

BIRD COMMUNITIES IN THE MALHAM TARN REGION OF THE PENNINES

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INTRODUCTION

The bird-life in the neighbourhood of Malham Tarn and its Field Centre, at an altitude of 1,250–1,400 feet in the West Riding of Yorkshire, is well known. A comprehensive check-list of 149 species, recorded between April 1948 and February 1960 over nearly 11,000 acres of Malham Moor, was compiled by the late warden Paul F. Holmes, and will stand as the basic contribution to the ornithology of this part of the Pennines (Holmes, 1960). The present paper aims to complement Holmes' work by considering the structure of the bird communities occupying sample "plots" of different habitat types within this region. The area covered by the investigation was purposely contained within the boundaries selected by C. A. Sinker for his excellent study of the plant communities (Sinker, 1960), in the hope that our findings would carry knowledge of the general ecology of the area a further step forward.

The sample plots whose bird-life is dealt with in detail in the present paper are clearly shown in maps I and II of Sinker's study, and in Plate 1, here, and are as follows:

1. Malham Tarn, at 1,230 feet O.D. Area about half a square mile.
2. Tarn Moss, the mature raised bog lying to the west of the Tarn and south of its main inflow stream. Area about 88 acres.
3. Fen and carr with willow (*Salix*), alder (*Alnus*), birch (*Betula*) and introduced *Rhododendron ponticum* between the inflow stream and Waterhouses, and bounded in the south-west by Pothole Lane and Horseshoe Plantation. Area about 26 acres.
4. Woodland along both sides of the access road from Waterhouses to the Field Centre, especially that part on either side of Malham Tarn House rising from the lake shore to the slope below Highfolds Scar. Area about 40 acres.
5. Calcareous marshes at Ha Mire and Great Close Mire, at 1,250 feet.
6. The drift grassland of Malham Lings to the south of Ha Mire, and east of the Tarn.
7. Exposed woodland, comprising five small plantations, but with special attention paid to the largest, Ha Mire Plantation (10 acres) on the east shore of the Tarn.

STUDY METHODS

The mapping technique adopted for the Common Birds Census organized by the British Trust for Ornithology (Williamson, 1964) was used for the observation and recording. The basis of this method is the plotting of all "contacts" thought to have a territorial significance on large-scale maps of the census area



Plate 1.

Aerial view of Malham Tarn, looking North.

Photo by permission of Aeroflms Ltd.

—usually outlines prepared from the 1 : 2500 O.S. series. (As this area is not covered by the O.S. 25 inch we had to spend some time in 1966 in mapping the ground east of the Tarn.) Such contacts will be largely with male birds advertising their interest in a territory by means of song, but may also include birds fighting, or carrying nest-material or food for their young. With a number of species sight-records can be helpful. All nest finds were plotted.

Ideally a bird census of this kind should span the entire breeding season, visits being made at weekly or 10 days intervals. There are accepted abbrevia-

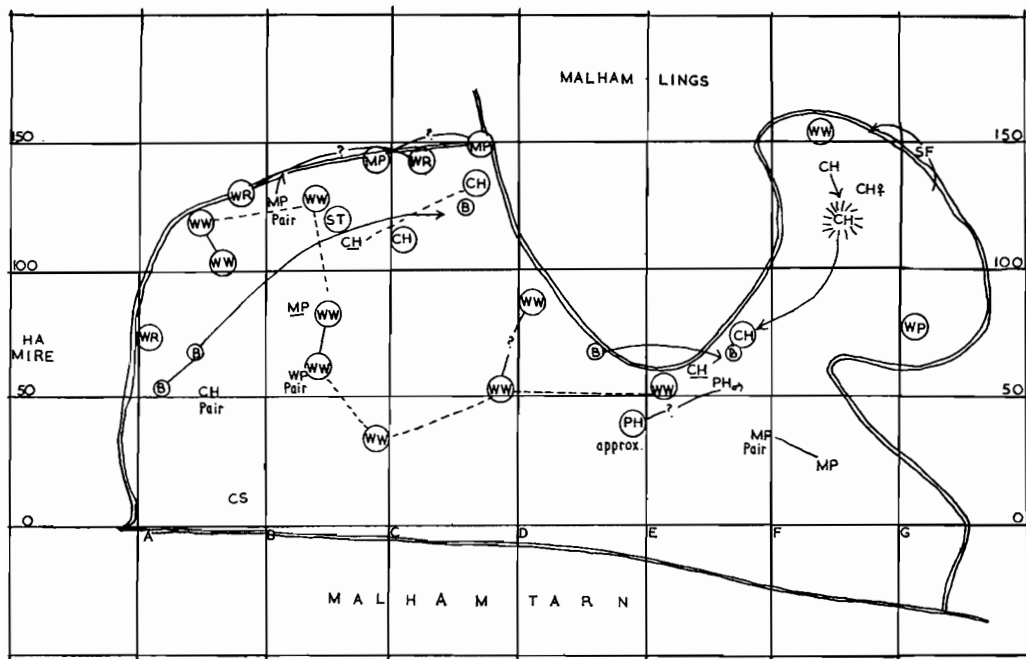


FIG. 1.

"Discovery map" B, 26 May, 1967, 2000–2100 hrs. B.S.T. in Ha Mire Plantation, showing the 50-metre grid laid out to assist census work. Each symbol records a "contact": a circle indicates song; a ring of dashes denotes territorial fighting; underlined symbols refer to birds calling. Movement of individual birds is shown by an unbroken line. Different birds singing at the same time are joined by a dotted line. WW = Willow warbler, CH = Chaffinch, B = Blackbird, PH = Pheasant, etc.

tions for the species one is likely to encounter, and a code of symbols denoting song and other activities, with conventions for birds singing against each other, or moving position when in song (Fig. 1). Completed discovery maps are lettered A, B, C, etc. in chronological order, and at the close of the field-work species maps are compiled, each contact being transferred from the discovery maps to its appropriate species map and represented there by the relevant visit

letter (Figs. 2, 3). These letters tend to fall into discrete "clusters" or groups which indicate the approximate territorial limits of individual males. Such clusters do not necessarily represent breeding pairs, since there is no surety that the male is mated unless, of course, a mate is seen or a nest found. However, the primary purpose of this kind of census is to determine the carrying capacity of the habitat and throw some light on the composition of the bird community within it, so that different habitats and different regions can be compared, and a small error in assessing the absolute breeding density is therefore tolerable.

The present field-work had to be compressed within a much shorter span

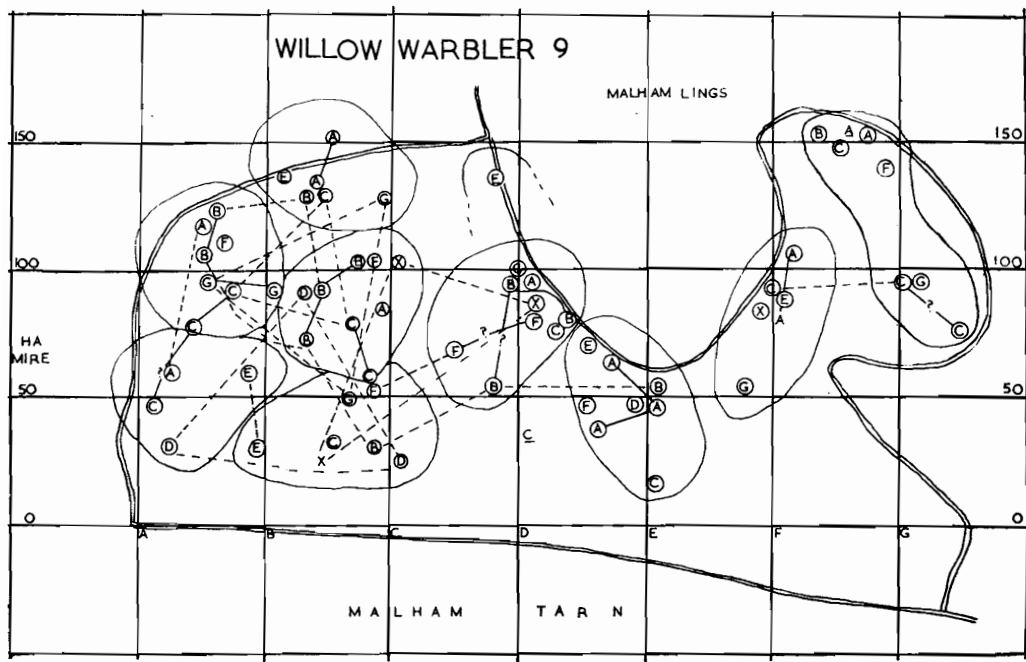


FIG. 2.

Willow warbler "registrations" and territorial distribution in Ha Mire Plantation, compiled from the various "discovery maps". (X refers to observations before the grid was completed.)

than a normal B.T.O. census, and was carried out during Courses of a week's duration in 1966 and 1967. New discovery maps were therefore prepared each day, and frequently twice in one day when early morning and evening visits were made to the sample plots. Truncated censuses of this kind are perhaps subject to a wider margin of error than those conducted over a longer period, since the latter method gives a better chance of registering different species at the peak of their song-period. However, previous experience at Gibraltar Point Nature Reserve in Lincolnshire in 1965 had shown that a great deal of useful

information could be gleaned by this more concentrated form of censusing (Williamson, 1967).

The Courses were held at Malham Tarn Field Centre within the period 24 May–1 June in both years. In 1966 some additional data were available from a reconnaissance visit by the author on 17–18 April, and also from a Spring Bird Course run by C. K. Mylne between 5–10 May. In the second year, because of dissatisfaction with that part of the 1966 results concerning Malham Lings, we made use of a grid in which markers flying a code of

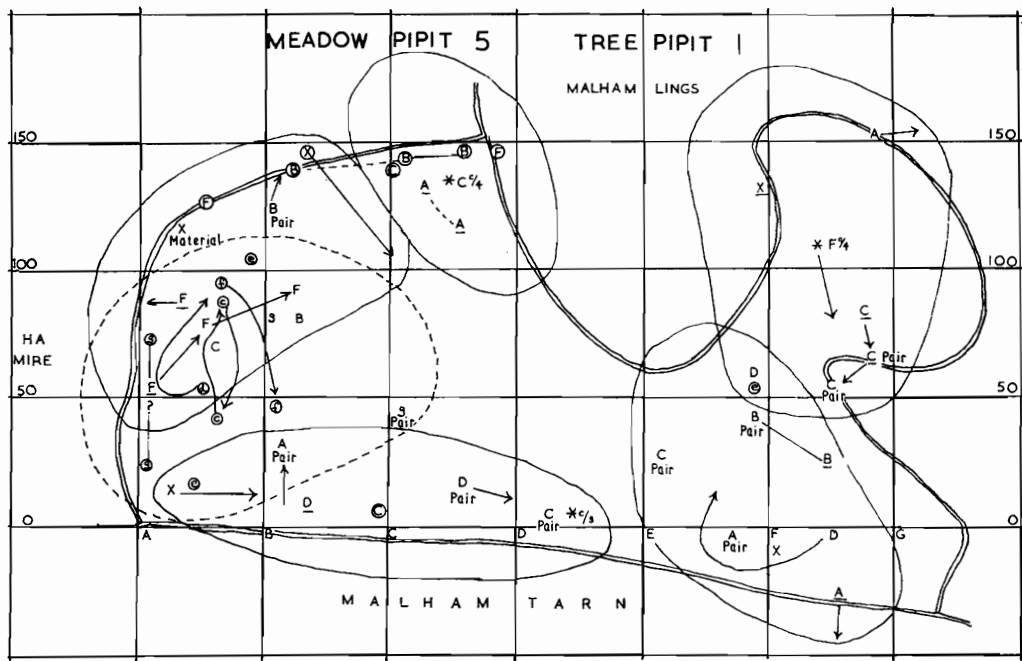


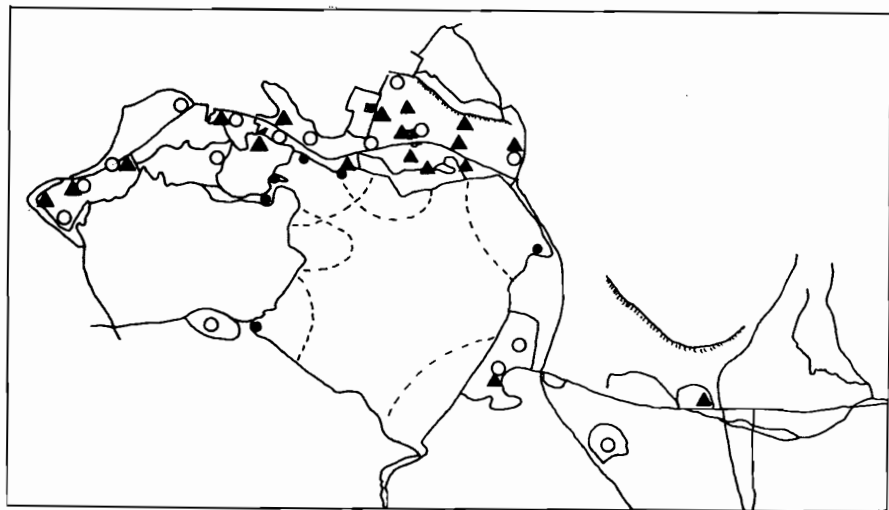
FIG. 3.

Meadow and tree pipit territories, Ha Mire Plantation, 1967. (Meadow pipit registrations in capitals, unbroken lines: tree pipit registrations in small letters, dotted line. An asterisk indicates a nest-find.)

coloured streamers were set up at 100 metre intervals, covering an area of approximately 75 acres. This grid was laid at the beginning of the Course, and despite the vicissitudes it suffered at the hands of visitors during the spring holiday weekend, the census work in 1967 gained in precision.

Both Courses were led by the author, with the assistance of Dr. R. S. Bailey (Assistant Research Officer) and H. Mayer-Gross (Nest Records Officer) of the Populations Section of the B.T.O. Henry Mayer-Gross concentrated on nest-finding, and he and other members amassed a score of over 150 nests each season. In 1966 the students were Mr. and Mrs. A. B. Bailey, Mrs. M.

Tugendhat, Miss H. Williamson, Dr. G. H. Spray and Messrs. J. G. Cook, N. Gammon, G. R. Jacobs, N. J. Morris and D. W. Swindells. Mrs. Tugendhat and Dr. Spray were again present in 1967, together with Dr. and Mrs. R. Stanford, Mrs. B. A. Moore, Mrs. B. Poloniecka, Messrs. J. M. Butterworth, R. G. Chaytor, M. Fitch, D. Holyoak, I. Hopkins and L. Wray. All students had had previous experience of field work as contributors to the B.T.O. Common Birds Census.



▲ SPOTTED FLYCATCHER 1966 ○ REDSTART 1966

FIG. 4.

Distribution of spotted flycatchers (black triangles) and redstarts (open circles) at Malham in 1966. Nests of great crested grebes in 1966 are shown by black circles and regularly patrolled areas by dotted lines.

THE RESULTS

Although Sinker's paper (1960) was invaluable as a basis for bird-community studies it is not possible to deal with each habitat in isolation, since there is considerable overlap. This is particularly so with, for example, Horseshoe Plantation and the trees bordering Pothole Lane, and the adjacent fen; also with the Mires on the east side of the Tarn and Malham Lings. In listing the birds (Tables 1 and 3) I have attempted a breakdown which fits fairly well into Sinker's classification of the major habitats, but in discussion have preferred to deal with the bird-life under three main headings—Malham Tarn, the open country, and the woodland.

1. *Malham Tarn*

Plotting territories on a sheet of open water has its difficulties and limitations: the birds are conspicuous enough, but may range far from the shore. The two

Table 1. "Open country" habitats, Malham: Territorial males recorded in 1966 and 1967

Species	Distribution							Totals 1966 1967
	Tarn Moss	Fen	Lime- stone Scars	Tarn House "Meadow"	Ha Mire	Great Close Mire	Malham Lings	
Teal, <i>Anas crecca</i>	1	1 1					1 1
Kestrel, <i>Falco tinnunculus</i>							1 1
Red grouse, <i>Lagopus scoticus</i> ..	5 7							5 7
Black grouse, <i>Lyrurus tetrix</i> ..	1							1 1
Lapwing, <i>Vanellus vanellus</i> ..	2				2 2	2 4	1 2	7 8
Golden plover, <i>Charadrius apricarius</i> ..						1		1
Common snipe, <i>Capella gallinago</i> ..	6 5	3 4			4 2	4 8	2 4	19 23
Curlew, <i>Numenius arquata</i> ..	6 5		1 1		4 3	1 4	3 5	15 18
Dunlin, <i>Calidris alpina</i> ..							1	1 1
Redshank, <i>Tringa totanus</i> ..	1 1				1	3 5		5 6
Black-headed gull, <i>Larus ridibundus</i> ..	4 5					6+ 10	16+ 42	4 29+ 58
Skylark, <i>Alauda arvensis</i> ..	4 4		3 2	5 ? 11 ?				5 2
Swallow, <i>Hirundo rustica</i> ..								2 2
House martin, <i>Delichon urbica</i> ..			2 3		1		2 4	5 7
Ring ouzel, <i>Turdus torquatus</i> ..								1
Wheatear, <i>Oenanthe oenanthe</i> ..								
Whinchat, <i>Saxicola rubetra</i> ..								
Sedge warbler, <i>Acrocephalus</i> <i>schoenobaenus</i> ..								
Meadow pipit, <i>Anthus pratensis</i> ..	17 21	1 6 7	1 2	1 1	10 8	7 8	11+ 17	1 53+ 64
Pied wagtail, <i>Motacilla alba</i> ..			2 2	1		1 1		4 3
Yellow wagtail, <i>Motacilla flava</i> ..	4 4	1	1 1	1	4 4	3 2	4 5	17 17
Starling, <i>Sturnus vulgaris</i> ..			2 1					2 1
Linnet, <i>Carduelis cannabina</i> ..		2 1		1				3 1
Reed bunting, <i>Emberiza schoeniclus</i> ..	2	3 3		10 ?				3 5
House sparrow, <i>Passer domesticus</i> ..								10 ?

grebe species, and practically all the Coots, are wholly dependent on the Tarn, and estimation of their breeding strength is based largely on the nests discovered in 1966, when most attention was given to this habitat. The ducks, on the other hand, may nest at some distance from the water, and the estimate is based on pairs or parties counted on the Tarn. The moorhen is more closely associated with the Fen than with the open water. Two other dissimilar species are essentially members of the Tarn community—the common sandpiper, which feeds along the shore but nests in the woods, and the sand martin, which feeds on aerial insects over the water and nests in the vertical peat-banks on the western margin.

Great crested grebe, *Podiceps cristatus*. Seven pairs were present in 1966—within the range of 4–9 pairs recorded by Holmes (1960), though the grebes were able to better his statement that only 3 pairs can breed successfully owing to a shortage of suitable nesting-sites. Six nests were found; five of these were built among the *Carex rostrata* sedge swamp of the Tarn's north-west bay and Fen inflow stream (4), and the Ha Mire inflow stream (1). The remaining nest was in an unusually exposed situation in the small bay immediately east of Spiggot Hill. The seventh pair (no nest was found) was usually to be seen swimming offshore from Ha Mire Plantation. Fig. 4 shows the known nests in 1966 and the approximate areas patrolled by the pairs.

Dabchick, *Podiceps ruficollis*. Four pairs were present, a substantial improvement on Holmes' single pair: two were nesting in the *Carex rostrata* at the Ha Mire and Fen inflow streams, while the others patrolled off Spiggot Bay and Tarn House "meadow" (Fig. 7).

Mallard, *Anas platyrhynchos*. We estimated a minimum of 6 pairs. Nests with eggs were found in 1966–1967 in the open eastern section of Tarn House Wood, a relatively open bit of Ha Mire Plantation (3), on Tarn Moss immediately west of Spiggot Hill, and in the middle part of the Fen.

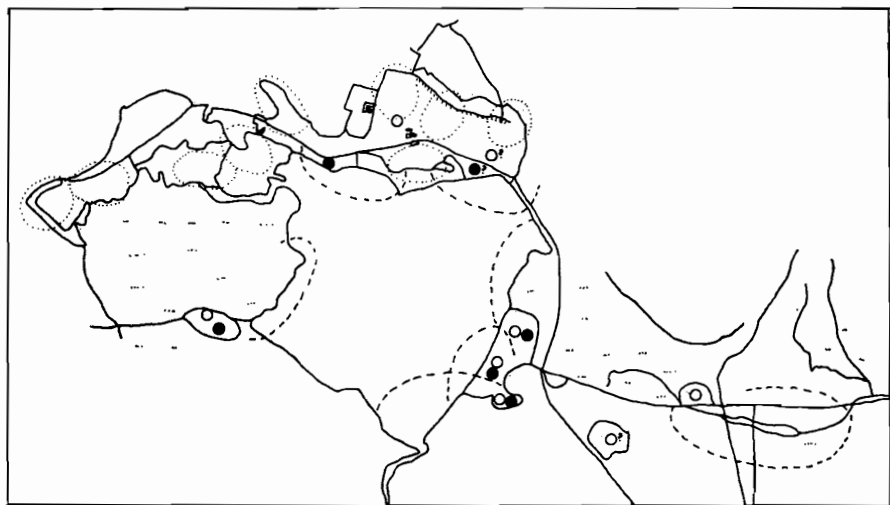
Teal, *Anas crecca*. A pair was seen on the artificial pool in the western section of the Fen in 1967, and their nest with 8 eggs (subsequently predated) was found nearby. The only other sighting was of a pair on Great Close Mire.

Shoveler, *Spatula clypeata*. This appears to be an important gain (at least in 1966) since Holmes' survey, five pairs being seen regularly. Four of these appeared to be based on the north-west bay, and the fifth moved between the Ha Mire inflow and the pool at Gordale Beck Head. No nests were found, but as males were always more numerous than females it is possible that two if not more of the ducks were nesting. On one occasion a male flew out of Ha Mire Plantation. Very little was seen of this species in 1967.

Tufted duck, *Aythya fuligula*. As Holmes says, this is the commonest duck: it has bred since 1907 at least. We estimated at least 12 pairs, perhaps a slight increase since 1960. One pair haunted the artificial pool in the West Fen in 1966, and two pairs were seen on Tarn Moss below Spiggot Hill fen, where a nest was found.

Moorhen, *Gallinula chloropus*. In 1966 there were pairs in the sedge swamp in the north-west bay and the Ha Mire inflow stream, and one (possibly two) in the Fen. In 1967 there were three pairs in the Fen and a nest was found in the middle of Ha Mire.

Coot, *Fulica atra*. In 1966 we accounted for 8 pairs, 5 of which were associated with the sedge swamp of the north-west bay and the two inflow streams. Others regularly patrolled off Ha Mire Plantation, Tarn House "meadow" and the small bay below Spiggot Hill (nest). There was a similar distribution in 1967 (but none in Spiggot Bay) when one pair also nested on the pool in the West Fen, and one a short distance up the inflow stream (Fig. 6).



COMMON SANDPIPER NESTS AND FEEDING RANGES. 1966 ● 1967 ○
PHEASANT TERRITORIES 1966

FIG. 5.

Common sandpiper nests in the Malham Woods (black circles, 1966; open circles, 1967) and feeding-ranges (dashed lines) on the Tarn shore. Pheasant territories in 1966 are shown by dotted lines.

Common sandpiper, *Tringa hypoleucos*. Included in the woodland Table 3, since all the nests found were in the plantations, either hidden by dog's mercury, *Mercurialis perennis*, or under the twigs of fallen larch trees. They were mostly at a distance of 100–250 yards from the water. The nests, and the birds' ranges along the shore are shown in Fig. 5.

Sand martin, *Riparia riparia*. According to Holmes, a small colony of about 7 pairs had burrows in the 5–6 ft. high vertical peat bank of Tarn moss. There is a small, rather scattered colony there still but its strength is difficult to estimate. Some 30–40 birds hunted over the water regularly, and, watching

through field-glasses from Tarn House "meadow", it appeared that at least a dozen nest-holes were being visited. D. Bremner (pers. comm.), examining the Moss edge from a boat on 12 August, 1966, found a minimum of 19 nests which were or had been recently occupied.

2. Open country habitats

The birds recorded as probably or certainly breeding in the open habitats are summarized in Table 1, and rough density figures for each of the main habitats are presented in Table 2 so that species preferences can be compared.

Table 2. *Some breeding bird densities in "open country" at Malham, 1967*

Species	Tarn Moss		Ha Mire		Great Close Mire		Malham Lings	
	Pairs 100 a.	Pairs 100 h.	Pairs 100 a.	Pairs 100 h.	Pairs 100 a.	Pairs 100 h.	Pairs 100 a.	Pairs 100 h.
Red grouse	7.9	19.5	—	—	—	—	—	—
Lapwing	—	—	5.0	12.4	5.7	14.1	2.7	6.6
Snipe	5.7	14.0	5.0	12.4	11.4	28.2	5.3	13.1
Curlew	5.7	14.0	7.5	18.5	5.7	14.1	6.7	16.4
Redshank	1.1	2.8	—	—	7.2	17.7	—	—
Skylark	4.6	11.2	—	—	14.3	35.3	56.0	138.3
Meadow pipit	24.0	59.3	20.0	49.4	11.4	28.2	22.6	54.2
Yellow wagtail	4.6	11.2	5.0	12.4	2.9	7.1	6.7	16.4

NOTE: Acreages, Tarn Moss 88; Ha Mire 40; Great Close Mire 70; Malham Lings 75.
(a = acres; h = hectares)

Red grouse (and probably black grouse in 1966) were confined to Tarn Moss, where there is the only growth of heather in the neighbourhood of the Tarn. The population of 5-7 pairs is good.

Common snipe and curlew are also well represented on the raised bog, the former intruding into the Fen, and both species are prominent on the calcareous mires and the drift grassland of Malham Lings. There seems to be little or no preference for a particular type of habitat. There is a small black-headed gull colony on a marshy field edge adjoining the western side of the Moss, nests being found in both years. The lapwing shows a preference for the wetter ground of the calcareous mires, and eschews the raised bog, although two pairs had nests close to the black-headed gulls in 1966. The lapwing proved to be much less in evidence over the area as a whole than was expected from Holmes' remark that it is "common". It has undergone an alarming decrease in the lowlands in recent years (Bailey, 1967).

Great Close Mire and Gordale Beck Head are the stronghold of the redshank: Ha Mire is perhaps too disturbed for this shy species. A pair of golden plovers nested on Great Close Mire (1,250 feet) in 1966, when we found the nest just as the four chicks were leaving; this is a considerably lower level than the 1,400 feet Holmes noted as a minimum on Malham Moor. A pair was flushed on one occasion only in the following year; but by way of compensation, a pair of dunlin with two newly hatched chicks were found beside the marsh-fringed pool on Malham Lings on 28 May.

The meadow pipit, according to Holmes (1960), is the commonest bird in summer. Our figures suggest that there is little to choose between this and the skylark, the former possibly gaining precedence by having a wider habitat tolerance and therefore a more general distribution. Whilst the skylark has more than twice the density of the meadow pipit on the drift grassland of Malham Lings, and may be slightly commoner on Great Close Mire, Ha Mire and the raised bog of Tarn Moss are clearly very marginal for this bird. Indeed, the few pairs around Spiggot Hill may well be an overspill from the rough pastures to west and south. The meadow pipit, on the other hand, has a comparable density among the heathery hummocks and *Sphagnum* hollows to that attained on Malham Lings; it is a prominent bird on the more open parts

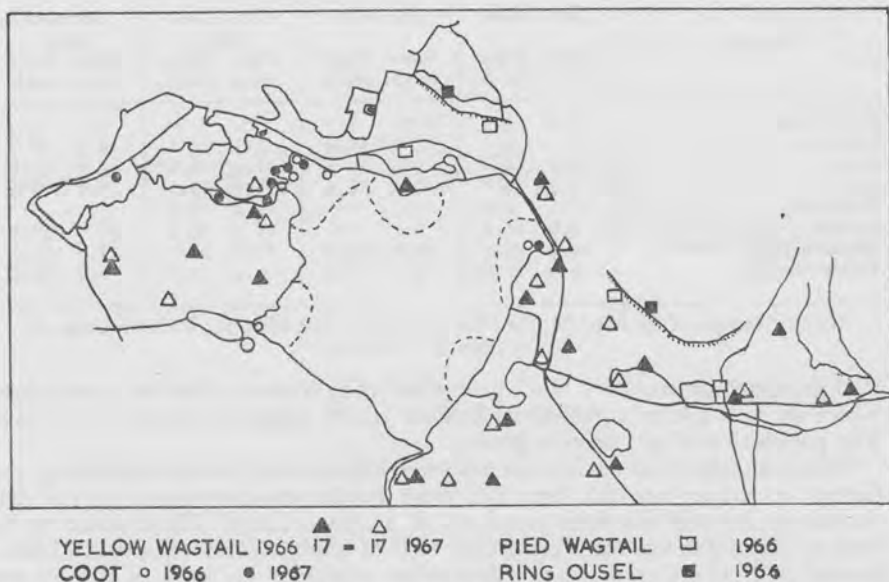


FIG. 6.

Distribution of yellow wagtails at Malham in 1966 (black triangles) and 1967 (open triangles) with territories of pied wagtail (open squares) and ring ousel (black squares) in 1966. Also shown are nests of coot in 1966 (open circles) and 1967 (black circles).

of the Fen, and even penetrates the plantations. In Ha Mire Plantation and the open eastern part of Tarn House Wood it breeds alongside the tree pipit (Fig. 3).

The yellow wagtail has a fairly general distribution, though at a much lower density, on all types of open ground (Fig. 6). The pied wagtail is closely associated with the rocky limestone cliff-face and stony slopes of Highfolds Scar and Great Close Hill, a situation in which the two pairs of ring ousels (1966), the kestrel (both years) and several of the wheatears also nested.

Tree pipit as well as meadow pipit song was heard in the East Fen and the

species probably nested there. Linnet and sedge warbler were also attracted to this area in 1966. A lesser whitethroat (almost certainly on passage) sang on 30 May 1966, and a jay was once seen in the West Fen in 1967. In both years two pairs of reed buntings occupied territories along the inflow stream, with a third pair near the pool in West Fen, while in the second year their distribution had extended to the Spiggot Hill fen and the western edge of Tarn Moss.

The open triangular "meadow" sloping down to the lake shore from the lawn of Tarn House attracted a pair of meadow pipits in both years, and a pair of yellow wagtails in 1966. Pied wagtails and hirundines based on Tarn House often sought food there. Both male and female whinchats were seen on different days during the 1966 Course where the meadow adjoins the young spruce plantation.

3. Woodland habitats

The numbers of territorial males recorded in each of the two years in the various woodland habitats are recorded in Table 3. With the exceptions of Ha Mire and the smaller isolated plantations it is difficult to consider the separate parts in isolation. Horseshoe Plantation is contiguous with the line of mature trees and the secondary growth of hawthorns (*Crataegus monogyna*) along Pothole Lane, extending as far north as Waterhouses, and there is a marked "edge effect" where the plantation borders on the willow and other scrub of West Fen. A similar transitional ecotone exists where the coniferous south-western portion of Tarn House Wood abuts on the rhododendron and other shrubs of the East Fen. The Fen has necessarily to be considered in this section as well as the last, for although much of the eastern and western parts are sufficiently bare to attract "open country" birds, there is a strong "forest" element associated with the dense carr of birch, alder and willow in the middle part.

All the plantations are rather mixed, as described by Sinker (1960, p. 20). Spiggot Hill is mainly larch (*Larix decidua*) at the western end, beech (*Fagus sylvatica*) and sycamore (*Acer pseudoplatanus*) at the eastern. Ha Mire has a dense larch plantation in its southern half, but is otherwise mainly alder (*Alnus glutinosa*) and birch (*Betula pubescens*), stunted towards the open shore, but tall and fairly dense towards the Lings. Round Wood is more open and wind-blasted than the others, with stunted beech, rowan (*Sorbus aucuparia*), Scots pine (*Pinus sylvestris*), sycamore and some hawthorn, mainly hugging the walled periphery. Great Close Wood has taller sycamore, ash (*Fraxinus excelsior*) and larch in better condition, owing to its sheltered position below Great Close Hill. There is a small clump of trees east of the gate between the Ha Mire and Malham Lings.

The main wood, behind Tarn House and fringing the access road, is the most varied, but like the others is almost devoid of a shrub layer, except in close proximity to the House. The south-east corner by the Tarn shore has a 12 years' old stand of larch and Norway spruce (*Picea abies*); north of this, felling has taken place recently, and the remaining trees are fairly scattered with open ground and piles of brushwood between them. Young conifers have been planted as "nurses" to beech, ash and other hardwoods, but as yet are not more than a foot or so high. Another conifer plantation, about 16 years old, lies alongside the Tarn south-west of the House. Westwards, beyond a fairly open

Table 3. Woodland habitats, Malham: territorial males recorded in 1966 and 1967

Species	Distribution						Totals 1966 1967
	Spigot Hill P.	Horseshoe P. and Pothole La.	Fen and Cottages	Tarn House Wood	Ha Mire P.	Other Ps.	
Pheasant, <i>Phasianus colchicus</i>	..	2	2	6	2	?	10
Woodcock, <i>Scotopax rusticola</i>	..	1	1	1	1		4
Common sandpiper, <i>Tringa hypoleucos</i>	..	1	1	2	3	1	8
Woodpigeon, <i>Columba palumbus</i>	..	2	2	13	2		17
Cuckoo, <i>Cuculus canorus</i>	..	1	1	1	2		3
Tawny owl, <i>Strix aluco</i>	..	1	1	1	1		3
Carrion crow, <i>Corvus corone</i>	..	1	1	1	1	1	5
Great tit, <i>Parus major</i>	..	1	1	7	3		9
Blue tit, <i>Parus caeruleus</i>	..	3	5	15	14		24
Coal tit, <i>Parus ater</i>	..	1	1	1	1		1
Marsh tit, <i>Parus palustris</i>	3	3		3
Treecreeper, <i>Certhia familiaris</i>	3	3		3
Wren, <i>Troglodytes troglodytes</i>	11	14		15
Mistle thrush, <i>Turdus viscivorus</i>	..	2	2	3	1	1	24
Song thrush, <i>Turdus philomelos</i>	..	6	6	26	1		40
Blackbird, <i>Turdus merula</i>	..	6	5	22	2	2	38
Redstart, <i>Phoenicurus phoenicurus</i>	..	4	2	6	2	1	15
Robin, <i>Erithacus rubecula</i>	..	5	2	13	12		20
Blackcap, <i>Sylvia atricapilla</i>	..	1	2	4	1		5
Garden warbler, <i>Sylvia borin</i>	1	1		1
Whitethroat, <i>Sylvia communis</i>	2	2		2
Willow warbler, <i>Phylloscopus trochilus</i>	..	8	16	39	7	9	75
Goldcrest, <i>Regulus regulus</i>	..	1	2	3	3	2	70
Spotted flycatcher, <i>Muscicapa striata</i>	..	3	2	11	1	1	18
Pied flycatcher, <i>Muscicapa hypoleuca</i>	..	5	3	16	3		24
Duncock, <i>Prunella modularis</i>	..	1	5	1	5	1	12
Meadow pipit, <i>Anthus pratensis</i>	7	1	2		14
Tree pipit, <i>Anthus trivialis</i>	..	1	1	4	1		5
Starling, <i>Sturnus vulgaris</i>	..	2	4	12	3	2	22
Greenfinch, <i>Chloris chloris</i>	..	1	1	5	2		7
Lesser redpoll, <i>Carduelis flammea</i>	..	1	1	10	1		17
Bullfinch, <i>Pyrrhula pyrrhula</i>	..	2	4	1	1		1
Chaffinch, <i>Fringilla coelebs</i>	..	6	2	32	6	3	51

slope, a close plantation of larch and spruce about 50 years old and 30–40 feet high lies between the road and the north-east part of the Fen. North of the road at this point the trees are close and for the most part rather poor beech improving in stature farther east, and at their best immediately behind and beyond the House. Below Tarn House, on either side of the lawn and overlooking the shoreward “meadow”, there is a liberal mixture of yew (*Taxus baccata*) and various shrubs with taller larch and deciduous trees.

The dominant bird of the woodland, despite the virtual absence of a shrub layer, is the willow warbler. It gains on its closest rival, the chaffinch, by being abundant in the Fen carr, from which the chaffinch (which requires a certain amount of high canopy) is absent (Fig. 7). In addition to chaffinch, song thrush and blackbird may also be regarded as subdominant. The song thrush is as

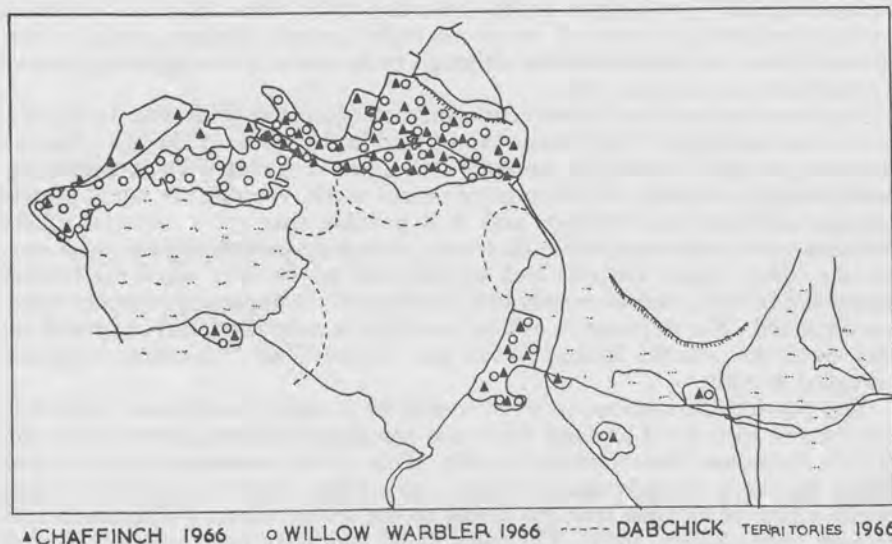


FIG. 7.

Distribution of willow warbler (open circles) and chaffinch (black triangles) at Malham in 1966. Dabchick “territories” are also shown (dotted lines).

numerous as the blackbird, an unusual situation compared with that in lowland woods, where the latter is often at least twice as common. So great is the premium on nesting-sites, owing to the paucity of secondary growth, that most of the song thrushes build their nests on the ground. Also the rock cutting which carries the road up to the House had a number of occupied nests of both *Turdus* species within a few yards of one another, very exposed and vulnerable to predation. The robin, the dominant species in lowland woods of almost any type, is relatively poorly represented, as also is the great tit, though blue and marsh tits are in fair strength.

Such northern species as the lesser redpoll (surely the most difficult bird to

census!) and redstart are in very good numbers, and the abundance of spotted flycatchers was unexpected. Tree pipits have in all likelihood increased since tree-felling began and opened up the canopy: their main area of activity is the recently thinned eastern part, although at least two pairs (one behind Tarn House, one in Ha Mire Wood) were song-fighting where the canopy was fairly dense. The pied flycatchers of 1966 may have nested, as a female was observed in addition to the singing male, which on one occasion was seen examining a hole in a tree. The only bullfinches haunted the clearing south-west of the road cutting, while the garden warbler kept to the young conifer plantation by the eastern shore. The greenfinches, more especially in 1966, showed a predilection for the yews and other ornamental shrubs fringing the lawn. The two pairs of whitethroats, as would be expected, were in the more open sections east of Tarn House. The blackcaps of 1966 may well have been unmated (no females were recognized), as Holmes (1960) recorded to be often the case. A species worth mentioning in view of its recent rapid spread (Hudson, 1965) is the collared dove, *Streptopelia decaocto*, although there was only one sighting close to Tarn House on 25 May, 1967.

Despite some variation in the census method (50-metre grids were laid down in the main section of Tarn House Wood, and in the whole of Ha Mire Plantation, for the 1967 Course) the annual totals agree very closely for most species, confirming the validity of this type of census work. We did not count wood-pigeons and starlings in 1967, and it is possible that great tits and mistle thrushes were under-counted in that year (their song-periods appear to be over by late May). Lesser redpolls had not returned to the area when the Course assembled in 1967, and were only just "settling in" in improving weather when we dispersed. The decrease in willow warblers is only slight but may well be real since the isolated Round Wood and Great Close Plantation were not occupied in 1967.

The remarkable increase in wren territories is undoubtedly real, since it is reflected in almost all lowland farm and woodland habitats surveyed for the B.T.O. Common Birds Census in 1967. This is the continuation of a trend which has been strongly marked since 1963, when the wren population was about a fifth of its 1962 strength owing to the severe winter (Williamson and Homes, 1964; Bailey, 1967). The main wood may have been nearly saturated by 1966, since the spread in 1967 appears to have been outwards to the Pothole Lane and West Fen area, and to isolated plantations on the east side of the Tarn (Fig. 8), suggesting a low preference for the more exposed sites. The drop in chaffinch numbers may also be real, since some 1967 farm and woodland censuses show a decline. This may be the result of non-operation of the 'voluntary ban' on the spring use of seed dressed with toxic preparations: many farmers were prevented from sowing in autumn 1966 by the persistently wet weather, and so used their seed in the spring. The chaffinch is a summer visitor only to the area, so that most would be equally exposed as lowland birds to this hazard. Moreover, if the lowland population fell, Malham may have lost birds to the niches left vacant on lower ground.

A careful census, based on a 50-metre grid, was carried out in Ha Mire Plantation in 1967, eight discovery visits being made in the week. Despite its exposed and stunted nature the 10 acres of this compact little wood contained

40 pairs belonging to 16 species (Table 3), i.e. a density of 4 pairs to the acre or 10 pairs per hectare. Spiggot Hill (about 2 acres) contained 11 pairs of 9 species—with, perhaps, the addition of goldcrest, though only single song-records were obtained there in each year. Great Close Plantation (2½ acres) had 7 pairs of 6 species (common sandpiper, wren, blackbird, redstart, 2 starlings and chaffinch), with the possible addition of pheasant (though the ♂ and ♀ seen there on 25 May, 1967, were perhaps visitors from Ha Mire Plantation). Round Wood (3 acres) had breeding pairs of curlew (4 eggs in a depression between the branches of a fallen tree), common sandpiper, blackbird, spotted flycatcher and chaffinch.

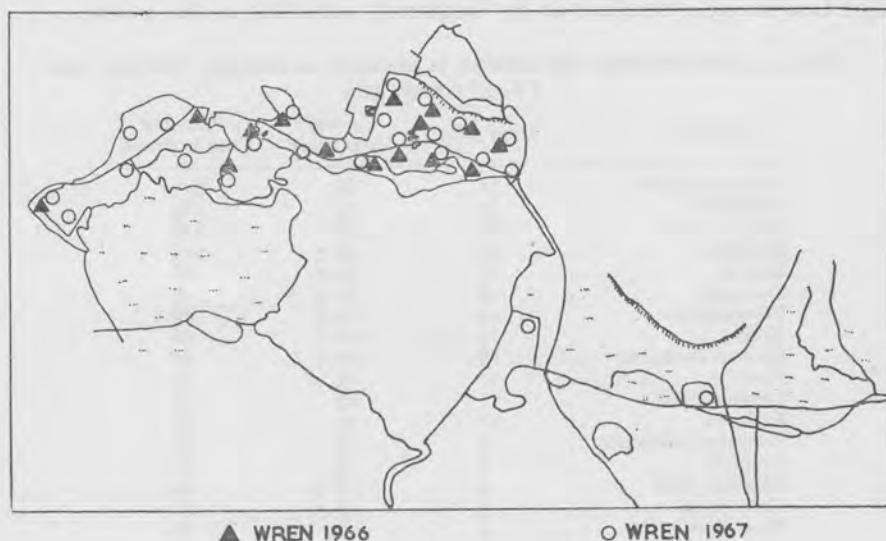


FIG. 8.

Wren territories at Malham in 1966 (black triangles) and 1967 (open circles). Note the outward spread into West Fen-Pothole Lane and the small east-side plantations.

COMPARISON WITH LOWLAND WOODS

Tarn House Wood covers some 40 acres, and the isolated groups of trees (omitting Horseshoe Plantation and Pothole Lane) bring the total to about 58 acres. In Table 4 the counts have been added together and a density figure worked out: this is expressed in "pairs" per 100 acres, and also per 100 hectares (=1 square kilometre), since this is the unit adopted by European census workers. If the willow warbler and chaffinch densities for Tarn House Wood and Ha Mire Plantation respectively are compared, they are so close as to suggest that the latter, despite its isolation and exposure, is in no way marginal for these two species.

"Forest" bird communities are so highly variable, depending upon a number of factors such as the dominant tree species, age of the timber, type and extent

of the shrub layer, the kind of management, etc., that any comparison between the Malham community and those occupying lowland woods can only be made in the broadest terms. Malham is, however, the only woodland, out of 20 "plots" of comparable size censused under the B.T.O. enquiry, mostly in the lowlands, which has chaffinch subdominant to willow warbler, with song thrush and blackbird at equal densities occupying third place. The relative positions of willow warbler and chaffinch are the same as in West Highland birch woods (*Betula pubescens*) examined by Yapp (1962), and there is agreement also in the low status of the robin, though this is in a higher place than song thrush (the blackbird is absent from his list). Willow warbler, followed by chaffinch, also dominate the ash woods of the Pennines, with the redstart at high but the other turdinae at low frequency, according to this author.

Table 4. *Some breeding bird densities in woodland surrounding Malham Tarn (Total acreage 58)*

Species	Total pairs	Pairs per 100 acres	Pairs per 100 hectares
Willow warbler ..	51	88	217
Chaffinch	43	74	183
Song thrush	28	48	119
Blackbird	27	46.5	115
Blue tit	16	27.5	68
Dunnock	16	27.5	68
Woodpigeon	13	22.5	56
Robin	13	22.5	56
Spotted flycatcher ..	13	22.5	56
Wren	11	19	47
Lesser redpoll	11	19	47
Redstart	10	17	42
Common sandpiper ..	7	12	30
Great tit	7	12	30
Meadow pipit	5	8.5	21
Greenfinch	5	8.5	21
Tree pipit	4	7	17

NOTE: The 1966 figures have been used, since the latest Common Birds Census figures available for comparison are for that year.

No C.B.C. woodland bird-census in 1966 had a willow warbler density approaching that at Malham: between 20-40 pairs per 100 acres is usual, and in fact only three of the 20 plots examined attained half the Malham figure. On the other hand, all but seven of these plots had a considerably higher density of robins, and in half of them this is the most numerous species, confirming its position as the dominant "forest" species of the lowland zone. Nor is there anything approaching the chaffinch density at Malham: only two of the 20 plots reach a figure of 40 pairs per 100 acres. None has a higher song thrush density and only a quarter have a blackbird population similar to Tarn House Wood. A majority of these lowland woods have fewer blue tits, but more great tits: Yapp (1962) suggests that the scarcity of the great tit in hill woods is related to the poverty of the shrub layer, in which this species prefers to feed. The densities of wren and dunnock are well within the lowland range, but those of lesser

redpoll and spotted flycatcher are exceedingly high, while redstart is equalled only by a sessile oakwood in Wales. Only one wood, beside Derwentwater (Cumberland), has nesting common sandpipers, at a density of 4 pairs. The abundance of pheasant at this altitude is noteworthy (Fig. 5); Yapp (1962) says it is entirely absent from fell woods, and its presence at Malham is probably due in no small measure to artificial feeding throughout the winter.

MANAGEMENT

It is clear that, despite its altitude and the rigorous climatic environment (see Manley, 1957) the Malham woodland has a rich bird fauna. The woodland is, however, mostly mature, and in the more exposed parts it is rapidly dying back. A number of trees are blown down every winter. Management policy, according to D. Bremner (pers. comm.), envisages the felling of much of Tarn House Wood during the next decade, followed by replanting—mainly with larch and spruce acting as “nurses” for beech, ash, oak (*Quercus robur*) and other hardwoods, which will be left to grow on when the conifer crop is taken out in 30–40 years’ time.

Felling will open the canopy and some species, such as chaffinch and tree pipit, will benefit, but the disappearance of the older trees will undoubtedly reduce the availability of nest-sites for the tits and redstarts. Alternative nest-sites should therefore be afforded by fixing nesting-boxes to the healthy trees that remain. It would be of the greatest interest to carry out a programme of providing nesting-boxes now, dispersed at regular intervals (say, one to each 50-metres square), with a view to censusing the wood again in five years’ time, in order to see which species have responded. The population of great and blue tits would almost certainly increase, whilst marsh and coal tit ought also to benefit. It is possible that pied flycatchers (since they apparently occur regularly on spring migration) could be enticed to remain in the wood. E. Cohen (1967) gives details of construction and siting of nest boxes.

Artificial nest-sites, such as half-barrels or large open-fronted boxes for tawny owls, and gourd-shaped “nests” for house martins under the eaves of Tarn House, might well have good results. An owl’s nest with young in 1966 was in a hollow tree-stump almost at ground level, and one in 1967 was in an old crow’s nest. The present commendable policy of destroying carrion crows, which are a menace to all the tarn and open-country birds in the breeding season, could conceivably limit the available nest sites for tawny owls.

A part of present management is to leave heaps of brushwood on the newly-felled areas, and this certainly encourages pheasant, common sandpiper, and probably such passerine species as blackbird, duncock and song thrush by providing shelter and protection for their nests. This is, however, small compensation for the virtual absence of a secondary layer, and it would certainly enrich the bird-life of the area if some planting of shrubs in selected places could be included in the reafforestation programme. If these could be placed in a narrow belt around the periphery of new plantations they would afford shelter to the young trees, and when these grow to a reasonable height would afford a transitional ecotone attractive to a number of birds which might otherwise avoid the conifer stand.

A small pool was made by Conservation Corps workers in the West Fen in 1964, on a site where open water existed a few decades ago. The object was to increase the freshwater habitats, in order to enrich the invertebrate fauna and study the changes in plant-life. This project has clearly benefited the birds, and one may hope for a similar result in the case of a new pool made in 1966 among the stunted pines on the eastern side of Tarn Moss.

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