating procedure. By such meetings, too, the outlying research workers are kept in touch with the general work and do not regress into hermits.

For my third, and last night a 'social evening' was laid on in best Canadian style. I had a suspicion that the Englishman was to be de-reserved, especially when told that dancing would be Square and Virginia Reels. My protests that I had no experience of either were little heeded, except that I was offered copious draughts of the national drink, rum and 'Coco-cola.' I can certainly vouch for this as being an excellent convention-relaxer and it has no after-effects. It was a wonderful party.

When the time for departure came I realised how much this place and these people had come to mean to me in so short a time. I wished I could have stayed longer, but the pressure of events was driving me back. Al presented me with a memento of Canada, the skin of a wolf he had shot himself. I was deeply touched, even though some unkind colleagues have suggested it was a suitable choice of animal. In Winnipeg we dined with Angus Gavin and his wife. Angus carried out many interesting ornithological explorations while with the Hudson Bay Company, one of his achievements being to locate the breeding grounds of Ross's Snow Goose. When the Hochbaums had started back along the long trail to Delta, the Gavins very kindly took me on a tour of the city, which is rapidly spreading. Three times the Gavins have built a house farther out in the country as their previous one was swallowed up by the town blocks. The houses are mostly of wood, very fresh and modern ; often they are dwarfed by the enormous cars standing outside them. There is a fine park with a small-scale Whipsnade-type zoo, and large conservatories. The wonderful blooms they contain are a great source of pride and enjoyment in a country where spring comes late. Finally, at the airport hotel the proprietor greeted me, to my delighted surprise, with 'Hi, Geoff.' I had been introduced but briefly on my arrival three days before. Such is the friendliness of this fine nation.

Take-off next morning was complicated by the beginning of Summer Time: the 'plane, having started from Vancouver the previous day, was running on the old time. In the country areas, indeed, no notice is taken of time manipulation. We flew straight to Toronto, right over the Great Lakes, a truly wonderful sight. Then on to Montreal, where there was the best part of a day's wait, and friends of a friend took a stranger into the family in typical Canadian fashion. I was astounded to find how much they knew of the intimate details of British politics and ashamed to find how little I knew of theirs. Already one felt closer to home for this is a very European city in appearance and manners.

And so off into the night on the long flight over Newfoundland and on without stopping to Prestwick. Cloud, which spread beneath us as we approached Scotland, broke most timely over the Kyles of Bute to bring a surge of delight at homecoming. The custom's officer looked a little unbelieving when I declared a wolf skin to be in my meagre luggage, but kindly let it pass.

Once more we boarded a 'plane for a swift flight down the length of England to London Airport; then back to earth for the last time in ten days, and back to the sordid reality of British Railways (Eastern Region).

THE WHITE-FRONTED GEESE OF ENGLAND AND WALES

By Hugh Boyd

SINCE the presence at Slimbridge of the largest flock of Whitefronts in Britain was of decisive importance in the establishment of the Wildfowl Trust headquarters, it is easy to understand why this species should have received particular attention in the Trust research programme. Early in 1956 a census of the Whitefront population of England and Wales was organised, and its results used as the basis for a report on the status of the Russian-breeding race *Anser a. albifrons* in this country during the last ten years. This paper summarises its principal findings and offers some comments on them, with particular reference to their relation to the aims of wildfowl conservation policies and to the practical application of such policies.

Two subspecies of Whitefront winter in Britain. The typical race *albifrons*, breeding in north-west Russia, occurs almost entirely in England and Wales, being only a vagrant in Scotland and Ireland. The Greenland-breeding *flavirostris* winters in Ireland, Scotland and (in small numbers) in Wales, being only a vagrant in England. This paper is concerned only with *albifrons*.

The British population of *albifrons* seems to have numbered about 6600 on 19 February 1956. Some late immigrants probably arrived after this date, but the greatest number present in England and Wales during the winter of 1955–56 is unlikely to have exceeded 8500. Counts made in earlier years were not so complete, but it seems likely that in the period 1947–55 seasonal maxima varied between 4000 and 8000, except that in January 1947 the total may have been as high as 10,500. Figure 1 records the best available estimates of numbers during the period. None of these totals is very accurate, nor do they necessarily represent the maximum numbers present in any season.

The pattern of immigration of this population seems to be changing. Whitefronts may normally be found in England between the last days of September and the second half of March, although the early arrivals are few in number. Formerly the first large-scale arrivals occurred in late November or early December and were further reinforced in late December or January. But in

the last three seasons (1953–56) the importance of the December influx has greatly declined and a large part of the population has delayed its arrival until February. Related differences in the distribution in Germany, Holland, Belgium and France have been found.

A feature of the distribution of Whitefronts in England and Wales is the extent to which the population is at all times almost wholly concentrated in a few places. The most important of these localities (measuring importance by the numbers of birds occurring) are visited each year. There are only 12 or so such places (the number depending on how some areas are defined). In addition another 24 are known to have been visited in three or more of the seasons studied. During the whole period (1946–56) Whitefronts were reported from as many as 120 localities, but half of the occurrences were unique. Thus it appears that the choosing of places to live in is dominated by tradition but involves some exploration (which may or may not be the same as failure to find established

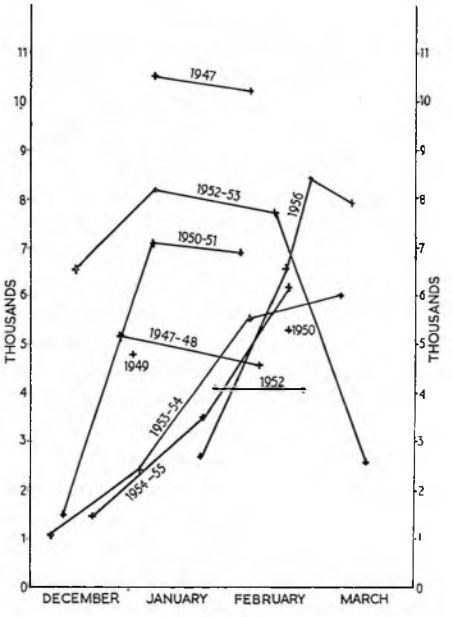


Fig. 1.—*Counts of White-fronted Geese in England and Wales*, 1947–56. *The points marked represent totals obtained by summing figures from the major haunts of the species, with interpolation and estimates included when necessary. Only in* 1956 *do the totals approach the accuracy of a census, but the seasonal trends shown are fairly reliable. There is no certainty that the maximum number recorded in any winter coincides with the maximum number of geese present in the country. The dates selected are almost all those used in the Wildfowl Count scheme* (i.e., *Sundays near the time of new moon*). *Numbers present in October and November are usually well below* 2,000. *In the spring, few Whitefronts remain by the end of March.*

haunts). This system seems to allow sufficient flexibility for the gradual transfer of 'allegiance' from a place no longer favourable (such as Margam in Glamorgan or Holkham in north Norfolk) to others more suitable.

Areas which provide relatively undisturbed conditions (such as the Walmsley Sanctuary near the Camel estuary in Cornwall, the Bure marshes in south Norfolk, and Slimbridge) seem to retain geese for longer periods than others (Somerset moors) where, though the food supply seems to be ample, disturbance is considerable. But there appear to be upper limits to the numbers that a refuge can hold for more than a few days (about 120 in the Walmsley Sanctuary and 3000 at Slimbridge). The upper limits to 'stable' flock size may also be affected by the social behaviour of the geese themselves, though it is difficult to be sure of this.

Shooting has not apparently been responsible for any major changes in distribution, although it has immediate dispersing effects: 11 of 15 recent shoots

at Slimbridge (where traditional organised shoots, by five to ten guns, take place up to five times each season in December and January) were followed by immediate decreases of one-fifth or more of the Slimbridge flock, although the numbers of geese killed were small. Small flocks seem to suffer relatively heavier casualties than larger ones. It has not been possible to obtain information from enough different areas to demonstrate this quantitatively on a national scale. But if this suggestion is correct it may help to explain why many minor groups (for example, in Sussex and in Dorset) have failed to increase or to become established.

A rather melancholy inference from the most recent alteration in the status of the British population, the change of the peak arrival period from December or January to February, is that what would seem to be greater protection afforded to them in this country in recent years has apparently failed to develop an early-immigrating group. (It *might* be argued that, since there are consistently more geese in October and November at Slimbridge than in all other British haunts, some progress is being made in this direction.)

A second corollary of the change in time of arrival is that a substantially reduced proportion of the population is exposed to the risk of being shot in this country. Indeed, if there was reason to suppose that the legal limits of the shooting season (31 January inland and 20 February on the foreshore) were rigidly adhered to, it would seem that few should die here. Complete bag records are not, of course, available, but it appears that the British kill from this Whitefront population in recent years may have been of the order of 200. There is no evidence for a decrease in the last three seasons.

This raises an issue of some interest; how are the annual losses of English Whitefronts distributed among the different countries visited by them in the course of the year? A direct answer by means of bag records is impracticable, but it is possible to make some provisional calculations based on the distribution of the recoveries of ringed Whitefronts and using estimates of the average death rates of various age-groups. These calculations and the estimates on which they are based are set out in Table I. The derivation of the mortality estimates is not given here, but may be found in Boyd (1957).

The national allocation of the autumn and winter losses depends on the assumption that the tendency to report British rings is the same in all the countries visited. This is probably not strictly correct, but is likely to be a smaller source of error than the use of only 42 recoveries as a basis for the distribution. Despite the vulnerability of the third and fourth parts of the table on that score, the evidence on shooting pressure and bags that is available conforms quite well with the rank order indicated here. Of course, the kill in different places varies widely from one winter to another.

It is worth noting that the average number of Whitefronts estimated from the recovery data to have been killed in recent winters in England and Wales is 200, in agreement with the total arrived at from the evidence of wildfowlers and other observers.

Tentative calculations, based on information about the total numbers of Whitefronts visiting Germany and Holland, not all of which also visit England, suggest that the toll taken by Dutch wildfowlers is proportionately rather smaller than in England, as Table I indicates, while fowlers in Germany (including a considerable number of British servicemen) take at least twice as many.

The idea of spring shooting is one which most British sportsmen regard as particularly heinous and it may seem to them that the suggested spring kill

($1370 \times \frac{16}{26} = 840$) is deplorable both because it occurs at all and because it falls not far short of the total winter losses. On the first charge two comments may be offered. First, you can kill geese only when they are in your vicinity. Whitefronts visit central Russia in autumn as well as in spring and it is not clear why the autumn kill is very small. But in any event, it is only for a very few weeks each year that the geese can be hunted in central Russia. Second, while no sporting shooting of geese takes place in spring in Britain large numbers of geese (Pink-footed and Greylag, but not Whitefronts) are nevertheless shot, on the plea of damage to crops. The Russians may also be acting on this belief: they certainly do so in the wintering areas around the Caspian.

Before it is asserted that the spring kill is too big it must be remembered that the area here described as 'central Russia' is as large as the whole wintering area in north-west Europe.

TABLE I

A summary of the Mortality Statistics of ringed White-fronted Geese; estimates of the Seasonal Distribution of the Annual Losses from the British Population; and the Regional Distribution of Recoveries of Ringed Birds

The average number of Whitefronts in England and Wales in late February is assumed, from field counts in recent years, to be 7000.

1. Mortality statistics of ringed geese:

Annual deatb-rate of adults (after surviving one winter)	28%
Losses of adult geese during winter (October–February)	8·9%
Losses of young geese in their first winter (October–February)	22·2%

2. Annual losses among the British population, numbering 7000 in late February.

In February the average proportion of the total population which is made up of first-winter birds is 28%.

Thus a population of 7000 survivors in February would have consisted of 5530 adults and 2520 young geese = 8050 geese in the preceding October.

∴ Average *autumn and winter losses* from the British population = 8050 — 7000 = *1050* geese.

Total annual losses from the British population (October–October):

= (5530 × 0·28) +(2520 × 0·56) = 2420.

∴ *Losses from March to Septembe.* = 2420 — 1050 = *1370* geese.

3. Regional distribution of autumn and winter recoveries of ringed geese:

East Germany	2
N.W. Germany	17
Denmark	1
Holland	6
Belgium	3
France	5
England and Wales	8

From 1 and 2 eight recoveries in England and Wales correspond to a total season kill of 200 geese in this country.

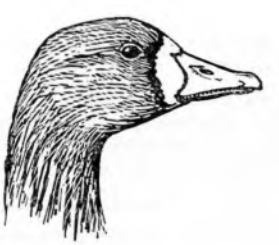
4. Regional distribution of spring and summer recoveries of ringed geese:

Central Russia (spring passage)	11
Russian Arctic coast (spring passage) ..	5
Kolguev Island, Novaya Zemlya (breeding places) ..	10

No objection can reasonably be made to the kills on the breeding grounds. These are places where it is essential for the human inhabitants to use every available source of food. They are killing for survival, not sport. The rounding-up of moulting geese, formerly practised by the Samoyeds, has been prohibited, at least in some places, and may have died out with the Samoyeds in others, but shooting is widespread, though the human population is small.

All the figures in Table I, especially those for spring and summer, would have to be increased if the annual mortality was substantially greater than 28%. But even if this became necessary it would still remain true that, because the losses are widely dispersed, the numbers killed in any country and even more in any one locality would not be impressively large. A kill of 200 in Britain or even 540 in central Russia from a population of 7000 does not *appear* excessive.

Yet a population of 7000 is a small one, and, as such, relatively more vulnerable than one of ten times the size. Even if, as it should be, the British population of the Whitefront is considered as part of the north-western European population, of about 15–20,000, the total may still appear precariously small. A similar total for the population of the Brent goose *Branta bernicla* in the same area has been considered alarming enough to warrant the introduction of special legislation for its protection. And yet the *albifrons* population appears to be maintaining itself without particular winter protection and in the face of extensive spring and summer losses.



THE FIDELITY OF A WHITEFRONT GANDER

By Jack Williams

I have two Grey Lag Geese which commenced to lay on 15 and 16 April 1955 respectively. After the second bird had laid three eggs in the same nest as the first one, she went and made another nest some 100 yards away and laid three more eggs in it. The first one contrived to lay in the original nest, and on laying the sixth egg commenced to sit. The second goose never attempted to sit at all: she finished laying at the sixth egg and then forsook the nest.

As soon as the first goose commenced brooding, a Whitefront gander that I have had for some 18 years went in attendance, never leaving the sitting goose and guarding her with great ferocity. This he had done on previous occasions with other unpaired sitting geese: the first a farmyard Toulouse Goose which he attended on for two seasons and, after she was removed, a Pinkfoot Goose a year or two after.

Very unfortunately, after the first Grey Lag Goose had been brooding for a week, on 29 April she became very seedy and died the following day. Whereafter the Whitefront gander became very perturbed and literally forced the

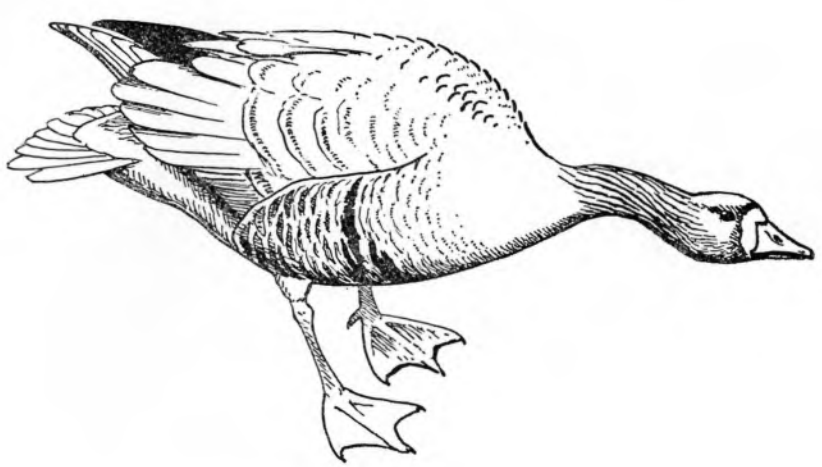
second Grey Lag Goose on to the nest and eggs. She did not brood at all tightly in fact, did not seem to relish the task—which was quite understandable considering she had made another nest elsewhere, and never showed any inclination whatsoever to brood in her own nest. However, she stuck it out for two days to 2 May, when she finally decided that it was no job for her.

The gander followed her about all day calling all the time, but on the morning of 3 May I saw that he was missing, so had a look round for him, and eventually found him brooding the forsaken nest. The next day he was still there and I was a bit sceptical about his powers of broodiness. I managed to hold him off with a forked stick and felt the eggs which were perfectly warm, and the nest well made up. This I did periodically during the ensuing three weeks, and each time I found the eggs perfectly warm, and in addition he had added down to the nest. I tried in vain to find some farmyard goose eggs near hatching to reward him for his fidelity and perseverance as I'm quite confident he would have reared them. But by 24 May I was still unsuccessful and decided to destroy the nest, as he was becoming very pale and thin through lack of adequate food and water.

In all that whole time I never saw him off the nest once. Although undoubtedly he must have come off during the night at some time or other, by the bad condition he was in he must have done it very sparingly, otherwise he would not have lost condition to the extent he had.

After he had been relieved of his duties for from a week to ten days, he began to look his old self again. I only hope the day is not far distant when I can find him a mate of his own species so that he can have a family of his own, as I feel no goose was ever more deserving.

By the 1956 breeding season I had removed the Greylags from the same enclosure and taken them some distance away, where incidentally they bred. The Whitefront gander took no particular interest in any of the other geese until an unattached Pink-footed Goose made a nest and laid six eggs. On remaining at the nest at the third egg, the gander seemed to notice that she was alone, so promptly went on guard beside her and never left his station, guarding her fiercely all the time until I broke up the nest on finding the eggs infertile after the goose had been brooding some three weeks.



THE RUSSIAN HOME OF BRITISH-WINTERING DUCKS

By Hugh Boyd

THE account of some summer recoveries of British-ringed ducks appearing elsewhere in this report (pp. 47–51) helps to confirm what has long been suggested, that most of our commoner winter immigrants breed in the north-west of the U.S.S.R. Anyone wishing to assess the prospects of British wildfowl must concern himself with the situation on their breeding grounds. This essay reviews the effects of recent changes in human activity in north-west Russia and attempts to predict the consequences of developments in the next 20 years or so. Written by an ornithologist, and dealing with a region not accessible to detailed study by western geographers, it is rather unlikely to attain either goal. It seems inappropriate to burden such a crude sketch with 'full documentation,' or even a discussion of sources.

The map (Figure 1) illustrates the part of Russia within which a large number of our wintering ducks nest. A few recoveries (mainly Wigeon) have been

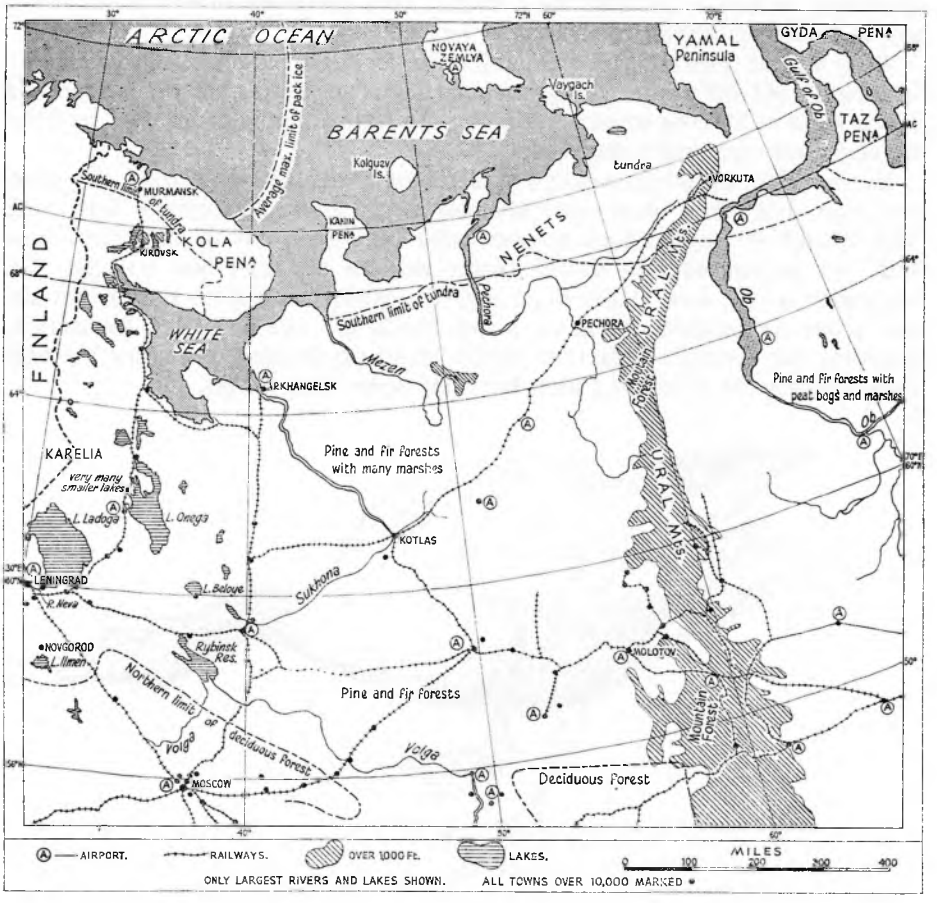


Fig. 1

obtained from farther east, and from the south, and the chosen limits are quite arbitrary. There is no sort of boundary abruptly dividing the area occupied by British-visiting ducks from areas frequented by ducks wintering in southern or south-eastern Europe, Asia Minor, or the Caspian. East of 70°E the country remains similar to the area under consideration, but gradually becomes less favourable for wildfowl, because of increasing aridity and lower summer temperatures. To the south the apparent reduction in the density of ducks suggested by the paucity of recoveries may result not only from a shortage of ducks in a more intensively cultivated region but also from changes in the relative abundance of different species and from the attachment of the ducks breeding south of about 50°N to southern rather than to western wintering places.

The three major characteristics of the region shown on the map are its vast extent, its topographical uniformity and the small human population in most parts of it. (The region lacks a label: for convenience we shall call it north-west Russia.) Its area is of the order of 1,500,000 square miles, or more than 12 times greater than that of Great Britain and Ireland. From Leningrad to Vorkuta at the north end of the Urals is 1200 miles in a direct line.[1] From Murmansk to Molotov is little less.

North-west Russia is a flat, low-lying country. Much of the Kola peninsula, in the north-west, is over 700 feet above sea level, with hills around Kirovsk rising to 4000 feet, and in the east are the Ural Mountains, but nowhere else in the intervening area is there a hill of more than 1500 feet, and about four-fifths of the whole is below 500 feet. The Urals themselves have acquired their mountainous reputation largely from the fact that their north-south set made them a convenient boundary between 'Russia' (to the west) and 'Siberia' (to the east). But the Russians have abandoned this distinction, and it is doubtful if it ever existed for ducks, since the highest peak in the range is only 6200 feet, and in the north the hills are extremely narrow and pierced by many valleys.

There is very much surface water, with many lakes, especially in the west, and numerous rivers. The largest lakes are Ladoga (7000 square miles, larger than Yorkshire, 850 feet deep) and Onega (3860 square miles, 740 feet deep). These enormous areas are much less important to ducks than the smaller and shallower Ilmen (less than 400 square miles, 33 feet deep), Chudskoye (not shown on the map but south-west of Leningrad, 1400 square miles, 56 feet deep) and Beloye (420 square miles), or the host of smaller waters. The artificial Rybinsk Reservoir, of about the same size as Chudskoye, is of unknown value. No recoveries have been obtained from it. Some of the rivers drain immense basins. The Neva, only 47 miles long, but the outlet for Lake Ladoga, drains over 100,000 square miles, including much of south-east Finland. The basin of the Dvina is about 140,000 square miles, that of the Pechora 124,000 (each larger than the total area of the British Isles), while the Ob drains over 800,000 square miles, much of it outside the region used by British ducks. The Ob is 3114 miles long and its gradient is very slight, so that it is only 300 feet above sea level 1200 miles from the Arctic Ocean. The other rivers, though shorter, are all slow-flowing. They are all frozen for at least 160 days in the year and produce heavy flooding when the ice breaks up in the spring.

Despite the abundance of surface water the rainfall in the region is quite small. The summer rainfall, which alone affects the ducks, is higher than that in winter but averages in the north and east only between five and ten inches

[1]From Leningrad to London is 1300 miles, or 1430 miles by sea.

(as in the driest parts of eastern England). In the western Great Lakes region (around Leningrad) and the south the summer rainfall averages 10–20 inches. Mean summer temperatures lie in the range 48° to 64° Fahrenheit, except in the Kanin peninsula, and the islands where the White-fronted Geese breed where it is below 48°F. This temperature range is comparable with, though slightly lower than, that of north-west Scotland.

The region may be divided into two main vegetational zones. The coastal zone is tundra. To the south this changes more or less abruptly to areas of coniferous forest interspersed with tundra. Farther south again the tundra disappears and nearer the southern limit of the region some deciduous woodland is mixed with the predominant conifers.

The conventional boundary between the tundra and forest zones, as drawn on maps, corresponds fairly closely with the 50° F. isotherm for mean summer temperature and the climate is of first importance in affecting the transition, but other physiographic features are involved. Over most of north-west Russia much of the soil is permanently frozen beneath the surface. In the forest belt the thawing effect of high summer temperatures extends some 6 feet down, but in the northern coastal area only the top 1½ to 2 feet thaw. Soils that are nearly always frozen can support only very limited vegetation, and cannot benefit from mixing of decaying organic matter with the minerals of the subsoil in consequence of the burrowing of worms and other animals, since these are absent. Such organic matter as there is rots and remains on the surface of the ground, forming acid half-humus of little value. The permafrost also prevents the percolation of water, leading to the formation of shallow marshes, although most of the tundra is dry.

The soils of the coniferous forest belt are not much more fruitful than that in the extreme north, because although the greater extent of the thaw permits better mould formation (the soil fauna being much richer) the organic surface layer is poorly aerated, and the underlying soil has been deprived of most of its useful mineral content by leaching. The richer 'black earth' which alone provides good conditions for cultivation in Russia lies very largely beyond the southern limit of our area.

The distribution of breeding ducks is closely related to the vegetation zones. Of the dabbling ducks only the Pintail and Wigeon occur at all frequently in the tundra and both are relatively more plentiful in the *taiga* (damp coniferous forest interspersed with peat bogs and marshes). British-wintering Mallard seem to come very largely from the Great Lakes area. Our Shoveler may prove to do the same. The Teal spread farther east, but do not reach the tundra and are most numerous in the forest. Russian-breeding Gadwall and Garganey are not known to visit Britain: their summer distribution in north-west Russia is in any case meagre. The Russian literature indicates that Tufted Ducks are much more numerous in the Great Lakes region than in the tundra, but the recoveries of British-ringed Tufted so far do not conform with that finding. Too few Pochard have been ringed to establish whether our immigrants include a substantial proportion of Russian breeding birds, although there has been a recovery from the South Urals (1 May 1952).

We are very far from being able to assess the present duck-producing capacity of north-west Russia, but it is clear that, although large parts of this relatively uniform region are suitable for nesting ducks, and though it is of enormous extent, the stock it can produce must not be thought of as unlimited. For example, some preliminary calculations from summer recovery rates of Teal

indicate that the breeding density of this species in north-west Russia may be no higher than it is in Britain and is certainly substantially less than in Scandinavia.

A proclaimed purpose of this essay is to assess the possible effects on the breeding ducks of changes in the numbers and activities of the human inhabitants of north-west Russia. It has already been remarked that the human population is small. The impression of cheerlessness which may have emerged from the preceding pages should in part explain this. Much of the region is unsuitable for occupation throughout the year. The inhabitants of the northern towns have to endure prolonged and severe winters. Travel in winter is apparently impossible in the tundra areas and difficult farther south. Railways and roads are few (as can be seen from the map, on which *all* the railways north of 58°N are marked), hard to construct and to maintain. During the short summer the rivers provide the easiest form of communication. The Murman coast is ice-free even in winter, so that coastwise shipping is important in the north-west, but farther east the Barents Sea suffers from the hazards of ice, fog and shallow water and a lack of good harbours.

These harsh conditions have not prevented considerable increase in the human population of the north during this century, particularly in the Kola peninsula, where the population has increased ten-fold in the last 30 years. The high rate of settlement in this peninsula is due partly to its advantages in communications, but more to the discovery and exploitation of mineral deposits. These have led to the growth of mining and industrial towns, producing artificial fertilisers and aluminium. The main centres of production are in the Khibiny Hills, but the ports have also expanded. Murmansk had 4500 inhabitants in 1924, 117,000 in 1939, and 160,000 in 1954, and is now the largest town anywhere north of the Arctic Circle. Since almost all the new population has been absorbed in towns and there have been few changes in land use, this surge of activity has had, and will have, comparatively little effect on the ducks of the Kola area, which are in any case rather sparsely distributed. (The effects of settlement on the Bean and Lesser White-fronted Geese may be more severe.)

The rest of the tundra zone has been less affected by human activities. Attempts to increase the volume of shipping using the 'Northern Route' in summer have led to the establishment of settlements at various anchorages in the Nenets region, and the building of airfields has produced others. Against this increasing activity may be set a decline in the importance of the indigenous hunting tribes of Samoyeds, who, like the Eskimos and other highly specialised northern people, have been reduced in numbers. Although, from the behaviour of the Russian mining colonies in Spitsbergen, it must be supposed that wildfowl in the vicinity of settlements will suffer, probably severely, it may well be that over much of the tundra zone there will now be less rather than more human predation. The large-scale drives of moulting geese are reported to have been abandoned. It is doubtful whether losses from shooting in May or June will offset this reduction in exploitation.

Some Soviet geographers believe that extensive settlement of the Nenets area may be possible, and a very considerable concentration of population has in fact been achieved at and around Vorkuta, in the northern Urals. During the war the loss of the west Ukrainian and Don basin coalfields forced the Russians to turn to deposits farther east. The Pechora-Vorkuta coalfield is now an important one, connected with the industrial areas farther south by the Vorkuta-Kotlas railway (completed in 1942) and by water transport on the Ob. The total population of the Vorkuta area is sometimes put as high as 450,000.

The great majority are either prisoners or forced residents, including some foreigners. This concentration may well have important effects on the ecology of the north Urals and the Pechora basin, especially if the oil found in the latter begins to be exploited more extensively. The decrees of April 1954, which converted forced-labour camps into forced settlements, may also worsen the position for ducks, since the mobility and freedom of the human inhabitants has thereby been somewhat increased, without any obvious amelioration of their low standard of living. In an area where food is desperately short wildfowling is not a sport but a means of subsistence.

In the west, between the Kola peninsula and the Leningrad area, lies the Karelo-Finnish Republic, heavily wooded, with many lakes. This is an important duck breeding ground. The land is unsuitable for cultivation and the sparse population lived formerly by hunting and fishing and lumbering. Recently, industrial development has begun, along the Baltic-White Sea Canal and the railway to Murmansk. East of Karelia the country remains forested even close to the coast. The port of Arkhangelsk (325,000 inhabitants in 1954) is an important centre for the timber trade. Lumbering in the hinterland, as well as in Karelia, seems to be carried on from large temporary settlements. It seems unlikely that the inhabitants of these labour camps can indulge in duck shooting, but they may well have added considerably to the casualties inflicted on the duck population by the fishing nets and musk-rat traps of the forest dwellers.

The Leningrad area has a very dense human population, predominantly industrial. Leningrad itself had a population of 3,191,000 in 1939. This was much reduced during the war but by 1954 had recovered to the level of 1939. The main threat to the duck population of the Great Lakes region, for which Leningrad is the trading centre, probably lies not in the growth of the industrial zone, which covers a comparatively small area, but in the destruction of forest and its replacement by cultivation, leading to a more general diffusion of the human population.

Most of the duck recoveries have come from farther south and east, from parts of Russia already fairly densely inhabited and developed industrially and agriculturally. The human population of this large area, stretching from Novgorod in the west to Molotov and beyond, south to Moscow and north to Kotlas is certainly increasing. From experience in Europe and America more people result in fewer ducks, unless special attempts are made to prevent their destruction. It is possible, though perhaps not very likely, that the Russians will be more successful than western countries in retaining their ducks. They could even do so unintentionally, since the depletion of duck populations by man in arable country is due to the detailed technique of cultivation as well as to shooting. Shooting certainly goes on, as recoveries of ringed ducks demonstrate, but it is likely to fall short of the intensity attained in, say, France or parts of the U.S.A. The hope for the ducks of 'middle Russia' lies perhaps in Russian ability to learn from the mistakes of the prairie farmers in the U.S.A. and Canada. If they avoid the folly of supposing that the best thing to do with all your marshes is to drain them the ducks may still survive. Intensive cultivation is not in itself against their welfare.

The great emphasis given in recent Soviet pronouncements to the agricultural development of hitherto virgin land to the east of our area suggests that the changes of the habitat in the south of north-west Russia may already be largely completed, without the destruction of the wildfowl population.

The Ural mountains are not a home for ducks, but the lower Ob basin to the east, which still remains to be considered, is perhaps the most important area of all. Unfortunately it is also the most difficult one about which to make predictions. The country is grim for human settlement, and western geographers have written little about its potentialities, but recent Russian maps indicate that settlements are increasing rapidly. The density of recoveries of British-ringed ducks, though still low absolutely, is relatively higher than for any other breeding area. Although the lower Ob is described by Russian ornithologists as an important gathering ground for moulting ducks, the recoveries have nearly all been made in May and early June. This suggests that the beginning of the summer, when the ducks are newly arrived and the human inhabitants are first able to move about after the break-up, is a hazardous time. Until more is known of the growth of the human population of the Ob basin it is difficult to guess whether conditions there will deteriorate in the next few years.

As has already been emphasised, this is no more than a sketch for a picture of north-west Russia as a home for ducks. Very much more work will have to be done in determining the needs of nesting ducks as well as in collecting information about human activities in Russia and Scandinavia before reliable estimates of the status and prospects of the populations of various species can be achieved. But in the author's opinion the human development of north-west Russia is not likely to produce catastrophic changes in the duck population in the foreseeable future. The ducks visiting Britain in winter seem to be in far greater danger from their reception in western Europe than from the hazards of living in Russia.

THE USE OF HAND-REARED DUCKS FOR SUPPLEMENTING WILD POPULATIONS

By Hugh Boyd

HAND-REARING of ducks for shooting has long been practised in Britain. Until recently such rearing was undertaken only by landowners, or their tenants, for their own immediate benefit. In the last two years the Wildfowler's Association of Great Britain and Ireland has been advocating the rearing of ducks for release in the wild by its members, individually or collectively, and some of its local organisations put such schemes into practise in 1955. The novelty and interest of these schemes lies in the fact that few of the members of W.A.G.B.I. are landowners, and the majority are probably only able to indulge in fowling on the foreshore. Two lines of inquiry suggest themselves. First, will duck-rearing schemes improve the sport of members of W.A.G.B.I.? Second, will such schemes 'in due course do much to increase our wildfowl populations' as the Annual Report of their Association for 1953–54 suggests? The two questions are related, though by no means identical. This discussion of them is based on a number of papers published in America in the last 20 years dealing with similar problems, analyses by the writer of the results of British Mallard ringing (see Boyd 1954, but largely unpublished), and various observations on the behaviour of ducks and wildfowlers.

The improvement of fowling, at least for those who call themselves wildfowlers (though not for those who simply want to kill ducks and geese), does not only involve the provision of larger numbers of fowl. The birds must also be wild, so as to be difficult (though not too difficult) to shoot. Thus, to return an affirmative answer to the first question it is necessary to demonstrate that the release of hand-reared ducks will increase the numbers of wild ducks frequenting the shore. The relevant evidence is of various kinds, but of nearly unanimous import: it seems unlikely that hand-reared ducks can improve shooting on the foreshore. The reasons may conveniently be classified under the heads of rearing, release and replacement.

Rearing

There are two main difficulties in rearing: obtaining supplies of eggs, and rearing for wildness. The technique of rearing as such is not difficult (see Jull 1947). The only eggs obtainable in any numbers are those of the Mallard. This is unfortunate because it is difficult (Professor Konrad Lorenz says impossible) to find any Mallard population in Britain or western Europe wholly free from an admixture of domesticated or 'call duck' blood. The eggs supplied by game farms inevitably contain a very high proportion of such stock. Their

faults from the wildfowler's point of view are obvious enough. They are too tame and usually poor flyers. Ducklings reared from wild-taken eggs are comparatively unlikely to suffer from these faults, but the taking of eggs from wild ducks' nests is only justified if the number of ducks reared to fledging is higher as a result than would have been the case if the Mallard duck had been left to hatch and rear her brood. If the eggs are taken early in the season this hope may be fulfilled, since it is then probable that the duck will re-nest so that the survivors of her second brood may be added to the captive-reared birds in counting the yield.

Perhaps largely because of the existence of heritable differences, the effects of hand rearing on the tameness of ducks after release are arguable. My own view is that, even if artificial rearing has led to the attachment of young ducklings to the person looking after them, the free-flying adults released in a different locality will not be abnormally tame. This opinion is based on several year's experience of rearing ducklings in an investigation especially concerned with the forming of social bonds amongst young birds. But the opposite view is widely held. Butt (1956) says 'I am convinced that the only way (to prevent

adult tameness) is for the birds to see humans as little as possible; the only person who should visit them regularly is the one who feeds them, and he should frighten the life out of them every time he goes near them'. Perhaps the dispassionate detachment of the Dickensian orphanage-master represents the best compromise.

Release

The problems of release consist in when and where. Cornish (1903) said that young Mallards should be transferred to their feral home six weeks after hatching. This suggestion is probably as good as any. Young Mallard first fly somewhere between seven and 12 weeks after hatching, wild birds maturing earlier than those from captive stocks (Foley 1954). In the intensive investigations carried out at Delta, Manitoba, ducklings were released at between five and 12 weeks (Brakhage 1953) and those released before they were able to fly seem to have done better. In the large restocking programme of New York State the age at release was standardised at about five weeks, this having been found to provide the greatest return in terms of money spent (Benson 1939).

In deciding where hand-reared birds should be released the most important requirement is that the place chosen should have not only adequate supplies of food but also plenty of escape cover. This is defined by Foley (*loc. cit.*) as 'emergent cover that is easily negotiated by swimming ducklings.' He found that the composition of this cover seemed to make little difference, so long as it remained negotiable. Butt (*loc. cit.*) reports that his Association chose to release their ducklings at places where wild ducks were already present. This is a very sensible procedure when possible. In districts where no ducks are known to have nested the most suitable localities seem likely to be small marshes or cover-fringed pools with some water that will not dry up during the six weeks after the release. 'Wild' country is not necessary, small ponds or marshy places of as little as an acre in arable areas being able to provide all the necessary requirements. There are no data which suggest either upper or lower limits to the density of stocking, except that ten ducklings per acre seemed no better or worse than one in the New York experiments (Foley *loc. cit.*). Brakhage (*loc. cit.*) notes that at Delta the ducklings were originally released on the marsh without conditioning or protection of any sort and suffered heavy losses before becoming competent flyers. Later the losses were reduced by liberating the birds on a pond enclosed by a predator-proof fence, in the company of pinioned and visiting wild birds. This procedure may not always be possible in Association rearing schemes.

From the point of view of shore-shooters the selection of releasing places must also be influenced by the behaviour of the ducks. British hand-reared Mallard are extraordinarily sedentary. Forty-one of 46 recoveries of hand-reared Mallard marked at places within two miles of the coast were obtained 'where ringed'. But 592 recoveries of hand-reared Mallard released at places farther inland have included only two from the coast. The ringing stations involved have been spread over 11 counties, but none has been more than 15 miles from the shore. Clearly, if wildfowlers are to benefit from the Mallard they rear, the birds must be liberated very close to the place where it is intended that they should be shot.

The results of early American releasing experiments (Lincoln 1934, Pirnie 1935, Errington and Albert 1936) also showed that hand-reared ducks did

not disperse like wild ones. But the more recent experiments (Brakhage *loc. cit.*, Foley *loc cit.*, Wells 1952), in which most of the birds used were reared from wild-taken eggs, have shown that normal dispersal may occur, apparently as the result of the young birds accompanying wild adults or juveniles on their autumn migrations (see also Hochbaum 1955). Many, probably most, British-breeding Mallard do not migrate, so that hand-reared ones released in Britain would scarcely be expected to move long distances, except as abmigrants (as the result of pairing in winter with birds visiting this country but breeding in Scandinavia or Russia).

This reference to migratory behaviour is not so much of a 'red herring' as it might seem, for it becomes of importance when the question of using other species for restocking is considered. Pintail, Shoveler and Wigeon may be suggested for the purpose, since all breed fairly widely in Britain (in some places possibly as the result of earlier introductions). All are much more likely to reach the coast than inland-bred Mallard. But all are likely to be seduced by foreign visitors.

Replacement

The discussion of replacement may well be based on a text by Brakhage (*loc. cit.*), 'it cannot be considered sound management to stock birds which do not survive long enough to reproduce'. Most rearing programmes have proved unsatisfactory in this respect. In the first place pre-fledging losses amongst hand-reared young are substantially greater than the losses suffered by ducks in the wild. For example, in New York State losses of hand-reared Mallard between release at five weeks old and attaining flying age probably amounted to 310 of the 801 released (39%) (Foley *loc. cit.*), whereas losses of wild Mallards during the same stage in the life cycle (as determined from brood counts by several workers) are probably less than 2% (Hickey 1952). Indeed, these losses between release and flying are of the same order as the total losses between hatching and fledging amongst wild broods.

Second, the mortality *after* fledging is consistently higher for hand-reared than for wild-trapped ducks. From nearly 2000 recoveries of British-ringed Mallard I find the mortality of hand-reared birds (over 700 recoveries used) in the first year after fledging to have been 94%, compared with 71% for wild juveniles and 70% for those marked in Holland, from data given by Eygenraam, 1955. (Höhn (1948) reported both to suffer losses of about 89%, but his sample of wild juveniles was unsatisfactory; many more have been ringed since he examined the recovery data.) From ringing in North America in the years 1924–39 Hickey (*loc. cit.*) computed the first year losses of hand-reared and wild Mallard at 82% and 68% respectively. Brakhage (*loc. cit.*) reports losses of 91% of hand-reared and 70% wild-trapped. Darrow (1949) put the first year mortality of hand-reared Mallard in New York at 80%. Similarly the rates for Pintail in Manitoba were 89% for hand-reared and 66% for wild-trapped (Brakhage *loc. cit.*). It has also been found that the rates of loss in years after the first tend to be higher for hand-reared birds than for wild ones, for which the mortality rate is of the order of 50%. Because of the large clutches laid by the Mallard and the persistence it shows in re-nesting, it is possible for the species to maintain its numbers even with a first-year death-rate of 70%. But when losses during the same period are over 80% the task is too great and the population must decline unless continually added to artificially. This has been the case with all but one of the hand-reared stocks in Britain for which

information is available as the result of ringing. The exception is the population started at Slimbridge in 1948. With an ample food supply and no shooting this group has approached immortality (by ornithic standards).

To recapitulate, the release of hand-reared Mallard seems unlikely to benefit coastal wildfowlers or to increase the British population in the long run. Releasing programmes can improve shooting on inland waters (and have often been used for this purpose), but the ducks are unlikely to frequent the coasts in numbers sufficient to improve the sport of shore-shooters. Releases will increase the British population only if these hand-reared ducks are afforded some special protection to offset their unusual vulnerability to the hazards of free-living. The use of other species might give better results, but it will be difficult to obtain sufficiently large supplies of their eggs.

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A GLOSSARY FOR GOOSE-NETTERS

By H. G. Brownlow and E. A. Maxwell

As a technique develops, a specialised jargon usually grows with it. Rocket-netting is no exception, and a list of some of the more printable terms used is given below. This, we hope, may interest some people, cause nostalgia to a few and even assist new recruits to the happy band of rocketeers who scurry around northern Britain in the autumn.

Concerning the Apparatus

Bags. Curtain-like extensions to the net edges, designed to prevent geese from running out.

C.A. Catching Area; that over which the nets may be expected to fall, indicated by white feather markers but surprisingly difficult to judge from a distance and at an angle.

Dog leads. Long cords attached to the leading corners of the net. By a subtle formula these keep the sides of the net parallel.

Dropper. The connection between each rocket and the main electric wire running the length of the net. Particularly liable to be cut by spades or tripped over.

Harnesses. The strong wires attaching the rockets to the net. Tangle dreadfully.

Hide. The wheeled contraption in which the firing party suffers hunger, thirst and other physiological torments. Always due for replacement. Probably the largest Peter Scott painting in existence.

Keeping cages. Compartmented hessian constructions in which geese are restrained until marking of whole catch is complete. Shop girls titter when one orders the dozens of large safety-pins needed to fasten flaps.

Pig's Ears. The strengthened loops on the nets to which harnesses and rubbers are attached.

Ramps. Heavy iron contraptions up which the rockets slide on firing. To grease or not to grease is a frequent source of debate.

Rubbers. Thick elastic restrainers fastened to the trailing edge of the net to prevent the whole arrangement becoming airborne.

Smalle trappe. A sparrow trap carried by a Chaucerian member of the team—liable to be successful when the main operation fails. Objects other than passerines have been found in it.

Spindle. The rod on which the reels of netting are carried. Surprisingly difficult to thread.

Upwind net. The net which is fired downwind. And vice-versa.

Concerning the Operations

Cleaning. The tiresome sequel to any catch in a stubble field. May involve as much as 25 man-hours and is the main reason for a large team. Calculated to arouse official hostility if carried out on a hotel lawn or seaside promenade.

Decoys. Representations of geese placed in the catching area to encourage the flocks to alight. May be stuffed and tatty or plastic and smooth. The latter have shown that wild geese do not appreciate modern art.

Doddle. A situation in which a record catch is anticipated; usually a prelude to disappointment.

Flit. Spontaneous but unhurried flight of geese from one field to another, usually the wrong one.

Fort. A locale in which the land owner or farmer is unco-operative. Rare. (Generalised from a place-name, as also Hollybush and Hurkledale.)

Firing party. Two or three persons gathered together in the hide by call of duty or sheer inexperience. One presses the firing button.

Führer's final fling. A usually rash or complicated move (surprisingly often successful) initiated by the Director prior to departing to the B.B.C. The rockets are recharged with surprising and unwonted celerity on these occasions.

Gin Palace. A four-star hotel used *faute de mieux* and as briefly as possible. Inhabitants seldom appreciate the privilege afforded them by the team's presence.

Grandstand. The sufficiently remote viewpoint at which all save the firing party assemble and await developments.

Had-it field. A stubble field which looks a suitable set but on which it transpires the geese have been feeding for some days and from which they are just about to remove themselves.

Hollybush. A situation in which it is known that many geese are feeding in the area but it is extremely difficult to locate them.

Hurkledale. A feeding place closer to the roost than the main feeding grounds. Seldom used except in foggy or windy weather when the team can wait on the main grounds indefinitely.

Jammy set. One in which all the omens are good.

Mooned. The state of enforced inactivity when the geese feed under clear moonlit skies and ignore the diurnal efforts of the team.

Oojahcapivvy. The technique of putting up geese not in the catching field in the hope that they will go there.

Poppa. A member of the team skilled in distinguishing male from female geese; preferably with muscular thumbs.

Reservoir field. A field holding a subsidiary flock of geese which may be oojahcapivvied to the set when the agonised cry 'more geese' is heard over the walkie-talkies.

Safety measures. Certain precautions enforced occasionally when the Director has visions of a Coroner's Court.

Set. (*a*) To lay the nets and rockets in position. (*b*) The completed arrangement of nets, rockets, etc. (*c*) The place chosen for (*a*).

Twinkle. The intricate manoeuvre whereby geese feeding in the right field but wrong place are encouraged to walk, or lift and settle, into the catching area. Now generally carried out by car and almost always by the Director.

Up sticks. Dismantling the set when patience has been exhausted and moving off to happier hunting grounds.

Concerning the Pursued and the Pursuers

Baby. A juvenile goose.

Club member. A virile and obvious gander.

Face-filling. Surrendering to the needs of the inner man; considered a sign of effeteness by true devotees especially the Director.

Fat four figures. A goose flock exceeding 1000 by the most conservative estimate.

Friendly native. A farmer with a T.V. aerial. Also referred to as 'most affable' and 'most agreeable'.

Führicle. The Director's car.

Glug. Cherry brandy, a favourite beverage of some goose-catchers.

Goodly goose or great geese. A large flock of geese.

Gull geese. Seagulls excitedly hailed as a skein of geese by a newcomer (and even by old hands on occasions). Likewise crow-geese and plover-geese.

Guylarks. Passerines.

Harry-hotters. A cooked meal in contradistinction to the usual picnic fare. Especially yearned for by the face-fillers when it refers to breakfast. This is seldom achieved. The prefix 'Harry' tends to be used as an emphatic prefix to any word which goes with it euphonically and can be converted to end in '-ers'. Believed to be of Coastal Forces origin.

Live Decoys. A small group of geese which obligingly land in the C.A. (or remain there when the bulk of the flock flushes). Very superior to other decoys.

Little Brown (low) bird. A passerine (sometimes found in smalle trappes).

Lol. A 'character'.

Marmalade goose. A 'white' goose, actually very pale brown or grey (leucistic). When one is present in an area it is very difficult to get the Director to move on.

Old friend. A goose ringed in previous years and now recaptured. Joyful recognition one way only.

Sellickiana. Verbal or functional eccentricities, e.g., running over day's food with Land-Rover.

Shootist. One who pursues with a 12-bore. Sometimes helpful.

Sparrow. A very small baby.

Swanning. (*a*) Of geese, flying high and far as if moving to pastures new. (*b*) Of men, motoring fast and far as if looking for geese.

EIGHTH ANNUAL GENERAL MEETING

MINUTES

THE Eighth Annual General Meeting of the Wildfowl Trust was held at the Royal Society of Arts, John Adam Street, London, W.C.2, on 31 March 1955.

The following Officers and Council Members were present:

Council: Sir Landsborough Thomson, C.B., O.B.E., D.Sc. (in the Chair), Michael Bratby, Esq., John Bevan, Esq., C.B., M.C., Michael Crichton, Esq., K. Miller Jones, Esq., Miss P. Talbot-Ponsonby.

Hon. Director: Peter Scott, Esq., C.B.E., D.S.C.

1. Apologies for absence were received from the President, and from the Duke of Beaufort, Lord Kennet of the Dene, Sir Percy Lister and James Robertson Justice, Esq.

2. The Minutes of the Seventh Annual General Meeting, which had been circulated with the Report of the Council, were taken as read and signed by the Chairman.

3. The Hon. Director, Mr Peter Scott, gave a brief survey of the latest news from the New Grounds and moved the adoption of the Report of the Council and the Accounts to 31 December 1954.

He thought it possible that some Members might feel that too much emphasis had been laid on research during the past year. It was in this field, however, that the Trust had gained its international prestige, and the scientific study of wildfowl was one of the main aims for which the Trust had been formed. He pointed out that the scientific projects were, in any case, largely financed from outside sources.

Referring to the Income and Expenditure Account and Balance Sheet, Mr Scott remarked that Members could see that the situation was not too bad, although there had been a transfer of £3000 from Reserve. This had been spent on development work at the Trust. The Chairman of the Finance Committee, Mr Guy Benson, was not present, but he had made it clear at the last meeting of the Council that there should be a policy of retrenchment during the coming year.

In the discussion which followed, several Members expressed the view that the balance between scientific research and the Trust's other activities had been satisfactorily maintained.

Mr K. Miller Jones seconded the motion for adoption of the Report of Council and the Accounts, which was then carried unanimously.

4. The re-election to the Council of the following retiring Council Members was proposed by Mr Hallam, seconded by Mr Crichton, and carried unanimously:

Michael Bratby, Esq., R. A. H. Coombes, Esq., James Robertson Justice, Esq.

5. The election of Officers for 1955–56 was, at the wish of the Meeting, taken *en bloc*, proposed by Mr J. M. Craster, seconded by Mr J. A. S. Russell and carried unanimously.

6. The Chairman called upon the Director to propose the following motion under Item 4 on the Agenda for the Meeting:

That Rule 14 (4) shall be altered to read:

'The Council may elect a Chairman of their meetings and determine the

period for which he is to hold office; but, if no such Chairman is elected, or if at any meeting the Chairman is not present at the time appointed for holding the same, the Members of the Council present may choose one of their number to be Chairman of the meeting.'

The Director explained that, when the Trust was first formed, it had not been envisaged that the President would be able to attend all the meetings, and it was then thought that the Director should be Chairman in his absence. Lord Alanbrooke, however, who had always taken such an active and effective part in the work of the Trust, had attended all meetings and taken the Chair, until recently, when illness had prevented him. As a servant of the Trust it was not proper for the Director to take the chair in the President's absence. It was now deemed advisable, therefore, to alter the Rule.

The motion was seconded by Mr Bevan, put to the meeting and carried unanimously.

7. Messrs S. J. Dudbridge & Sons, of 8, Lansdown, Stroud, were appointed Auditors for the ensuing year.

8. Major-General A. E. Davidson, C.B., D.S.O., suggested that a message should be sent to Lord Alanbrooke regretting his absence and wishing him a speedy recovery. This was unanimously approved.

Miss C. Longfield asked the Director to enlarge upon Trust policy with regard to Branches. The Director said that the proposal to seek Members' views on the formation of Branches had arisen because Members of the Council thought that there must be many Members living too far from Slimbridge to enjoy the facilities offered by the Trust, who might not think it worth while to continue their subscriptions. Such Members might like to establish a branch nearer home in their own parts of the country. There were three main suggestions: (i) The formation of other collections of tame birds; (ii) The use of places where wild birds could be observed; and (iii) The creation of groups of interested Members who could meet for lectures and discussions.

Opinions expressed by Members seemed to spring mainly from two opposed points of view: one, that branches might attract more funds to the Trust by enlarging the area of potential membership; and, another, that branches would absorb all available funds for their own use and dissipate interest and funds which would otherwise be centred on Slimbridge. The Director said there were two possibilities: either someone might be persuaded to start a branch on the Trust's behalf, or else some keen person might start one on his own initiative and want the Trust to become associated with it. Miss Longfield said it might be dangerous to scatter resources too widely.

No decision was taken in the matter as no specific proposals were before the Meeting. In the course of the discussion, however, it was agreed that no new burdens could be placed on the Trust's resources until the financial position had become substantially more favourable.

The business of the Meeting was then closed, and the Director showed a film of Hawaiian Geese.

NINTH ANNUAL GENERAL MEETING

MINUTES

THE Ninth Annual General Meeting of the Wildfowl Trust was held at the Royal Society of Arts, John Adam Street, London, W.C.2, on 10 May 1956.

In the absence of the President, Field-Marshal the Viscount Alanbrooke, K.G., G.C.B., O.M., G.C.V.O., D.S.O., the chair was taken by Mr Guy Benson, Chairman of the Finance Committee.

1. The Minutes of the Eighth Annual General Meeting, which had been circulated with the Report of the Council, were taken as read and signed by the Chairman.

2. Before proceeding to the business of the Meeting, the Hon. Director, Mr Peter Scott, gave two items of news from the New Grounds. On 20 April, the Queen had honoured the Trust with a visit. Her Majesty, who was accompanied by the Princess Royal, spent nearly an hour and a half walking round the grounds and took a number of photographs of the birds. The Second Item referred to the television programmes broadcast from the New Grounds, of which there had been three: the first to children in this country, the second to France, and the third to the general home public in the evening.

The Director then moved the adoption of the Report of Council and the Accounts to 31 December 1955. The Report of Council for this year was in summary form since Members had already received the most important news items in the Bulletins. In particular the Scientific programme was very briefly summarised for the same reason. A few points were worthy of special mention: there had been more than 90,000 visitors last year, Gate Takings were greatly increased, and overall Membership numbers had gone up by nearly 200.

Before coming to the Accounts, the Director said he would like to announce that the Trust had just received notice of a legacy of £1000 from the late Mr F. J. Fitzmaurice Barrington, the distinguished surgeon, who had always taken a keen interest in all the Trust's activities.

It would be noticed that the Accounts had been regrouped under different subject headings, and presented in what was thought to be an improved form, mainly at the suggestion of our present Chairman. It would be seen that we had been able to put £2400 to reserve; the first time the Trust had been in such a favourable position. Another new feature of this year's Accounts was that details of special expenditure, on Borough Fen, Abberton Ringing Station, and the Wildfowl Counts had been given in a separate analysis for the better information of Members.

On the Income side, there was a fall in receipts from Membership subscriptions in spite of an overall increase in Membership numbers. This was partly explained by the fact that in the previous year we had had six new Life Members (paying 50 guineas each), whereas there had been only one new paying Life Member in 1955. Speaking of Life Membership reminded him of a point which concerned the Chairman. Mr Guy Benson had made a very generous donation to the Trust of £1000, in the form of a seven-year Covenant, and as an expression of gratitude the Council had agreed that his grandchildren should be made Life Members of the Trust. Another factor contributing to the fall in subscription-income lay in the fact that there had been a number of transfers

to Associate Membership on the part of former Full Members whose original Covenants had expired.

Vice-Admiral Waller asked whether the general rise in Rating assessments affected the Trust. The question was referred to the Bursar, who stated that the assessment had been increased by nearly 300%, but we expected some relief from local Rates. Mr K. Miller Jones suggested that the Trust should apply for relief as a charitable organisation.

Mrs Rait Kerr doubted whether the proposed changes in Life Membership payments were in the Trust's interests, but this was postponed for discussion under Item 4 of the Agenda.

The motion for the adoption of the Report of Council and the Accounts, having been seconded by General Wainwright, was carried unanimously.

3. The re-election of the retiring Members of the Council named in the Agenda, taken *en bloc*, was proposed by General Wainwright, seconded by Mr Miller Jones, and carried unanimously.

4. Major Maxwell Knight proposed the election of Officers for 1955–56, taking them *en bloc* as named in the Agenda, and said he would like to take the opportunity of expressing Members' thanks to the Director and Officers for the excellent work they had done. Mrs Rait Kerr, seconding, associated herself with Major Knight's remarks, and the election was carried.

5. Referring to the proposed changes in categories of membership outlined in Item 4 of the Agenda[1], the Director said that it was thought that it was time the whole framework of Membership was reviewed, and new forms of Junior Membership introduced. Life Membership had hitherto been fixed at the figure of 50 guineas for all age-groups, but it was now felt that a sliding scale according to age would be more appropriate. Referring to Mrs Rait Kerr's earlier question, he said he was not at all sure of the ultimate effects of this change on the Trust's interests. The Director then called attention to a small misprint in paragraph 4 (D) (ii) (b), which should read 'shall *have* contributed a sum . . '. There was also a potential ambiguity here in that it was not intended that subscriptions previously paid should be taken into account in reckoning the fee. Dealing with the change in name from Associate to Associate-Member, he said it was felt that the latter term implied a more intimate participation in the Trust's activities, which would be welcome to the holders of this form of Membership. The Junior Compounded Membership referred to in sub-paragraph (iv) was an 'under-21 Life Membership' which it was thought might appeal to parents, godparents or guardians with children or wards whose interests lay in the Trust's direction. 'Gosling' Membership was an entirely new idea to attract the young people, and offered limited facilities for a very modest fee. Sub-paragraph (vi) gave details and privileges of Corporate Membership and the special 'Parish' Membership which had not previously been formally defined.

Vice-Admiral Waller suggested that Members subscribing under Covenant might feel aggrieved if the fact of their having signed a seven-year Covenant should place them at a relative disadvantage in the matter of the new Life Membership rates if their payments under Covenant were not to be taken into account. The Director consulted Mr Miller Jones and replied that our legal adviser had said that too many complications would be involved in releasing Members from their Covenants to become Life Members.

The Director moved the adoption of the Resolutions under Item 4 of the Agenda, which was seconded by Mr Miller Jones, and carried.

[1] See Classes of Members, p. 137

6. In reference to Item 5 on the Agenda, Alteration of Rule relating to Accounts, the Director explained that at present the Rules laid down that the Accounts must be made up to within three months of the Annual General Meeting. As the Accounts were invariably made up to the end of December, this required an A.G.M. before the end of March. Three months, which was ample margin for preparation when the annual turnover was about £1000, was quite inadequate in present circumstances. He therefore proposed the adoption of the Resolution altering the wording of the Rule to remove this restriction, which was duly carried *nem. con.*

7. The Chairman proposed that Messrs S. J. Dudbridge & Sons of Stroud should again be appointed Auditors for the coming year, which was seconded by Sir John Craster, and carried.

In reply to a question by Mr H. K. Hallam on the shortness of the notice of the A.G.M. and Dinner given to Members, the Director said he saw no reason why the date should not be fixed anything up to a year ahead, and steps would be taken accordingly.

Mr C. Savage spoke on the question of Wildfowl interests in East Africa, which he said was a vast potential source of membership and an excellent area for research purposes while the need for conservation was very urgent. Mrs Robbins asked whether there was any possibility of establishing Waterfowl Gardens somewhere near London. The Director replied that we were not at present contemplating anything very near London, but were engaged in establishing such a garden near Peterborough, which it was hoped would soon produce sufficient funds to make the Borough Fen Decoy self-supporting. Developments on this scheme would be reported at the next Annual Meeting.

The business of the Meeting was then concluded, and the Director showed a short film of the wild and tame birds on the pond outside his Studio window at the New Grounds, and of the Queen's visit in April, followed by coloured slides taken by Mrs Scott on their Uganda trip in January 1956.

THE WILDFOWL TRUST

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER, 1954

1953	EXPENDITURE	£ s. d.	£ s. d.
£			
7,725	To Valuation, 31 December, 1953		8,513 0 0
	„ Membership:—		
1,152	Salaries of Administrative Staff	2,116 6 9	
862	Office Expenses, Postages, etc.	351 0 7	
1,267	Printing and Stationery—General	900 9 0	
147	Telephone	224 17 6	
118	Bank Charges	116 13 3	
312	Miscellaneous Expenses	111 18 2	
2,139	Printing Fifth Annual Report	—	
—	Printing Sixth Annual Report	2,113 13 7	
165	Expenses of Annual Dinner	103 14 5	
40	Staff Travelling Expenses	88 3 4	
6,202			6,126 16 7
	„ New Grounds:—		
2,954	Salaries of Outside Staff	3,042 4 2	
187	Staff Travelling Expenses	197 15 4	
1,016	Purchases and Transport of Wildfowl and Eggs	590 18 8	
45	Purchases of Hens for Sitting	49 0 0	
59	Carriage on Birds Sold	19 0 5	
2,082	Food for Wildfowl	2,535 5 2	
347	Rent, Rates and Insurance	378 6 1	
1,722	Materials, Repairs and Replacements	876 14 7	
446	Land-Rover and Motor Mower Expenses	641 11 3	
—	Electricity	157 10 1	
—	Repairs, Curator's Cottage	80 17 6	
8,858			8,569 3 3
	Purchases for Re-sale:—		
308	Printing Christmas Cards	785 3 4	
283	Post Cards	105 19 3	
—	Books	25 4 0	
370	Ties	284 7 0	
—	Duck Models	234 8 2	
—	Films	146 16 5	
961			1,581 18 2
	Carried forward		24,790 18 0

1953	INCOME	£ s. d.	£ s. d.
£			
	By Membership:—		
6,839	Subscriptions	7,103 7 5	
2,095	Income Tax Repayable on Covenants	—	
38	Gift Tokens	23 2 0	
237	Donations	1,391 16 10	
165	Receipts from Annual Dinner	92 3 0	
16	Dividends and Interest	26 19 10	
9,390			8,637 9 1
	„ New Grounds:—		
3,516	Gate Takings	5,505 2 5	
674	Sale of Surplus Wildfowl	1,202 3 0	
4,190			6,707 5 5
	„ Sales:—		
—	First Annual Report	1 15 0	
1	Second Annual Report	1 17 6	
128	Third Annual Report	57 12 7	
339	Fourth Annual Report	119 4 1	
258	Fifth Annual Report	23 4 4	
—	Sixth Annual Report	172 4 9	
316	Key to 'The Wildfowl of the World'	549 7 6	
28	Booklets	11 1 0	
746	Christmas Cards	1,341 5 11	
236	Post Cards	308 15 10	
42	Books	47 2 0	
185	Prints	188 4 7	
236	Paintings	—	
442	Ties	402 1 8	
—	Duck Models	198 15 7	
—	Films	162 10 5	
—	Binders	8 10 0	
2,957			3,593 12 9
	Carried forward		18,938 7 3

		Brought forward			24,790	18	0
	To Scientific and Educational:—						
4	Hostel	2,132	16	1			
558	Rocket Netting Expenses	658	16	1			
792	Icelandic Expedition	217	15	10			
680	Expenses of Lectures	584	8	3			
—	Travelling Expenses	137	1	4			
20	Decoys	613	7	0			
—	Duck Counts	209	12	10			
411	Scientific Equipment and Expenses	430	4	10			
—	Duck Adoption	145	10	9			
2,465					5,129	13	0
					29,920	11	0
	„ Capital Expenditure:—						
655	New Bridges, Road, Paths, etc.	1,063	18	5			
—	Water Scheme	850	16	10			
—	Electric Wiring	157	16	7			
—	Office Equipment	341	18	7			
—	New Land-Rover	570	0	0			
1,000	Installation of Electric Main	—					
250	New Pool	—					
1,905					2,984	10	5
400	Written off Buildings				400	0	0
£28,516					£33,305	1	5

		Brought forward			18,938	7	3
	By Scientific and Educational:—						
—	Hostel—Board and Lodging	225	7	5			
1,732	Fees and Collections at Lectures	1,552	4	6			
—	Duck Adoption	652	14	11			
827	Receipts, Icelandic Expedition	—					
2,559					2,430	6	10
19,096					21,368	14	1
1,000	Installation of Electric Main				—		
250	Donation for Construction of New Pool				—		
1,250							
—	„ Surplus on Realisation of Investments				27	6	8
—	„ Transferred from Pilgrim Trust Reserve Account				3,250	0	0
8,513	„ Valuation, 31st December, 1954				8,254	0	0
28,859					32,900	0	9
343	„ Balance. Excess of Expenditure over Income for the year				405	0	8
£28,516					£33,305	1	5

NOTE.—The figures in the margin are those for the year ended 31 December 1953 and are given for the purpose of comparison only.

THE WILDFOWL TRUST

BALANCE SHEET 31 DECEMBER, 1954

1953	LIABILITIES	£ s. d.	£ s. d.
£			
	Sundry Creditors:—		
2,832	On Open Accounts		1,775 7 0
	Banks:—		
344	Overdraft, Westminster Bank Ltd.	949 12 8	
46	*Less* Cash at Lloyds Bank Ltd. .. 57 1 1		
	Cash at Westminster Bank Ltd. 590 0 3		
		647 1 4	
298			302 11 4
	Loan Accounts:—		
10,405	Balance, 31 December, 1953		10,405 0 0
	Grant from Nuffield Foundation :—		
700	Amount Received	700 0 0	
88	*Less* Expenditure to date	283 12 6	
612		416 7 6	
—	*Less* Repaid	350 0 0	
612			66 7 6
	Reserve Account:—		
	Grant from Pilgrim Trust :		
4,000	Balance, 31 December, 1953	3,250 0 0	
750	*Less* Transfered to Income and Expenditure Account	3,250 0 0	
3,250			—
	Income and Expenditure Account:—		
	Balance, 31 December, 1953	5,464 7 0	
	Less Loss for the year	405 0 8	
5,464			5,059 6 4
		Carried forward	17,608 12 2

1953	ASSETS	£ s. d.	£ s. d.
£			
	Cash in Hand:—		
	Petty Cash Accounts	18 2 1	
	General Accounts (since Banked)	689 19 8	
10			708 1 9
	Sundry Debtors:—		
484	On Open Accounts	651 9 2	
2,095	Inland Revenue for repayments	20 1 3	
2,190	Messrs. J. & A. Scrimgeour (Deposit) ..	—	
4,769			671 10 5
	Investments:—		
1,094	Balance, 31 December, 1953	1,094 8 4	
	Realised	1,121 15 0	
	Surplus on Realisation transferred to Income and Expenditure Account	27 6 8	
	Valuation:—		
7,353	Wildfowl	5,874 0 0	
160	Land-Rovers	520 0 0	
1,000	Coops, Henhouses, Huts, etc.	1,860 0 0	
8,513			8,254 0 0
	Narrow Boat:—		
1,000	Valuation, 31 December, 1951	1,000 0 0	
25	*Less* Rents to 31 December, 1953 125 0 0		
	Rent, year ended 31 December, 1954 .. .. .. 100 0 0		
		225 0 0	
875			775 0 0
		Carried forward	10,408 12 2

NOTE.—The Narrow boat is hired from the Trust under a ten-year agreement at £100 per annum, payable by quarterly rents of £25 in advance, as from 21 October, 1952, with the option to purchase for ten shillings after rents amounting to £1,000 have been paid.

Brought forward		17,608 12 2		Brought forward	10,408 12 2
			New Buildings, etc., New Grounds, Slimbridge, Gloucestershire:—		
			Balance, 31 December, 1952	8,000 0 0	
			Less Written off to 31 December, 1953	400 0 0	
			Written off in year ended 31 December, 1954 ..	400 0 0	
				800 0 0	
	7,600				7,200 0 0

NOTE.—The New Buildings, etc., to be written off over a period not exceeding that of the lease.

£22,861	£17,608 12 2	£22,861	£17,608 12 2

We have examined the above Balance Sheet of The Wildfowl Trust, dated 31 December, 1954, together with the accompanying Income and Expenditure Account and find them to be in accordance with the Books and Vouchers produced to us and the information and explanations given to us.

STROUD, Gloucestershire.
21 February, 1955.

(Signed) S. J. DUDBRIDGE & SONS,
Auditors.

THE WILDFOWL TRUST

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31 DECEMBER, 1955

1954	EXPENDITURE	£ s. d.	£ s. d.
£			
8,513	To Valuation, 31 December, 1954		8,254 0 0
	„ Membership:—		
2,116	Salaries of Administrative Staff	1,503 7 7	
351	Office Expenses, Postages, etc.	568 19 4	
900	Printing and Stationery—General	538 16 2	
225	Telephone	237 18 8	
117	Bank Charges	144 7 9	
112	Miscellaneous Expenses	236 11 2	
2,114	Printing Annual Report	2,487 8 7	
104	Expenses of Annual Dinner	115 15 3	
88	Staff Travelling Expenses	132 17 0	
6,127			5,966 1 6
	„ New Grounds:—		
3,042	Salaries of Outside Staff	4,223 0 11	
198	Staff Travelling Expenses	188 9 0	
591	Purchases and Transport of Wildfowl and Eggs	1,078 0 4	
49	Purchases of Hens for Sitting	33 5 0	
19	Carriage on Birds Sold	148 14 10	
2,535	Food for Wildfowl	2,558 5 4	
378	Rent, Rates and Insurance	405 17 7	
877	Materials, Repairs and Replacements	1,068 8 2	
642	Vehicles and Mechanical Equipment Expenses	455 9 8	
157	Electricity	250 7 9	
81	Repairs, Curator's Cottage	—	
8,569			10,409 18 7
	„ Purchases for Re-sale:—		
785	Printing Christmas Cards	1,085 0 0	
106	Post Cards	95 17 2	
25	Books	21 3 10	
284	Ties	239 0 6	
235	Pottery	283 12 10	
147	Films	179 15 7	
—	Leathercraft	134 16 7	
—	Car Badges	157 12 3	
—	Table Mats	68 4 10	
1,582			2,265 3 7
		Carried forward	26,895 3 8

1954	INCOME	£ s d.	£ s. d.
£			
	By Membership:—		
7,104	Subscriptions	6,730 18 0	
—	Income Tax Repayable on Covenants	2,350 1 4	
23	Gift Tokens	—	
1,392	Donations	134 5 4	
92	Receipts from Annual Dinner	118 1 0	
27	Dividends and Interest	—	
8,638			9,333 5 8
	„ New Grounds:—		
5,505	Gate Takings	8,770 9 11	
1,202	Sale of Surplus Wildfowl	1,072 4 0	
6,707			9,842 13 11
	„ Sales:—		
377	Annual Reports	326 18 11	
549	Key to 'The Wildfowl of the World'	728 1 10	
11	Booklets	—	
1,341	Christmas Cards	1,515 9 4	
—	Surplus Christmas Cards	100 0 0	
309	Post Cards	362 8 6	
47	Books	14 14 0	
188	Prints	220 10 0	
—	Paintings	400 0 0	
402	Ties	314 8 9	
199	Pottery	329 5 6	
163	Films	248 8 2	
8	Binders	—	
—	Leathercraft	130 12 10	
—	Car Badges	285 8 6	
—	Table Mats	21 12 6	
3,594			4,997 18 10
	„ Scientific and Educational:—		
225	Hostel—Board and Lodging	128 9 1	
1,552	Fees and Collections at Lectures	1,205 5 7	
653	Duck Adoption	789 11 7	
—	Donations for Abberton Ringing Station	283 10 0	
—	Donations for Borough Fen Decoy	456 3 3	
		Carried forward	24,173 18 5

			Brought forward			26,895	3	8
	To Scientific and Educational:—							
372	Salaries		1,342	17	9			
2,133	Hostel		1,688	5	1			
287	Rocket Netting Expenses		614	9	6			
218	Icelandic Expedition		—					
584	Expenses of Lectures		365	10	5			
137	Travelling Expenses		200	5	2			
513	Abberton Ringing Station		764	0	0			
100	Borough Fen Decoy		502	8	2			
210	Wildfowl Counts		590	17	1			
430	Scientific Equipment and Expenses		503	1	3			
145	Duck Adoption		276	15	11			
5,129						6,848	10	4
29,920						33,743	14	0
	„ Capital Expenditure:—							
—	Brooders		263	17	0			
—	Deep Freeze Refrigerator		166	6	5			
—	Conversion of Garage into Wildfowl Counts Office		268	17	9			
158	Electrical Wiring		150	0	0			
—	Excavation of New Pool		300	0	0			
—	Floodlighting and Sundry Equipment		178	11	0			
—	Nylon Rocket Netting Equipment		301	0	0			
—	Decoration and Repairs to Bungalow		140	3	0			
—	Re-siting Fuel Tanks		144	14	0			
1,064	New Bridges, Road, Paths, etc.		—					
851	Water Scheme		—					
342	Office Equipment		—					
570	New Land Rover		—					
2,985						1,913	9	2
400	Written off Buildings					400	0	0
—	Transferred to Reserve Account					2,400	0	0
—	Balance. Excess of Income over Expenditure for the year					10	3	8
£33,305						£38,467	6	10

			Brought forward			24,173	18	5
	By Grants:—							
—	The Nature Conservancy, Salary of Deputy Director (Research)	£789	14	8				
—	The Nature Conservancy, Wildfowl Counts	536	14	3				
					1,326	8	11	
—	Bristol Zoo, towards Salary of Resident Biologist				400	0	0	
2,430						4,589	8	5
27	Surplus on Realisation of Investments					—		
3,250	Transferred from Pilgrim Trust Reserve Account					—		
24,646						28,763	6	10
8,254	Valuation, 31 December, 1955					9,704	0	0
32,900						38,467	6	10
405	Balance, Excess of Expenditure over Income for the year					—		
£33,305						£38,467	6	10

NOTE.—The figures in the margin are those for the year ended 31 December, 1954 and are given for the purpose of comparison only.

THE WILDFOWL TRUST

BALANCE SHEET, 31 DECEMBER, 1955

1954	LIABILITIES	£ s. d.	£ s. d.	1954	ASSETS	£ s. d.	£ s. d.
£				£			
	Sundry Creditors:—				Cash:—		
1,775	On Open Accounts		2,987 15 5	708	In Hand	44 0 8	
				—360	At Bank, Westminster Bank Ltd.	2,218 6 8	
	Loan Accounts:—			57	Do. Lloyds Bank Ltd.	36 10 1	
	Balance, 31 December, 1954	10,405 0 0					
	Less Repaid	500 0 0		405			2,298 17 5
10,405			9,905 0 0	620	Sundry Debtors and Payments in Advance:— On Open Accounts	822 13 9	
				51	Payments in Advance	61 14 3	
	Grant from Nuffield Foundation:—						
	Amount received	700 0 0		671			884 8 0
	Less Expenditure	283 12 6			Valuation (as valued by the Honorary Director):—		
				5,874	Wildfowl	6,959 0 0	
		416 7 6		520	Land-Rovers	420 0 0	
	Less Repaid	416 7 6		1,860	Coops, Henhouses, Huts, etc.	2,325 0 0	
66		—		8,254			9,704 0 0
					Narrow Boat:—		
				1,000	Valuation, 31 December, 1951	1,000 0 0	
	Reserve Account:—			125	*Less* Rents to 31 December, 1954 £225 0 0		
—	Transferred from Income and Expenditure Account		2,400 0 0	100	Rent year ended 31 December, 1955 100 0 0		
						325 0 0	
	Income and Expenditure Account:—			775			675 0 0
5,464	Balance, 31 December, 1954	5,059 6 4			New Buildings, etc., New Grounds, Slimbridge, Gloucestershire:—		
—405	*Add* Excess of Income over Expenditure for the year	10 3 8		8,000	Balance, 31 December, 1952	8,000 0 0	
5,059			5,069 10 0	400	*Less* written off to 31 December, 1954 .. .. £800 0 0		
				400	*Less* written off — year ended 31 December, 1955 .. .. 400 0 0		
						1,200 0 0	
				7,200			6,800 0 0
£17,305			£20,362 5 5	£17,305			£20,362 5 5

We have examined the above Balance Sheet of The Wildfowl Trust, dated 31 December, 1955, together with the accompanying Income and Expenditure Account and find them to be in accordance with the Books and Vouchers produced to us and the information and explanations given to us.

STROUD, Gloucestershire.
17 March, 1956.

S. J. DUDBRIDGE & SONS,
Auditors.

DETAILS OF ITEMS IN INCOME AND EXPENDITURE ACCOUNT

Borough Fen Decoy

	£	s.	d.		£	s.	d.
To Wages	134	13	7	By Donations	456	3	3
„ Transport Expenses	39	11	6				
„ Ringing	173	0	0				
„ Rent and Rates	40	4	0				
„ General Maintenance	65	11	6				
„ General Expenses	49	7	7				
	£502	8	2		£456	3	3

Abberton Ringing Station

	£	s.	d.		£	s.	d.
To Wages	359	1	0	By Donations	283	10	0
„ Petrol	123	17	8				
„ Ringing	89	9	4				
„ Food for Wildfowl	26	14	4				
„ General Expenses	164	17	8				
	£764	0	0		£283	10	0

Wildfowl Counts

	£	s.	d.		£	s.	d.
To Printing Report	313	7	2	By Grant	536	14	3
„ Stationery	84	12	11				
„ Maps	25	12	3				
„ Travelling and Subsistence	167	4	9				
	£590	17	1		£536	14	3

PHOTOGRAPHS

The Trust is greatly indebted to the following for permission to reproduce the photographs they have taken :

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D. G. Schuyl
Peter Scott
Miss P. Talbot-Ponsonby
A. R. Wayre
G. T. Wilkins

MEMBERSHIP

The increase in subscriptions which took place in 1954 led to a drop in membership, but this was smaller than anticipated, and the total in January 1956 had recovered to within 130 of the 1954 peak:

	1954	*January* 1955	*January* 1956
Life Members	65	72	86
Ordinary Members	3808	3389	3370
Associate and Parish Members ..	855	949	1103
Corporate Members	82	112	128
Contributors	35	36	29
Total	4845	4558	4716

CLASSES OF MEMBERS

Several changes in the categories of Membership were submitted to the Ninth Annual General Meeting on 10 May 1956 in the form of a Resolution which was duly carried unanimously. Accordingly, there are now seven classes of Members, whose respective privileges and rates of subscription are detailed below.

1. **Life Members** (*a*) up to 50 years of age: £52 10 0 } One
   (*b*) over 50, not over 60: £26 5 0 } final
   (*c*) over 60: £10 10 0 } payment.
   Entitled to all privileges of Full Membership (see below) during life, and exempt from payment of any subscription, *excepting any sum being paid yearly under Deed of Covenant.*
2. **Full Members** Annual subscription two guineas. Entitled to free access to pens and observation-huts at the New Grounds with one free guest, one free copy of the Annual Report for each year of Membership and of all Bulletins issued during Membership, and to attend and vote at the Annual General Meetings.
3. **Junior Compounded Members** Only persons under 21. One payment of ten guineas. Entitled to all privileges of Full Membership (as above) until attaining the age of 21. May then, if they wish, pay another 40 guineas and be elected Life Members.
4. **Associate Members** Annual subscription 10s. Entitled to free access to pens and observation-huts, and to free copies of all Bulletins. (Associate Members may, by subscribing an additional eleven shillings, one guinea in all, also have one copy of each Annual Report posted to them on publication.)
5. **Gosling Members** Annual subscription 7s. 6d. Limited to persons under 16. Entitled to free access to pens at the New Grounds on Saturdays

and Sundays. (With the aim of encouraging interest in Wildfowl among children, a system is being introduced of grades of Goslings, with appropriate distinguishing marks, and promotion by recognition-test. Full particulars of this scheme were given in a leaflet issued to all members.)

6. **Corporate Members** Annual subscription two guineas. Limited to Educational Establishments, Youth Clubs, Training Colleges, etc. Entitled to free access to pens and observation-huts at New Grounds in parties by arrangement with the Curator. (Sundays before 2 p.m. excepted.) One free Annual Report; one copy of all Bulletins during Membership.
7. **Parish Members** Annual subscription 2s. 6d. Limited to persons living in Slimbridge Parish. Entitled to free access, with one free guest, to pens only at the New Grounds. Copies of all Bulletins.

The Resolution further defined the status, as *Contributors*, of Clubs, Institutes, Libraries, etc., not qualifying as Corporate Members, who for an annual payment of not less than one guinea may receive one copy of the Annual Report and Bulletins.

OBITUARY

The Trust has suffered a severe loss by the death of the Rt. Hon. the Lord Dulverton of Batsford, O.B.E. He was a Vice-President of the Trust from its formation and we owe much to his great generosity.

The Council has learned with deep regret of the deaths (notified since the last issue of the Annual Report) of the following Members:

Major C. Abbott
J. N. Barham
F. J. F. Barrington
Mrs F. C. Berry
G. G. Blake
A. G. Brant
Mrs K. M. Brownlow
Mrs H. G. C. Carr-Ellison
J. F. Carson, O.B.E.
Major R. C. R. M. Clarke
A. W. Clifford
T. F. Coghlan
Lt-Com J. Cracroft-Amcotts, D.S.C.
Miss M. M. Curtis
Sir Francis Dent, C.V.O.
Mrs M. Eardley-Wilmot
A. Ezra, O.B.E.
W. Friling
Colonel A. Gibb
L. C. M. Gibbs
R. E. Gifford
Sir Allan Grant
W. H. Hampton
Sir John Hanham, Bt
Lady Peggy Hoare
Miss M. A. Horton
Lt-Col G. F. Hutton, D.S.O.
R. Jackson
Dr W. Johnstone
Dr L. R. King
G. S. E. Lacon
A. R. Lucas
Lt-Col W. Mallalieu
E. S. D. Martin
A. E. Messer
D. J. Mitchell
Miss B. Moore
Major the Hon. F. Needham, M.V.O.
Major A. Pam, O.B.E.
Major P. J. S. Pearson-Gregory
Mrs P. Pinfold
P. W. Ratcliff
J. Robarts
S. Scrimgeour
Sir Keith Smith
J. S. Stephens
Dr D. J. Thomas
Miss C. M. Tunnard
Miss M. Wareham
E. N. Yorke

MEMBERS OF THE WILDFOWL TRUST APRIL 1956

We apologise for any errors which may appear in this list and shall be grateful if Members will inform us so that our records can be corrected.

LIFE MEMBERS

H.E. Ahmed Abboud
T. W. Aiken
Field-Marshal Viscount Alanbrooke, K.G., G.C.B., O.M., G.C.V.O., D.S.O.
Miss L. Baker
Mrs Y. M. Baker
Miss J. Belville
G. H. Benson
Lt.-Col. R. L. Benson, D.S.O., M.C.
F. A. Kemmis Betty
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Miss D. Scott
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Peter Scott, C.B.E., D.S.O.
Mrs P. Scott
Miss J. Scurfield
Sir William Seeds, K.C.M.G.
H. C. Shipman
Mrs W. J. Short
R. Simpson
Sir Robert Sinclair, K.C.B., K.B.E.
Sir Keith Smith, K.B.E.
W. Proctor Smith
Group-Capt. R. Smyth-Pigott
W. Straight, C.B.E., M.C., D.F.C.
Lt.-Col. A. H. C. Sutherland
Miss E. Tonks
Mrs C. Tucker
C. A. Ullens
Sir George Usher
H. Whitbread
G. T. Wilkins
Capt. W. D. M. Wills
A. M. Wilson
D. Wilson
M. Winter

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Rev. R. B. Abell
Miss C. M. Acland
A. M. Adam
Miss A. E. Adam
C. Forbes Adam
C. M. Adam
Mrs E. C. Adam
Prof. N. K. Adam
Mrs N. K. Adam
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H. Adams
N. Adamson
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P. M. Agnew
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R. F. Aickman
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C. J. Ainscough
Col. E. A. Airy
Miss D. Albright
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J. H. P. Allan
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D. W. Allen
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R. Allen
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M. F. Berry
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Maj. A. W. Boyd
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H. Boyd
R. O. Boyd
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S. A. Bradford
Lt.-Col. W. B. P. Bradish
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Miss W. E. Bradley
H. W. Brady
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O. Brooke
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F. H. Brooks
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Miss B. E. Brown
B. St. J. Brown
Miss B. W. Brown
Mrs C. Brown
C. E. Brown
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Miss E. M. Brown
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E. T. Brown
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J. J. G. Brown
Col. J. R. Brown
Miss J. R. Brown
Dr P. P. Brown
S. Brown
W. A. Brown
W. E. Brown
Mrs W. S. A. Brown
Brig. C. C. L. Browne O.B.E.
Dr E. M. Browne
Col. J. B. Browne, U.S.A.F.R
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C. A. G. Brownrigg
A. H. Bruce
Miss M. Bruce
Miss M. E. Bruce
M. R. Bruce
Miss R. H. Bruce
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Miss B. E. Buchanan
Sir Charles Buchanan
D. H. Buchanan
Dr J. H. S. Buchanan
C. S. Buckley
Miss P. Bucknall
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Miss N. H. Butterworth
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E. Cadbury, D.S.C., D.F.C.
J. C. Cadbury
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M. A. Callender
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R. McL. Cameron
Miss U. L. Cameron
Mrs A. M. G. Campbell
Dr B. Campbell
Miss E. F. Campbell
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G. Campbell-Black
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W. D. O. Capper
W. P. Careless
Miss M. G. Carew
I. F. Carlile
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R. Carnegie
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Mrs D. Carson-Roberts
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C. D. Carter
C. T. Carter
G. F. Carter
Miss H. L. Carter
Mrs I. L. Carter
Lt.-Col. S. Carter, M.B.E., M.C.
Lt.-Gen. Sir Adrian Carton de Wiart, V.C., K.B.E., C.B., C.M.G., D.S.O.
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J. Cartwright
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Miss D. Casdagli
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H. D. Cassini
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