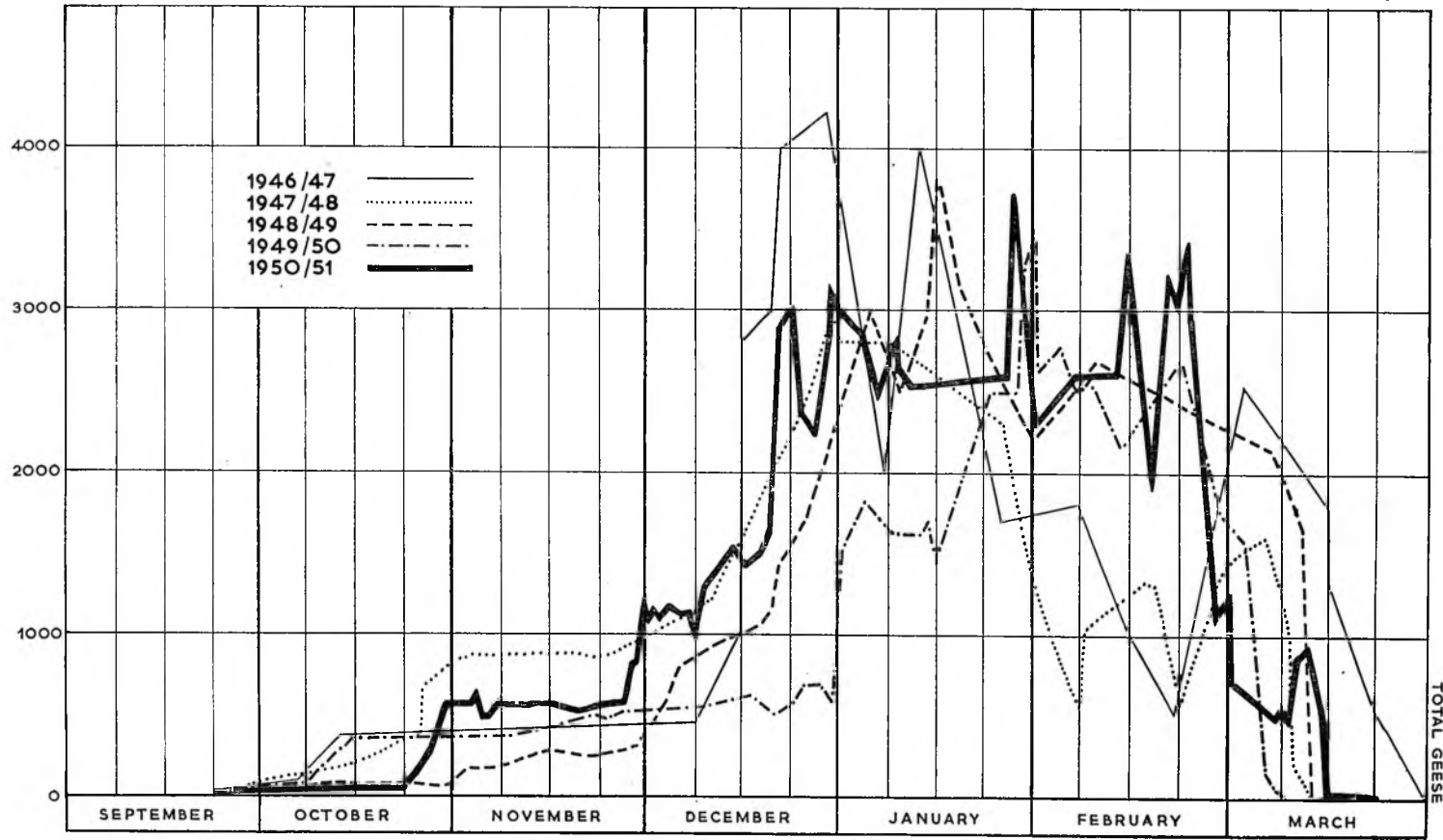


TOTAL NUMBER OF WILD GEESE ON THE NEW GROUNDS 1946—51



Severn Wildfowl Trust

TOTAL GEESSE

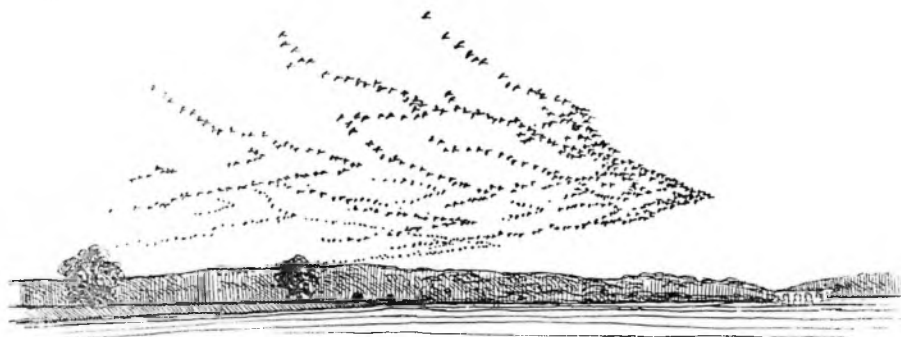
WILD GEESE

THE first geese arrived on the estuary punctually on 23rd September—a pair, followed by 20 more on the 26th—and the last 15 left the marsh rather later than usual, on 21st March.

Between these dates there were always Whitefronts (*A. a. albifrons*) to be seen on the New Grounds, and from the last week in December until the last week in February, the numbers were between 2,500 and the peak of 3,700.

Only six species and subspecies of geese were recorded this season. Grey Lag (*A. a. anser*) and Brents (*B. bernicla*) did not put in an appearance. On the other hand no fewer than six Lesser Whitefronts (*A. erythropus*) were observed, bringing the British records of this species to 17, of which all but three have been recorded on the New Grounds since 1945. The sixth of this year's birds, which had a wounded leg, spent some weeks in the enclosures and became perfectly tame.

The maximum number of Pinkfeet (*A. brachyrhynchus*) was 63, compared with 62 in 1949 and 58 in 1948.



PINK-FOOTED GOOSE (*Anser brachyrhynchus*)

Main flock similar in size to that of autumn, 1949, but a number remained until nearly the end of December, an unusually late date (see Table I for details of numbers). After the departure of the flock single birds and small groups appeared, or reappeared, at intervals throughout the winter.

BEAN GOOSE (*Anser fabalis* subsp.)

One adult with orange on bill limited to a narrow transverse strip seen 17th December (P. S.), 28th December (H. B., P. S.), and 30th December (H. B., P. S.). One with predominantly yellow bill seen 20th December (H. B.).

TABLE I
NUMBERS OF GEESE

Date	Pink-footed	Bean	White-fronted	Lesser White-fronted	Barnacle	Total
1950						
Sept. 23rd	2	—	—	—	—	2
„ 24th	2	—	—	—	—	2
„ 26th	22	—	—	—	—	22
„ 27th	26	—	—	—	—	26
Oct. 5th	14	—	—	—	—	14
„ 17th	14	—	3	—	—	17
„ 18th	14	—	—	—	—	14
„ 21st	37	—	3	—	—	40
„ 22nd	37	—	22	—	—	59
„ 23rd	38	—	65	—	—	103
„ 24th	49	—	140	—	—	189
„ 25th	53	—	224	—	—	277
„ 26th	54	—	291	—	—	345
„ 30th	45	—	c490	—	—	c535
„ 31st	44	—	—	—	—	No count
Nov. 1st	54	—	493	—	—	547
„ 2nd	54	—	467	—	—	521
„ 3rd	56	—	480	—	—	536
„ 4th	51	—	537	—	—	588
„ 5th	56	—	429	—	—	485
„ 6th	56	—	422	—	—	478
„ 7th	52	—	463	—	—	515
„ 8th	52	—	487	—	—	539
„ 9th	56	—	475	—	—	531
„ 10th	—	—	—	—	—	c510
„ 11th	52	—	470	—	—	522
„ 12th	56	—	468	—	—	524
„ 13th	—	—	—	—	—	523
„ 14th	56	—	475	—	—	531
„ 15th	57	—	480	—	—	537
„ 16th	57	—	487	—	—	544
„ 17th	56	—	478	—	—	534
„ 18th	50	—	464	—	—	514
„ 19th	56	—	453	—	—	509
„ 20th	58	—	473	—	—	531
„ 21st	42	—	471	—	—	513
„ 22nd	58	—	—	—	—	No count
„ 23rd	—	—	—	—	—	510
„ 26th	54	—	486	—	—	540
„ 27th	51	—	481	—	—	532
„ 28th	58	—	c755	—	—	c815
„ 29th	57	—	1025	—	—	1080
„ 30th	61	—	1100	—	—	1160
Dec. 1st	63	—	c1040	—	—	c1100
„ 2nd	—	—	—	—	—	c1050
„ 3rd	58	—	1057	—	—	1115
„ 4th	57	—	c1020	—	—	c1080
„ 5th	57	—	1065	—	—	1120
„ 6th	57	—	1100	—	—	1160
„ 7th	53	—	1053	—	—	1110
„ 8th	—	—	—	—	—	1120
„ 9th	—	—	—	—	—	1010
„ 11th	57	—	1180	—	—	1240

TABLE I—continued

Date	Pink-footed	Bean	White-fronted	Lesser White-fronted	Barnacle	Total
1950						
Dec. 12th	61	—	1260	—	—	1320
„ 13th	53	—	1370	—	—	1420
„ 14th	52	—	c1450	—	—	c1500
„ 16th	15	—	—	—	—	No count
„ 17th	20	1	1400	—	—	1420
„ 18th	—	—	—	—	—	c1500
„ 19th	c26	—	1660	—	—	1690
„ 20th	28	1	2800	1	—	2830
„ 21st	—	—	—	—	—	2990
„ 23rd	34	—	c2365	1	—	c2400
„ 26th	24	—	c2180	—	—	c2200
„ 27th	25	—	—	—	—	No count
„ 28th	1	1	c2800	1	—	c2800
„ 29th	—	—	c3100	—	—	c3100
„ 30th	1	1	c3000	—	1	c3000
„ 31st	—	—	c3000	—	1	c3000
1951						
Jan. 4th	—	—	c2800	—	1	c2800
„ 7th	—	—	c2430	—	—	c2430
„ 8th	—	—	c2800	—	1	c2800
„ 9th	—	—	2620	—	1	2620
„ 12th	—	—	—	—	—	c2500
„ 26th	6	—	2560	2	—	2570
„ 27th	4	—	c3700	—	—	c3700
„ 31st	2	—	c2500	1	—	c2500
Feb. 1st	—	—	2260	—	—	2260
„ 2nd	—	—	c2350	—	—	c2350
„ 6th	—	—	c2600	—	—	c2600
„ 12th	—	—	c2600	—	—	c2600
„ 14th	—	—	c3300	—	—	c3300
„ 17th	—	—	c2000	2	—	c2000
„ 18th	—	—	1950	—	—	1950
„ 19th	1	—	3140	1	—	3140
„ 20th	6	—	c3000	1	—	c3000
„ 22nd	—	—	3360	1	—	3360
„ 23rd	6	—	2630	1	—	2640
„ 24th	1	—	2290	1	—	2290
„ 27th	—	—	1100	—	—	1100
„ 28th	—	—	c1200	—	—	c1200
Mar. 1st	—	—	712	—	—	712
„ 8th	—	—	490	—	—	490
„ 9th	—	—	552	—	—	552
„ 10th	—	—	c450	—	—	c450
„ 11th	—	—	833	—	—	833
„ 12th	6	—	924	—	—	930
„ 13th	—	—	733	—	—	733
„ 14th	—	—	550	—	—	550
„ 15th	—	—	241	—	—	241
„ 16th	—	—	32	—	—	32
„ 18th	—	—	17	1	—	18
„ 19th	—	—	14	1	—	15
„ 21st	—	—	14	1	—	15

No counts were made on days omitted from the table. The symbol 'c' indicates that the figure given was obtained by estimation, or that some doubt was felt of the accuracy of the count. The numbers are in most cases the mean values of several counts.

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

See Table I for details of numbers. As will be seen from the graph on p. 6, these changes in numbers conformed more closely to the pattern of earlier seasons than in the 'abnormal' season of 1949-50. Sight records of geese ringed in previous seasons were obtained as follows :

3rd December : one ringed on right leg with red ring (i.e., caught 27th February, 1950). No details of family status or individual markings.

8th December : one red-ringed. No details.

16th December : a pair, both red-ringed, without young.

20th December : one red-ringed, paired, but without young.

29th December : one red-ringed, with a family (size not noted).

26th January : one red-ringed. Paired, no young.

5th February : two red-ringed. One paired, no young ; the second accompanied by two juveniles, but apparently without a mate.

6th February : three red-ringed. An adult in a family of four ; and a pair without young.

18th February : two red-ringed, one with white metal ring, right leg. Red-ringed pair as before. White-ringed bird presumably one of fifteen ringed at New Grounds, 18th February, 1948.

20th February : red-ringed pair again.

At least eight different red-ringed individuals were seen. Had it been possible to make satisfactory notes on the appearance of ringed birds on every occasion, this total would probably have been increased. The red-ringed birds were all caught together on 27th February, 1950, when 69 Whitefronts were ringed and released.

The gander known as 'White-eyebrows', seen in the previous seasons, was not found this year.

GREENLAND WHITE-FRONTED GOOSE (*Anser a. flavirostris*)

A family of two adults and four young first seen 27th November remained until 11th January at least. On 1st February a party of five, comprising one adult and four young, and thought to be this same family, was 'rediscovered'. They were then seen frequently until 23rd February.

A family of three, seen on 20th December only, included a ringed adult. This bird must almost certainly have been caught in Greenland, as the ring was not of the British pattern and no geese of this form are known to have been ringed elsewhere.

Odd records of birds of this race include two adults on 1st December (in addition to the family of six), one adult, 12th January, and three, apparently all adults, 13th March.

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*)

Six individuals, four adults and two first-winter birds, were observed during the season :

An adult, A, seen 20th (H. B.), 23rd (H. B., P. S.) December, 13th January (R. A. F. Gillmor, N. G. B. Jones).

A second adult, B, 28th December (P. S.), 17th February (P. S.).

Single adults, identity not established, 16th January (B. Ashworth), 4th February (P. T. P.), 22nd February (H. B.).

A juvenile, very lame in right leg, 26th January (H. B.), 17th February (P. S.).

A second juvenile 26th January (A. Richardson), 1st February (H. B.), 19th February (H. B.).

Third adult, C, 20th February (W. B. Alexander, G. C. Varley, H. B., P. S.), 23rd, 24th, 25th February (H. B.).

Fourth adult (♀), D, with badly damaged right leg, first seen in Thirty-Acre, 18th March, subsequently attached itself to the grey geese in the Big Pen, where it remained until late May, becoming very tame. No improvement in the condition of its leg occurred during its stay, so that its departure was unexpected.

BARNACLE GOOSE (*Branta leucopsis*)

A single adult present from 30th December to 11th January.

AGGRESSIVE BEHAVIOUR IN THE WHITE-FRONTED GOOSE

Observation on aggressive behaviour in the wintering flocks of wild geese, begun in the previous winter, was continued by the Resident Biologist, Mr. Hugh Boyd, from November, 1950, to March, 1951. In the preliminary account of this work given in the Third Annual Report it was described as a study of dominance relationship; but this form of description has been discarded in favour of the more comprehensive 'aggressive behaviour' to indicate that the data being collected are not restricted to those relevant to the hypothesis of dominance.

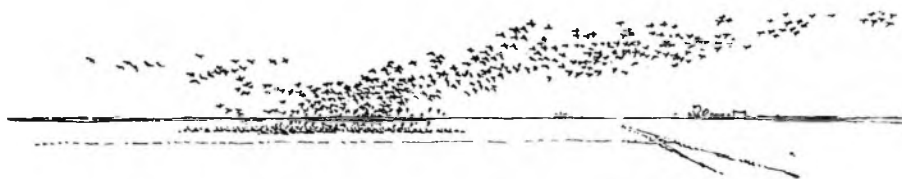
During the later part of the season attention was concentrated on the incidence of aggressive behaviour in groups rather than on the performance of family units, and it is proposed to develop this line of attack during the coming winter. It will, however, be necessary to continue the collection of information on family behaviour as the data so far obtained are insufficient to establish many results, though the picture to which they give rise is unexpectedly free from anomalies.

Studies of geese in the collection with the object of supplementing the observations on the wild birds have provided quite a lot of information on the ethological aspects of aggressive behaviour, but from the sociological viewpoint, which is being emphasized, it is only too apparent that conditions of captivity affect these activities and give a misleading idea of the natural social organization.

It is likely that at least two more seasons' study will be necessary before the pattern of these complex relations, which is now emerging, can be substantiated.

DISTURBANCE BY AIRCRAFT

Although pilots were officially asked by their respective Ministries not to fly over the New Grounds, little enough attention was paid to the request, and on days of good flying weather serious observation of the geese was virtually impossible. Once more the geese became for a while largely nocturnal. During the full moon periods of October and November many visitors who had come great distances to see the geese were disappointed, because of the lack of co-operation of both civil and R.A.F. pilots. If it were generally recognized that a minor alteration of course on the part of an aircraft can make, for 50 or more people, the whole difference between the success or failure of an ornithological expedition, perhaps of hundreds of miles at considerable expense, surely more pilots would take the trouble to avoid the area.



On at least three occasions during the season parties who had made the journey by coach from the other side of England saw nothing of the wild geese because of disturbance by a single aircraft.

It seems possible that nothing short of a prohibited area will ever really reduce the low altitude air traffic which causes such serious disturbance to the White-fronted Geese.

MARKING OF WILD GEESE

It will be recalled that the first catch of wild geese with special nets propelled by rockets was made on the New Grounds on 18th February, 1948, when 30 Whitefronts and 1 Pinkfoot were caught. For various reasons the development of the technique was very slow and subject to many delays. It was not until 27th February, 1950, that the next catch was made. On that day 71 Whitefronts were caught on the Dumbles, and during March 29 Greylags and 7 Pinkfeet were caught, ringed and released in S.W. Scotland. The first experiments were made in colour marking with dyes, and met with only very limited success.

During the summer the netting and marking techniques were greatly improved, although the methods available for the winter of 1950-51 were still far from perfect. Between 8th and 28th October, 1950, 400 Pinkfeet were caught in Southern Scotland in 14 catches (highest 75, lowest 6, average 28). An expedition to the Wash in December yielded only two catches, but one produced the record figure of 159. In January, in Scotland, three small catches were made (14 Greylags, 13 Pinkfeet, and 14 Pinkfeet). At the New Grounds only two catches were made—4 and 25 Whitefronts, in February; and in March a last expedition to Scotland resulted in three catches—the first of 4 Greylags and 1 Pinkfoot, the next of 79 Pinkfeet and 1 Greenland Whitefront, and the last of 2 Pinkfeet. Thus, throughout the season 691 geese were marked in 24 catches. All these birds were marked with British Trust for Ornithology rings (dyed blue, on the left leg), and most of them were also dyed on the tail and tail-coverts with bright colours, visible in favourable conditions at distances as great as a mile. 643 of the geese ringed were Pinkfeet; the remainder comprised 29 European Whitefronts, 1 Greenland Whitefront, and 18 Greylags. No recoveries of any of these Whitefronts or Greylags have yet been reported.

Pink-footed Geese

Fifty-eight of the 643 Pinkfeet have so far been recovered, i.e., 9 per cent. of those ringed were killed in the same season as they were caught. The following table of records gives some indication of the local movements of the geese during the winter. Recoveries are mainly birds which have been shot. Numbers in parentheses are sight records of dyed birds; but those noted in the immediate neighbourhood of the ringing area are not included unless the observation was at least a month after the original capture.



TABLE II—RECOVERY OF PINK-FOOTED GEESE

(a) Of 378 ringed in south Scotland in October, 1950, 72 have been reported.

Area of Recovery	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
S.E. Scotland	2	1	1(4)					4(4)
Solway	(8)	3	3	2(1)	3			11(9)
N. Scotland				1				1
E. Central Scotland ..	1	2	2(5)	2		4	1	12(5)
N.W. Midlands	(3)		1	1(1)	1			3(4)
Humber	1(1)	1	1	2				5(1)
Wash		1(3)	2(5)	1	1			5(8)
	4(12)	8(3)	10(14)	9(2)	5	4	1	41(31)

(b) Of 160 ringed in the Wash area, December, 1950, 20 have been reported.

Area of Recovery	Dec.	Jan.	Feb.	March	Total
Wash	4	3	3		10
N.W. Midlands	1				1
Solway		3(4)		1 recap. (1)	4(5)
	5	6(4)	3	1 (1)	15(5)

The bird recaptured on the Solway was released again.

(c) Of 27 ringed in the Solway area, January, 1951, one was recovered in the same area in January. Two blue-dyed geese were reported seen in flight near Neumunster, Schleswig-Holstein, on 27th January. These were probably Pinkfeet, in which case they were ringed on the Solway on 21st or 23rd January; but it is possible that they were Greylags, ringed in the same area on 16th January, or that the green dye used in December was mistaken for blue.

(d) Of 78 ringed in the Solway area, March, 1951, one was recovered in the same area in March and another in East Central Scotland at the end of that month.

Full details of individual recoveries are shown on pp. 24-25.

The Council wishes to express its gratitude to those who have given their assistance in various ways to this project, and especially to thank those who granted facilities to the netting team to operate on their land.

Experiments have been carried out with improved equipment and it is hoped that much better results will be achieved during the winter of 1951-52. It should be emphasized that early information about sight records of dyed birds is of great value and should be communicated to the Director at the New Grounds with as little delay as possible.

NOTES ON COLOUR MARKING OF GEESE**By Hugh Boyd, Resident Biologist**

THE first attempts at colour marking geese in February and March, 1950, were based on the findings of Wadkins (*J. Wildlife Manag.* 12 (1948) : 388-391), who concluded that basic dyes in alcoholic solution provided a practical, inexpensive and quick method of marking pheasants for field study. Accordingly we used solutions of Rhodamine B and Crystal Violet on geese captured at the New Grounds and in the Solway area. The results were disappointing: the intensity of colouring was less than expected and very uneven, and fading was very rapid.

This failure led to experiments with other methods, including paints, inks, etc., applied to series of feathers, to tame ducks and to passerines captured for ringing. None of these alternatives appeared preferable to the dye solutions for the purpose of marking geese, but since some promised to be of use on small birds they are commented on briefly here.

Rejected Methods

1. Quick-drying cellulose paints (supplied by Jenson and Nicholson Ltd., and I.C.I. Paints Division, Slough) provide a series of bright colours, are durable and fairly easily applied to small areas, but they seem objectionable in their effects on the treated birds. It is difficult to prevent bad matting of the feathers at the time of application, and continued observation of passerines marked by this means disclosed that after several weeks some individuals developed 'bald' patches, due to the loss of both the painted feathers and some of those adjacent to them. The cause of this loss was not established. No evidence of increased mortality of painted as compared with unpainted birds was obtained.

2. Artists' oil colours suspended in carbon tetrachloride appeared to produce quite good results on test-feathers and when applied to passerines. Bright colouring, quick drying and durability are the merits of this method. The length of time required to mark large areas and the relatively extravagant use of pigment led to its rejection.

3. Waterproof inks (supplied by Winsor and Newton Ltd., and J. Holden & Co. Ltd.) gave a very limited range of suitable colours (most shades fading badly), lacked intensity, and were slow drying. They would also be expensive to use in quantity.

4. 'Cado Flo-master' waterproof inks (Cushman and Denison Mfg. Co., New York) gave excellent results in respect of brilliance and durability, but the solvent used appeared to affect the feathers so that the cohesion of the webs was lost.

Use of Dyes

Continued experiments with alcohol-water dye solutions showed them to possess advantages of speed and inexpensiveness, making them the most suitable method yet devised for marking large numbers of large birds with areas of white feathers. The unsatisfactory initial attempts were found to be due to an inadequate method of application and an unfortunate choice of dyestuffs, and better results were obtained by changes in technique and material. The dyes so far tested are Rhodamine B 500, Auramine ON 150, Brilliant Green YN 5,

Victoria Blue BN 150, Methyl Violet 2 BN 200, and Methasol Nigrosine ENS (all supplied by I.C.I. Dyestuffs Division, Huddersfield); Crystal Violet and Malachite Green. The original batch of Rhodamine B was found greatly inferior to the type 500 and was discarded. Methyl Violet and Methasol Nigrosine (black) have not yet been used on geese in the field; but feather tests suggest that Methyl Violet is to be preferred to Crystal Violet because of much greater resistance to water fading. Nigrosine is unlikely to prove very useful. The following table summarises the conclusions reached on the success of the dyes in the field.

Dye	Colour	Initial intensity	Resistance to fading
Rhodamine B	Crimson to pink	Very good	Good
Auramine	Yellow	Good	Good
Rhodamine B and Auramine	Orange	Very good	Good
Brilliant Green	Green	Very good	Fair
Victoria Blue	Dark blue	Good	Poor
Crystal Violet	Violet	Good	Poor
Malachite Green	Green	Fair	Poor

Auramine produces an intense yellow coloration, but is only described as 'good' because it is rather difficult to detect this colour except in certain conditions of lighting. The bright crimson of Rhodamine fades fairly quickly to a shade not certainly distinguishable from that of the orange mixture in unfavourable conditions. The unsatisfactory lasting qualities of Crystal Violet and Malachite Green appear to be due principally to water fading; Brilliant Green is more affected by sun fading; and Victoria Blue is badly affected by both sun and water.

Preparation of Solutions

All the dyes except Nigrosine are used in a 33 per cent. solution of ethyl alcohol in water (industrial methylated spirit 64 O.P. is a satisfactory alcohol source). Optimum concentrations of each dye have yet to be determined but are of the order of 1-2 oz. dye per gallon of solvent. Attempts to prepare more concentrated solutions may result in the formation of insoluble precipitates, especially in the case of Auramine. The dyestuffs are added to the solvent in the cold. Solutions containing higher proportions of alcohol seem to give no greater initial coloration and tend to wash out more readily. The use of acetic acid in the solvent effects no improvement. Some experiments with wetting agents have been made but the results obtained have been unpromising.

Application

In the first field tests the dye was applied by means of a hand spray of the type used for insecticides. This failed to effect a sufficient penetration of the feathers, nor could enough solution be applied. To ensure a thorough soaking of the white parts of the plumage the technique now employed is to immerse the tail coverts of the goose in a bucketful of solution, care being taken to keep the wings dry. After dyeing the birds are placed in portable cages for about fifteen minutes. This allows the dye to penetrate and dry to a considerable extent, improving both the initial intensity and durability of the colouring.

Visibility of Colours

The most unsatisfactory feature of the dyeing method is the great variation in appearance of individuals marked on any one occasion. The causes of this variation are not yet understood, though wetting of the birds while in the nets and fouling play some part. Well-dyed birds have been detected in flight at ranges in excess of a mile and on the ground at half a mile within a few days of being marked. On the other hand some individuals have only been detected with difficulty at less than a hundred yards after a scarcely longer interval. Rhodamine-dyed geese have been recognized in the field at least fourteen weeks after marking and those marked with brilliant green after 13 weeks. Geese in the collection are still recognizably pink over six months after dyeing, though yellow- and green-dyed birds become no longer distinguishable after about four months.

Many of the people who have shot or found ringed birds and reported them have commented on the presence of dyes on the feathers, but a number have failed to note any colour even on birds shot within a few weeks of marking, while a majority of the positive reports have described the colouring as faint. Samples of feathers sent have shown great variation in colour intensity.

Effects of Dyeing on Birds

The behaviour of dyed geese has been carefully observed. Immediately on settling after release a great deal of preening of the affected areas takes place, but probably no more than would occur in any bird whose plumage had been drastically disarranged by contact with the nets, handling and wetting. A little dye may be ingested as a result, but is most unlikely to produce any serious effects (the solutions are distasteful but not highly toxic). A high rate of preening may be maintained for one or two days but the return to normal preening is speedy. Our attention has been drawn to the frequency and extent of damage to the tail feathers in dyed geese that have been recovered: it is uncertain whether there is any greater damage in dyed as compared with undyed birds that have been captured and more information is required on this point (which is complicated by the 'normal' severely-abraded state of the tail-feathers in first-winter birds until their renewal in the late winter).

Particular attention has been paid to the social effects of dyeing geese. It appears that for a day or so after capture marked geese tend to remain somewhat isolated. Subsequently many, though probably not all, of the captured birds become reunited with their families. No discrimination between them and their unmarked companions by other members of the flock is apparent. Precise data on conflict-frequency are only available for White-fronted Geese: the rates for dyed individuals fall within the range of variation found for the classes to which the birds belong. Non-quantitative observations on Pinkfeet and Greylags have not provided any evidence of coloured birds being attacked by their neighbours with abnormal vigour or frequency.

