Tests of the possible social significance of 'nonsense' orientation

G. V. T. Matthews

Summary

To test whether 'nonsense' orientation was concerned with the reassembly of a scattered flock, large numbers of Mallard were released in groups of varying sizes.

Groups proceeded N.W. rather more strongly and directly than single birds and over a certain size the groups tend to break up. This argues against the orientation behaviour being group-seeking.

Single birds released to the north of, but close to, the roosting site still showed N.W. orientation, indicating that regaining the roost is not of paramount importance. The question of the importance of landmarks to the individual would repay further investigation.

Introduction

On release Slimbridge-caught Mallard *Anas platyrhynchos* mostly fly off between north and west. Matthews (1961) termed this 'nonsense' orientation. since it was far from clear why it was adopted regardless of season or time of day, of sex or age, of the release point's topography or bearing from Slimbridge. One tentative suggestion was that such behaviour would tend to hasten the reassembly of a flock after it had been scattered. Thus if individual birds, finding themselves alone, fly in one direction and come down (as they do) on the first body of water encountered, they are more likely to reform a flock than if they scattered in all directions. In a highly social species flock maintenance could be an important consideration, giving selective value to behaviour that tended to foster it.

On this hypothesis it would be expected that the urge to fly in a " reassembly direction " would be lessened if the birds were released in groups. Such extravagant use of birds became possible in the 1961-62 season when embarrassingly large catches were being made. A second test of the hypothesis would be to release single birds to the north of and within sight of the resting area from which they had been taken. Again if rejoining the flock was of paramount importance the north west orientation should disappear.

Methods

Mallard were caught at the duck decoy at Slimbridge, Gloucestershire in September, October, December and January and at the decoy at Borough Fen, Northamptonshire in September and October. At that time of the year the population sampled at Borough Fen also has strong north west orientation tendencies, though these are less marked later in the season (Matthews, in press). Tests were carried out when an abundance of birds were being caught so that only in one case (M.140) were they kept waiting in the large aviaries at Slimbridge for any time. Transport and observational methods were as detailed in Matthews (1961). Birds released in groups were tossed up together by several helpers or ejected from a quick-release basket. If a group split up in flight the largest component was followed to vanishing point using 16 x 40 binoculars.

Five different release points were used:-

Coln St. Dennis	—	Slimbridge	bears 254°	24 miles
		Borough Fen	bears 048°	90 miles
Lutton	—	Borough Fen	bears 231°	19 miles
Deeping St. Nicholas	—	Borough Fen	bears 187°	6 miles
Madley	—	Slimbridge	bears 137°	28 miles
Beverstone	—	Slimbridge	bears 305°	9 miles

Group releases at each point were matched for comparison by releases of single birds. These were not usually on the same days, since there was a limit on the number of birds that could be carried in the vehicle and on the number of observations that could be made without eye strain and observer fatigue. In all cases releases were in good sunny conditions and winds were as similar as possible in matched releases. In this connection a N.E. wind is equivalent to a S.W. one, both being beam on to the ' nonsense ' direction.

Single releases were also carried out at:-

Crowland — Borough Fen bears 203° 2½ miles
Morton — Borough Fen bears 156° 11 miles
Little Hale — Borough Fen bears 174° 21 miles

Results

Group releases

The following were the releases carried out, those with Borough Fen birds being marked (*).

Table 1

Group size	Ref.	Date	Release Point	No. of birds	No. of groups	Wind direction & strength
Single	M.15	28.11.59	Coln	28	—	Nil
	M.54*	18.10.60	Lutton	23	—	SSW 2/3
	M.140	18.1.62	Coln	15	—	WSW 1
	M.82*	24.8.61	Deeping	35	—	NE 2
	M.27	22.3.60	Madley	30	—	ESE 2/1
	M.147	8.2.62	Beverstone	28	—	N 2
Two	M.90a	9.9.61	Coln	36	18	Nil
	M.98*	16.9.61	Coln	36	18	SW 3/4
	M.96*	15.9.61	Lutton	34	17	SW 4
Three	M.90b	9.9.61	Coln	39	13	SW 2
	M.138	13.1.62	Beverstone	3	1	W 4
	M.140	18.1.62	Coln	30	10	WSW 1
Four	M.97*	15.9.61	Deeping	20	5	SW 3
	M.99	18.9.61	Madley	40	10	E 1/2
	M.134	9.1.62	Beverstone	4	1	SSW 2
	M.136	10.1.62	Beverstone	4	1	WSW 3
Five	M.93*	12.9.61	Deeping	35	7	SW 3
	M.134	9.1.62	Beverstone	45	9	SSW 2
Six	M.93*	12.9.61	Deeping	6	1	SW 3
	M.103	2.10.61	Madley	36	6	SSE 2
	M.136	10.1.62	Beverstone	36	6	WSW 3
Seven	M.138	13.1.62	Beverstone	35	5	W 4
				598	128	

The final bearings at which groups or single birds were lost to sight are represented in Figure 1 as 5° blocks in the series of scatter diagrams a-f. It is immediately clear that releasing birds in groups does *not* break down their N.W. orientation tendency. Indeed the opposite appears to be true, the grouped releases showing less spread than do the single birds. This impression may be quantified by determining the mean deviation of bearing from the median (that bearing having half the readings on either side). The black fan in the centre of each diagram represents this measure of spread; the more open the fan the wider the scatter. It is also of interest to consider the deviations according to group size. This has been done in Table 2, from which it emerges that increasing group size does not lead to less scatter, the big difference being between the single birds and groups of any size.

Figure 1. Final bearings of Mallard released singly or in groups.
Each 5° block represents one bird or group. The centrifugal line is the direction of home. North is uppermost. The central fan represents the mean deviation from the median.

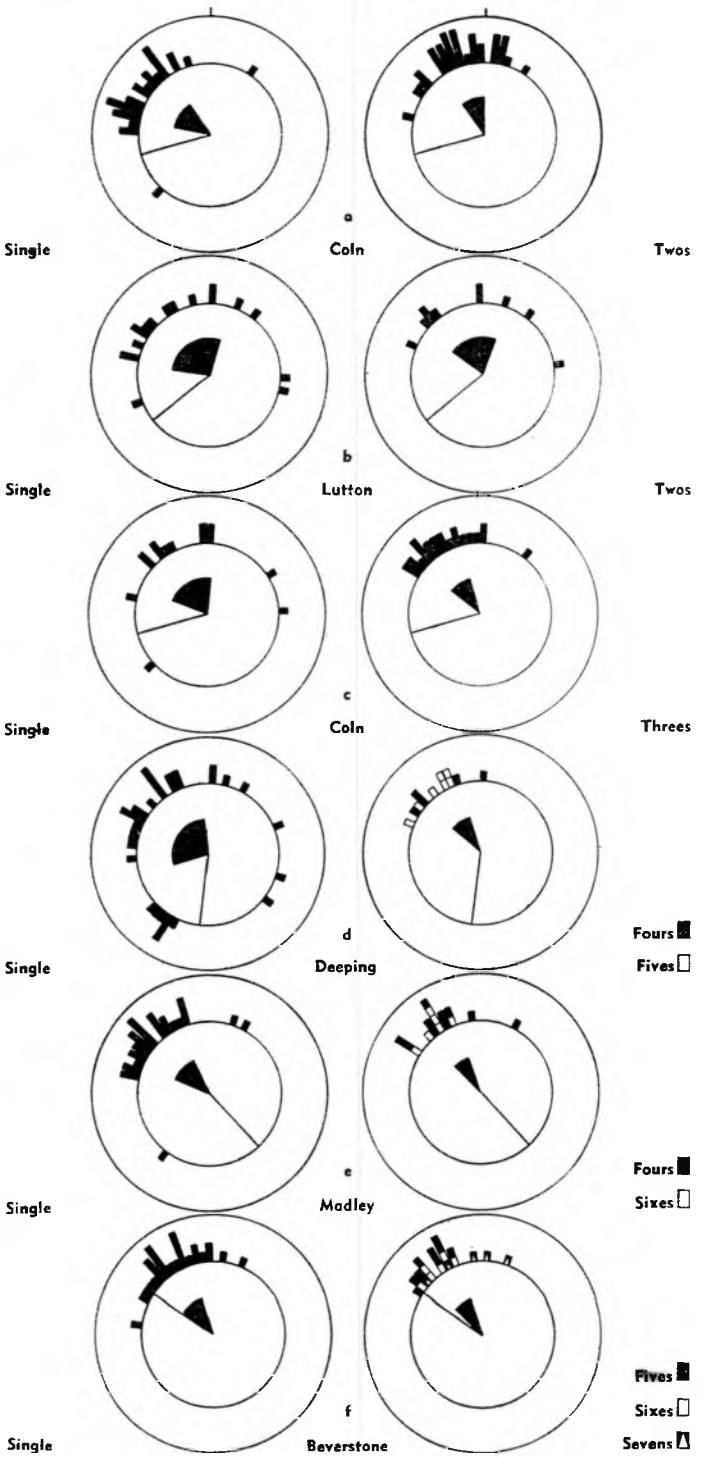


Table 2

Group size	No. of Final Bearings	Median	Mean Deviation	Mean Time in sight	Mean Difference 30″/Final bearing	No. of Groups lost intact
Single	147	319°	33°	3m.25s.	50°	—
Two	43	342°	22°	3m.45s.	29°	43
Three	24	330°	19°	4m.00s.	39°	12
Four	17	328°	19°	3m.55s.	37°	5
Five	16	326°	13°	2m.40s.	36°	2
Six	13	326°	17°	3m.40s.	19°	4
Seven	5	352°	19°	4m.05s.	29°	1
All Groups	118	342°	19°	3m.40s.	32°	—

Observing the birds after release it was clear that not only were the final bearings closer together than in the case of single birds but that the groups showed much less wavering in their flight. The fifth column in Table 2 shows the mean time for which single birds or groups were observed after release. The groups were in sight for slightly longer on the whole but for nothing like so long as their greatly increased visibility would have suggested. The implication is that they flew away more directly (and perhaps faster) than single birds. Intermediate bearings were taken at 30 second intervals. The next (sixth) column of Table 2 gives the mean differences between the bearing at 30 seconds after release and that at which the bird or group was lost to sight. These confirm that grouped releases flew more directly than single birds. Again, the size of the group on release appeared irrelevant.

The main point on which different group sizes varied from one another was that of cohesion. The right-hand column of Table 2 records the number of groups that were still intact when lost to sight. Here it may be noted that the number of final bearings for single birds and two-bird groups is less than that released (Table 1) by the number that landed within sight or were lost prematurely. All the larger groups provided good vanishing points at a distance and in full flight. But the larger groups were clearly much less stable. Whereas every two-bird release remained together (whether the ducks released were of the same or opposite sexes), only half the trios did so and for the larger groups cohesion was the exception rather than the rule. Of course these observations should not be used to comment on normal flock behaviour. The group ejected from the basket does not necessarily consist of friends and relations even though in many cases they were caught on the same day. From the point of view of orientation behaviour the important thing to the duck appears to be that it should have a flying companion. They then get down to the business in hand of flying north west as quickly as possible.

These observations may also be useful in planning experiments. Where it is expected that two samples of birds will show small deviations from each other, after differing treatment, it may be more rewarding to release them in twos. Only half the observations will be obtained but they will show less scatter and statistical analysis is more likely to discriminate between them.

Short distance releases

Although we can now be confident that reassembly of a flock in the air is not the purpose of ' nonsense ' orientation, it is just possible that reassembly at a suitable roosting place might be its end. When Mallard are released at the

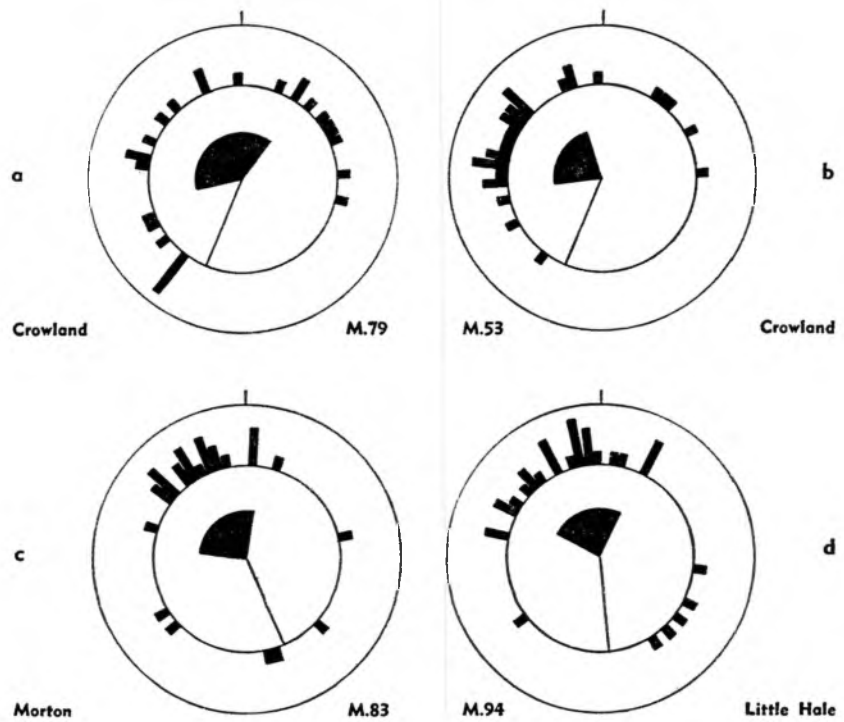
edge of the 14 acre Borough Fen decoy wood they usually drop into the decoy pool and do not fly off in any direction. Similar behaviour is also observed at Slimbridge, though with the estuary only half a mile distant the latter is often preferred. (The main roosting ground on it lies south of west, though mud is available all round to NNE). The following releases at short distances ($2\frac{1}{2}$, 6, 11 and 21 miles) north of Borough Fen were therefore carried out, in sunny conditions.

Table 3

Ref.	Date	Release Point	No. of birds	Wind
M.79	22.8.61	Crowland	31	NW 3/4
M.53	17.10.60	Crowland	30	SW 1/0
M.82	24.8.61	Deeping	35	NE 2
M.83	25.8.61	Morton	37	WSW 3/4
M.94	13.9.61	Little Hale	38	WSW 2/1

The final bearings are represented as scatter diagrams in Figure 2a-d, except that for M.82 which has already been shown at Figure 1d. The scatter for Crowland at 2a is wide (deviation 70°) but with a strong northwesterly wind this would be expected at any release point. The 'tail' of bearings close to the direction of the decoy suggests that these birds were returning to it. But it is remarkable that more did not do so, even though they must have been familiar with the surroundings and visibility was good. Fig. 2b is of a release at the same point in nearly calm conditions but with poorer visibility, 2 to 3 miles, which might have prevented direct view of the decoy. In this case

Figure 2. Final bearings of Mallard released at short distances from home



there is no bunch of birds on the 'home' bearing. The scatter (deviation 40°) and orientation are quite normal. Rather further away, at 6 miles (Fig. 1d) the release had a wider scatter (deviation 50°) and again a group of bearings suggests that some birds may have recognised the approximate home direction and were flying in it. But they are very much in the minority. Continuing in a northerly direction over the flat expanse of the Fens, the next release sites at 11 miles (2c) and 21 miles (2d) gave closely comparable results, with deviations of 41° and 44° and only a sprinkling of bearings to the south.

It should be stressed that observations of flight lines and ringing recoveries show that Mallard roosting at Borough Fen range widely when foraging, as far as the Wash coast twenty miles away. We can say, therefore, that the N.W. orientation remains when Mallard are released in areas with which they should be familiar and that it is not primarily concerned with a reassembly at a roosting place. As a few birds apparently turned homeward, further investigation by releases in other parts of the Fens is required. It may indeed be the case that Mallard do not give landmarks first attention on release. On the other hand learning of such landmarks may perhaps be a slow process.

Acknowledgments

I am grateful to Mr. W. A. Cook for catching the birds at Borough Fen and for helping in their release and to Mr. M. A. Ogilvie for similar assistance at Slimbridge. The experiments were carried out while holding at the Wildfowl Trust a post financed by the Nature Conservancy. The facilities and encouragement afforded by these bodies is sincerely acknowledged.

References

MATTHEWS, G. V. T. 1961. 'Nonsense' orientation in Mallard *Anas platyrhynchos* and its relation to experiments on bird navigation. *Ibis* 103a : 211-20. (A short version of this paper appeared in the Wildfowl Trust 12th Annual Report : 137-9, 1961).

MATTHEWS, G. V. T. in press. 'Nonsense' orientation as a population variant. *Ibis*.