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Wicken Fen Group

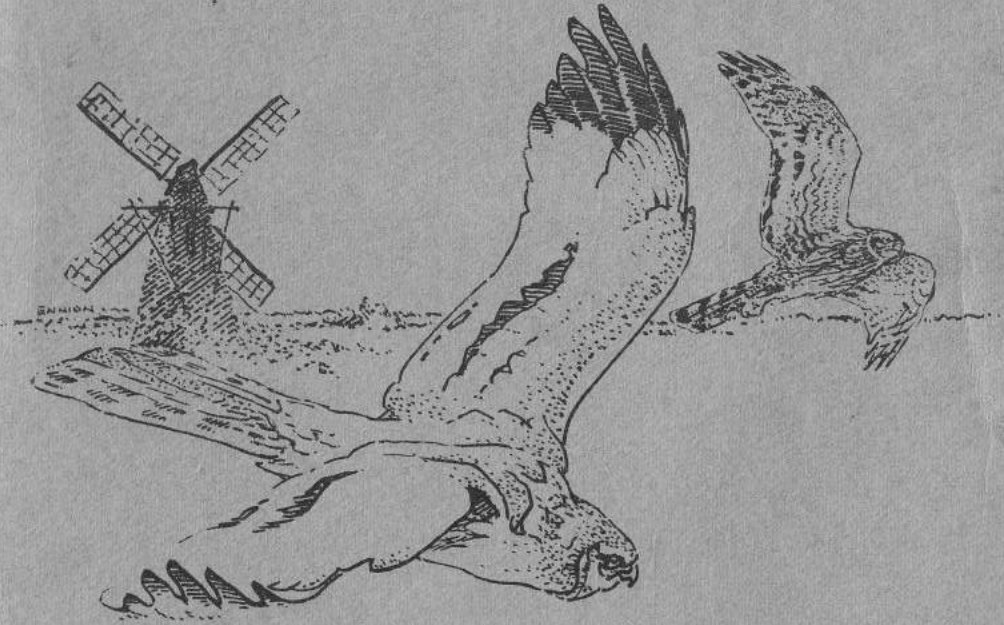
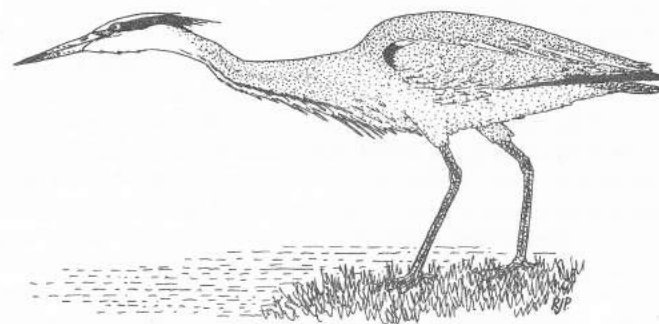


TABLE OF CONTENTS

Map of Wicken Fen	back cover
Introduction: M.J.Allen	p. 2
A review of the year: M.J.Allen	p. 5
Notes on selected species	p. 6
Ringling 1968-69: Totals list; recoveries and controls	p. 9
The vegetation of Wicken Fen and Adventurers' Fen: H.J.Harvey	p.12
Diurnal and seasonal changes in Reed Warbler and Sedge Warbler weights: H.J.Harvey	p.17
Weight variations of certain finches, buntings and sparrows: P.R.Messent	p.23
Brood patches as a guide to sexing: C.J.Bibby	p.29
Tongue spots and the age of birds: C.J.Bibby	p.33
Pied Wagtails: a roost at Milton: M.Y.Holdsworth	p.34
List of members	inside back cover

Peter Miles Bickham



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To Dr E A R Ennion go our thanks for his handsome cover design, and for his generous and prompt response to our request. Robin Prytherch did the line drawings, and we are most grateful to him for his help.

Finally to the members of the public who shew an interest in our work, and who allow us to pursue it without too much disturbance, we offer our thanks for their tolerance.

INTRODUCTION

Within the space of two years the Wicken Fen Group has become a feature of summer weekends on the Fen. During part of 1968 a few of us started to explore the reserve and spent some weekends netting and ringing birds in the area of the brickpits on the north-east corner of the Fen.

Our principal aim then was to contribute some information to the British Trust for Ornithology's national *Acrocephalus* warbler enquiry, and though we ringed other species caught, our main effort was devoted to sites where Reed and Sedge Warblers were known to be breeding, and where we could carry out fairly regular trapping during the summer. Elsewhere in this Report a note on this work together with a brief description of the aims of the national enquiry can be found.

The results of our first year's work were satisfactory (some rather unproductive autumn visits in an attempt to catch roosting Fieldfare and Redwing excepted), and encouraged us to plan much more regular coverage over a larger area in 1969. With this kind of expanded programme in mind a group of us met together during the Ringers' Conference at Nottingham in January 1969 and decided to form a Group to put the programme on a sounder basis. The Ringing and Migration Office of the B T O approved the plan, the Management Committee of the Fen gave their consent, and the Group began its work on 1 February 1969.

From the outset it was decided that the programme would need to be organised so that any team present on the Fen at any time would produce compatible information, and for this reason a circular was sent out detailing the procedure to be followed during all work on the Fen. It was decided to use the field sheets designed by the Iberian Ringing Group and to enter all details from these on to the Species Schedules prepared for use with them. This system it was felt would obviate the need for retrap cards. For each visit a specially prepared site-sheet is used, on one side of which is a sketch map of the Fen on which rough netting-sites could be indicated, together with notes on weather and species observed as well as the names of those present; and on the reverse, details of date, equipment used and time covered, as well as space for listing birds ringed and birds retrapped. During the year some sixty-five of these sheets have been completed and filed, although ringing was not necessarily possible on the occasion of every visit.

The sketch-map on the site-sheet shows the Fen divided up into eight separate areas which enable those at work in any given place on the Fen to record their area of work on the field-sheets, which will of course prove of great value when any assessment of the interchange of sites by birds within the area of the Fen is attempted. Comparisons of the birds' different habitats will also be possible.

During this first year of the Group's activities on the Fen a second major area was explored in addition to the north-east corner which had been worked during the pilot year. This was the area of the reed bed on the south-western edge of the Fen which was worked from Harrison's Drove. This has meant that two very different habitats have been worked, and interesting comparisons can be made between the figures relating to species caught in each area. At the same time our activities in the north-east corner have been extended towards Spinney Bank, for in fact the decline of the small reed-bed on the brickpits (which had proved quite productive of Sedge and Reed Warblers in 1968), meant that very little profitable ringing could be done in that area this year, while good catches have been made nearer the edge of the Fen.

Most of the ringing activities of the Group will always have to be carried out from non-permanent bases, as it would be difficult to justify the establishment of accommodation at any one of the sites so far removed from each other. At the same time the committee's generous offer of laboratory accommodation in the new building at the entrance to the Fen will enable us to store equipment, and provide us with a base for any possible winter forays for finch roosts on St Edmund's and Wicken Pools' Fens.

The pattern of our normal summer visits will not presumably change very dramatically. The use of a light portable ringing table and light-weight camping chairs makes the ringing a less uncomfortable procedure for the human beings and makes the processing of birds and the gathering of data a speedier and more reliable procedure. The personnel gathered on any particular weekend provide their own tents for the overnight stay, which enables catching to continue late in the evening and to begin early the following morning.

At present the membership of the group stands at 22 and there is a complete list on page 37. We are still anxious to increase our membership of ringers in all categories, and until this is possible it will be difficult to take many new trainees. During this year two trainees have qualified for their 'C' permits and one 'C' permit holder for his full 'A' permit; we hope the training of ringers will continue to be an important function of the Group as its work expands.

Anybody interested in joining the Group either as a ringer or as a trainee should contact the Secretary, but potential trainees should bear two important principles in mind:

- i) Ringing is a serious and disciplined undertaking, and those wishing to train must be prepared to visit the Fen frequently, particularly between April and October when the major part of the year's work is done. The recommendation for a permit is not an inevitable consequence of ringing a certain number of birds or completing a given number of months' training, but depends on the complete confidence of the trainer concerned. The 'C' permit is awarded, after all, in his name.
- ii) A good knowledge of bird identification is a necessary first step for the potential trainee.

The Group has established the following membership categories:

- | | |
|--------------------------------------------------------------------------------------------------|-----------|
| A) Members (including 'A', 'B' and 'C' permit holders and trainees after their probation period) | £2 10 0 |
| | per annum |
| B) Friends of the Wicken Fen Group | 10 0 |
| | per annum |

Both classes of members will receive the periodic bulletins produced by the Group and one copy of each report.

A prospective trainee will serve a probation period of not more than six months and will pay an enrolment fee of 10/-. On acceptance as a trainee he will pay the additional £2 0 0 and become a full member.

Friends of the Wicken Fen Group are always welcome; the category is intended to cover those who do not wish to take part in the ringing activities but who would like to support the Group's work and be kept in touch with its progress.

A REVIEW OF THE YEAR

1969 has been an unusual year in many ways, and perhaps it will be necessary to complete several more years of work at Wicken before it is known just how unusual.

During the first few months of our activity there this year, the Fen was unusually wet following an extraordinary summer and winter with abnormally heavy rainfall. Broadly this abnormal situation continued through the spring until early summer of this year, when the water level began to decline. As a consequence of one of the driest and warmest summers this century the Fen continued to dry out, and late autumn 1969 found the reserve abnormally dry, and many of the dykes and ditches still waterless at the end of November.

It is thought that the high water-level may well have had one effect relevant to the Group's work. During 1968 some catches of Reed Warblers were made on a small bed of Phragmites on the brickpits on the north-east corner of the Fen. During May and June this year, by which time its colony of Reed Warblers would normally be expected to have returned, the bed was practically without them and the Phragmites so sparse that it scarcely looked capable of sustaining a colony. At no time during the year, on the few occasions when nets were sited to catch the birds on the reed bed there, were Reed Warblers caught in significant numbers.

The first Chiffchaffs of the year were in evidence on 3 April at the north-east corner of the Fen, and one was caught that evening. Fieldfare were still present in fair numbers on the following weekend (11 April), when large winter flocks of finches were still feeding along the droves. Two Sand Martins were seen on 16 April, when the first Garganey were also present. By 18 April more summer migrants had arrived with two Sedge Warblers and a Willow Warbler on the brickpits, 100 plus Sand Martins on the Mere and two Grasshopper Warblers in the Spinney Bank area.

During 1969 Whitethroats have been scarce in many parts of the country and Wicken has been no exception. The first was seen on 19 April, but at no time during the summer was the species much in evidence. The Lesser Whitethroat numbers appeared not to have been affected in the same way, though none were reported before the first was caught on 4 May. Although the Nightingale was heard singing on St. Edmund's Fen on the evening of 24 April, it was not recorded in its usual area near the brickpits until 30 May. The first recorded Swallow of the year was one caught on 25 April, and a day later two House Martins and one Swift were seen over the Mere.

Turtle Doves were singing on 27 April and the first Reed Warbler was caught on the same day, by which time too the Willow Warblers and Sedge Warblers were much more widely distributed. The first Blackcap was caught on 26 April and this species too was present in fair numbers on the north-east corner of the Fen by 3 May. The first Garden Warbler recorded was caught on 4 May.

The Cuckoo was heard first on 11 May, but again it was possibly less numerous near the brickpits than in 1968. One adult was caught on that day on the 'ride' to Spinney Bank. The first Yellow Wagtail for the year was seen on the same day. A late movement of migrants through the area might be inferred from the trapping of a male Redstart and two Spotted Flycatchers (the first of the year) on 24 May.

With the fine weather and exceptionally dry conditions continuing until late autumn, it was perhaps not surprising that the summer migrants seemed late in departing, and the characteristically large winter feeding flocks of Turdidae and Fringillidae late in developing. A large roost of Swallows and a developing Starling roost were noted on 20 September, while a Chiffchaff was still singing on the following day, and small flocks of Golden Plover moving around the area of the Mere. The last Sedge Warbler was caught on 21 September and the last Reed Warbler on 27. Two Blackcaps were caught on 28 September, and on 4 October a Phylloscopus Warbler, thought to be a Willow Warbler, was seen.

By this date a few Fieldfares were present, though in small numbers, while some fifty Swallows were seen flying north at dusk. Two Redwing were caught on 19 October, and small parties of swallows continued to move through the Fen during the following week, including the albino bird noted elsewhere in this Report. No further summer visitors were recorded thereafter, and by the end of the month Redwing and Fieldfare numbers were beginning to build up.

There follows a set of notes of observations on selected species during the year.

NOTES ON SELECTED SPECIES 1969

BITTERN (*Botaurus stellaris*) One on reed bed 23 March, and one in same area during first week of May.

GARGANEY (*Anas querquedula*) At least one pair present on Mere from 16 April; one pair on Brickpits on 18 April.

PINTAIL (*Anas acuta*) One pair present on Mere on 10 May.

RED-CRESTED POCHARD (*Netta rufina*) One male on Mere 24 November.

GREYLAG GOOSE (*Anser anser*) One, probably feral, seen and heard from end of August on Mere to end of year.

CANADA GOOSE (*Branta canadensis*) Two heard on 20 April on Mere.

SPARROWHAWK (*Accipiter nisus*) One female near brickpits on 2 February.

MARSH HARRIER (*Circus aeruginosus*) Records of single birds not infrequently throughout the summer.

MONTAGU'S HARRIER (*Circus pygargus*) One female seen at close quarters near reed bed 24 May; and party of three very high to NW over reed bed 27 July.

OSPREY (*Pandion haliaetus*) One over Fen 15 June.

GOLDEN PLOVER (*Charadrius apricarius*) Total of sixteen around area of Mere 21 September.

JACK SNIBE (*Lymnocyptes minimus*) One caught near Mere 20 October 1968.

BLACK TERN (*Chlidonias niger*) Five over Mere 4 May.

COLLARED DOVE (*Streptopelia decaocto*) There is a marked and continuing expansion of the species on the Fen, particularly in the areas of older trees.

BARN OWL (*Tyto alba*) One near brickpits 4 May.

TAWNY OWL (*Strix aluco*) One adult caught 9 May; subsequently one Water Shrew (*Neomys fodiens*) discovered under the part of the net in which the bird was found.

LONG-EARED OWL (*Asio otus*) One heard end of March; one seen end of May; both in area of St. Edmund's Fen.

SHORT-EARED OWL (*Asio flammeus*) One seen from Hide 31 March; probably two on Fen mid-November.

SWIFT (*Apus apus*) First seen over Mere 26 April.

KINGFISHER (*Alcedo atthis*) Two caught during summer and infrequent sightings recorded.

GREAT SPOTTED WOODPECKER (*Dendrocopus major*) One over brickpits 25 April.

SWALLOW (*Hirundo Rustica*) Large autumn roost on Mere and reed bed area from end of July to mid-October. Probably 5,000 maximum in mid-September. One pure white individual seen on several occasions towards end of October.

BEARDED TIT (*Panurus biarmicus*) Last recorded in the spring in first week of April. Present on reed bed in mid-November; one flock of seventeen individuals seen.

TREE CREEPER (*Certhia familiaris*) Ringing totals suggest that the species breeds in small numbers on the Fen.

REDSTART (*Phoenicurus phoenicurus*) One adult male caught on passage 24 May.

NIGHTINGALE (*Luscinia megarhynchos*) Rather fewer observed this year. First heard on St. Edmund's Fen on 24 April. Not heard in brickpits area until end of May.

GRASSHOPPER WARBLER (*Locustella naevia*) Widely distributed over the Fen, though not numerous.

BLACKCAP (*Sylvia atricapilla*) Moderately numerous on the Fen.

GARDEN WARBLER (*Sylvia borin*) Much less numerous than the Blackcap.

WHITETHROAT (*Sylvia communis*) Decidedly less numerous than in 1968.

LESSER WHITETHROAT (*Sylvia curruca*) Sparsely distributed on the Fen.

SPOTTED FLYCATCHER (*Musicapa striata*) Apparently a scarce breeder: first recorded on 24 May.

PIED WAGTAIL (*Motacilla alba yarrellii*) Small roost in usual area near Sedge Fen Drove in April; about fifty birds.

REDPOLL (*Acanthis flammea*) Fairly numerous throughout the Fen.

CHAFFINCH (*Fringilla coelebs*) Small winter flocks apparent; not numerous in the summer.

TREE SPARROW (*Passer montanus*) Common breeding bird, primarily in north-east corner of the Fen where large feeding and roosting parties occur during the rest of the year.

RINGING 1968-69

The following table includes totals for 1968 not previously published, though reference was made to some of the data in a brief cyclostyled report on the pilot scheme prepared at the end of that year.

In 1968 most of the catching was carried out in the area subsequently designated 'A', though it has not been found worthwhile to divide the ringing totals for that year by sites. A key to the areas of sites 'A', 'B' and 'F' used in 1969 will be found on the map of the Fen on the back cover.

SPECIES RINGED

	1968	1969			Total
		A	B	F	
Mallard	-	1	-	-	1
Red-legged Partridge	-	-	-	1	1
Moorhen	-	-	1	-	1
Snipe	2	1	2	-	3
Jack Snipe	1	-	-	-	-
Cuckoo	-	-	1	1	2
Tawny Owl	-	-	3	1	4
Kingfisher	-	1	-	1	2
Skylark	-	-	-	1	1
Sand Martin	1	-	-	-	-
Swallow	9	19	9	13	41
House Martin	-	-	1	-	1
Pied Wagtail	3	2	-	-	2
Wren	37	28	30	37	95
Duncock	50	26	86	73	185
Grasshopper Warbler	3	-	6	4	10
Sedge Warbler	103	33	50	116	199
Reed Warbler	34	28	23	171	222

Garden Warbler	3	1	5	2	8
Blackcap	19	11	29	11	51
Whitethroat	17	2	3	12	17
Lesser Whitethroat	8	3	4	4	11
Willow Warbler	31	22	43	84	149
Chiffchaff	13	10	4	9	23
Goldcrest	1	1	-	-	1
Spotted Flycatcher	1	4	4	3	11
Redstart	-	-	-	1	1
Robin	36	19	37	19	75
Nightingale	2	-	1	-	1
Fieldfare	1	2	3	-	5
Blackbird	56	26	117	37	180
Redwing	7	2	13	-	15
Song Thrush	36	18	93	64	175
Mistle Thrush	1	-	-	-	-
Long-tailed Tit	40	5	16	19	40
Willow Tit	10	13	11	15	39
Blue Tit	23	28	26	49	103
Great Tit	8	5	7	19	31
Tree Creeper	4	3	-	4	7
Corn Bunting	-	-	4	-	4
Yellowhammer	3	2	14	2	18
Reed Bunting	20	26	39	51	116
Chaffinch	9	6	18	10	34
Brambling	-	-	1	-	1
Greenfinch	1	12	25	12	49
Goldfinch	3	3	20	8	31
Linnet	1	10	10	18	38
Redpoll	8	9	21	20	50
Bullfinch	41	27	84	76	187
Tree Sparrow	3	7	187	6	200
Starling	-	-	9	2	11
Jay	-	-	1	-	1
TOTALS	649	416	1061	977	2454

RECOVERIES 1968-69

There follows a list of all recoveries and controls of over five miles distant, notified by the Ringing Office since ringing began again on the Fen in spring 1968. Previous catching and ringing there had been carried out by Fenn and Palmer, and birds ringed by them and shewing interesting longevity have been included in the list. For the non-ringer it should be explained that 'controls' are birds marked by one ringer which are subsequently caught and released alive by another ringer.

Where the date of a recovery is unknown the date of the reporting letter is given in brackets.

Distances are given in miles together with approximate directions.

Key to symbols and terms

pull	-	nestling or chick not flying
1Y	-	bird in its first year
FG	-	full-grown; age uncertain
♂	-	male
v	-	controlled
x	-	found dead or dying
/?/	-	manner of recovery unknown
juv	-	young able to fly freely
PJ	-	post juvenile
Ad	-	adult at least one year old
♀	-	female
+	-	shot or killed by man
()	-	caught or trapped alive and not released, or released with ring removed.

SWIFT

SC 84053	PJ	25. 6. 66	Boughton, Downham Market (Norfolk)
	x	(ca. May 1968)	Wicken Village (Cambs) (20 miles SSW)

SAND MARTIN

AE 97982	Juv	23. 7. 67.	Earith (Hunts)
	v	12. 7. 68	Wicken Fen (W.F.) Cambs. (10 miles ESE)

DUNNOCK

AE 97627	FG	24.10.64	W. F.
	v	11. 5. 68	W. F. (local)

REED WARBLER

AB 97494 Ad 25. 7. 68 W. F.
v 3. 5. 68 W. F. (local)

AB 97492 Ad 25. 7. 68 W. F.
v 6. 7. 68 W. F. (local)

AS 49996 PJ 18. 5. 68 Nr. Dungeness (Kent)
v 24. 5. 69 W. F. (100 miles NNW)

HR 09046 Ad 31. 5. 68 Milton, Nr. Cambridge
v 26. 7. 69 W. F. (6½ miles NE)

BLACKBIRD

79531 R Ad^o 9. 11. 63 W. F.
v 20. 10. 68 W. F. (local)

SONG THRUSH

15550 X PJ 2. 3. 68 Coton, Nr. Cambridge
v 4. 5. 68 W. F. (11 miles ENE)

CP. 64079 Juv 31. 5. 69 W. F.
X (11. 10. 69) Bedford (33 miles WSW)

REDPOLL

HB 92411 pull 3. 8. 66 Boughton, Downham Market (Norfolk)
v^o 24. 5. 69 W. F. (20 miles SSW)

REED BUNTING

AE 97589 Ad^o 1. 3. 64 W. F.
v 27. 7. 69 W. F. (local)

THE VEGETATION OF WICKEN FEN AND ADVENTURERS' FEN

The operational area covered by the Wicken Fen Group extends beyond the geographical entity known as Wicken Fen and includes that part of Adventurers' Fen which is owned by the National Trust. The nearby St. Edmund's Fen, also owned by the Trust, has not yet been worked by the group. Wicken Fen, or more accurately Wicken Sedge Fen, and Adventurers' Fen are separated by Wicken Lode and there are considerable vegetational differences between Wicken Fen lying to the north of the Lode and Adventurers' Fen lying to the south; it is therefore convenient to consider the two areas independently.

Wicken Sedge Fen

The vegetation of Wicken Fen cannot be regarded as being typical of the natural vegetation of the Fenland Basin, rather it is the product of man's influence and must be considered to be semi-natural. Man's influence has been of two kinds, firstly through long continued cutting of sedge for thatching material, of 'litter' for animal bedding and of the fen droves for access, and secondly through a neglect stemming from a decline in the demand for thatching material after the end of the nineteenth century. Over more recent years reclamation and management for conservation purposes has influenced the vegetation.

Regular cutting, every 3 or 4 years in the case of sedge, every year in the case of litter and several times a year on the droves, leads to the development of a series of very distinct plant communities. With the cessation of cutting these communities disappear as the areas involved are invaded by shrubs and a dense scrub or 'carr' develops. In the oldest carr areas succession has led, or is leading, to the development of woodland; all of the fen would develop into such woodland if it were not for man's activities in cutting certain areas.

Of the 315 acres of Wicken Fen the areas occupied by the various communities are given in Table 1.

Table 1: Vegetational composition of Wicken Fen on acreage basis.

Community	Approximate Acreage
Droves	8
Litter	10
Sedge Fields	30
Carr	245
Woodland	2
Rough pasture and Arable	20
Total	315

The frequent cutting of the droves has led to the dominance of rosette type species, grasses and the smaller sedges and rushes. Typical of this community are Devil's-bit Scabious (*Succisa pratensis*), Lesser Spearwort (*Ranunculus flammula*) and Meadow Thistle (*Cirsium dissectum*).

In the less frequently cut litter areas taller growing species can survive and become dominant, the annual cutting prevents the establishment of Sedge or bushes however and Common Reed (*Phragmites communis*) does not thrive under such conditions. Such areas are typically dominated by *Molinia caerulea*, the rush *Juncus subnodulosus* is often abundant and the Common Reed is frequently present. Other species in this community include Meadowsweet (*Filipendula ulmaria*), Wild Angelica (*Angelica sylvestris*) and Common Meadow Rue (*Thalictrum flavum*). When cut in the autumn these species will have formed a dense vegetation up to 75 cms high.

When the interval between cuttings is stretched to 4 or 5 years, Sedge (*Cladium mariscus*) becomes the dominant plant but many other species survive and the community is a very rich one, especially in the year after cutting. Common species in this community are the Common Reed, *Molinia*, Milk Parsley (*Peucedanum palustre*) and Yellow Loosestrife (*Lysimachia vulgaris*). This community may reach a height of up to 150 cms at which stage it will be virtually impenetrable due to the sharp serrated edge of the leaves of *Cladium*. Cutting, in the winter months, results in a very open community which is colonised by a wide variety of plants; these gradually disappear as the Sedge recovers.

At present the litter and sedge communities are concentrated chiefly in the southern and south-eastern portions of the Fen but future clearance will inevitably lead to a wider distribution.

Sedge or litter fields which are abandoned are soon colonised by shrubs; the first coloniser is often Alder Buckthorn (*Frangula alnus*) which is later replaced by Buckthorn (*Rhamnus catharticus*), Guelder Rose (*Viburnum opulus*), Blackthorn (*Prunus spinosa*), Privet (*Ligustrum vulgare*) and Sallow (*Salix cinerea*). Over the period of a few years these species can convert an open field into an area of carr. This has happened over much of the Fen, the greater part of which is now covered by carr anything from 2 to 6 metres in height which can only be penetrated with considerable difficulty.

In certain areas succession has proceeded farther and Birch (*Betula pendula*), Oak (*Quercus robur*) and Ash (*Fraxinus excelsior*) have colonised the carr. In some areas, as in the extreme western corner of the Fen, trees have reached a height of 15 to 20 metres.

The area of arable and rough grazing land occurs in the north eastern corner of the fen. Here the underlying clay comes to the surface and there is not the deep peat soil which characterises the rest of the Fen. About half of this area is used for arable cultivation; the major portion of the remainder is occupied by rough grassland which is occasionally cut for hay or litter. There is also a small area of scrub, chiefly Hawthorn (*Crataegus monógya*).

Adventurers' Fen

Whereas Wicken Fen may never have been used agriculturally the area to the south of Wicken Lode has been cleared and farmed, most recently during the Second World War. One of the consequences of this different history is that the area is about two metres below the level of Wicken Fen, another consequence is that the peat soil is much shallower. At present much of Adventurers' Fen is still used for arable cultivation or as grazing land but the conversion of a portion of the Fen into a Marshland Reserve has already commenced.

The present vegetation types of Adventurers' Fen and their approximate acreages are given in Table 2. In addition there is an area of open water (the Mere) about 10 acres in extent and about half a mile of Poplar and Willow "hedges" up to 20 metres high.

Table 2: Vegetation types of Adventurers' Fen on acreage basis.

Community	Approximate acreage
Arable	73
Permanent grassland	80
"Rough grazing"	20
Rushes	40
Reed	60
Scrub	1
Total	274

Note: "Rough grazing" includes; paths, tracks, lode banks and some rush and reed infested pasture.

There is much less successional relationship between these communities than there is between those on Wicken Fen. Indeed the only clear-cut example of succession is the invasion of the permanent pasture, grazed by sheep and beef cattle, by Rushes and Reed, a process which is to be expected in an area as wet as

Adventurers' Fen. This succession is likely to be hastened by the development of the Marshland Reserve and true rush and reed communities are likely to develop.

At present the main rush dominated area surrounds the Mere forming a tussocky community up to 50 cms high in an area which in many years is permanently wet.

The main area of Reed is present as a large 48 acre block (The Reed Bed or Reed Field) in the north-west corner of the Fen; another considerable area fringes the Mere and small amounts occur in all ditches. The Reed on the Reed Bed is regularly cut for thatching material. Cutting takes place in the winter, yielding material 1.5 to 2 metres long.

The scrub of Adventurers' Fen consists mainly of Hawthorn which occurs as a discontinuous strip, never more than 20 metres wide, on the drier area along the foot of Wicken Lode bank. Some of the scrub is fairly mature but no tree colonisation has yet occurred. Linear scrub in the form of overgrown hedges also occurs.

No mention has so far been made of birds, the supposed main interest of the Wicken Fen Group. It might be expected that each plant community would have its characteristic bird species and that we might be able to describe these bird communities as accurately as we can describe and delimit our plant communities. Unfortunately we are not yet in a position to do so and can do little other than make generalisations about certain species or certain areas. This admission can but act as a challenge and it is hoped that in future reports we will be able to describe our avian communities both in terms of species composition and in terms of number of individuals of each species.

At present however we have to make do with general observations, few of which would surprise the competent ornithologist or the reader of the Handbook. Thus Bitterns and Bearded Reedlings are reported only from the Reed Field on Adventurers' Fen. This area is also the chief breeding area of the Reed Warbler but all suitable areas of Reed are utilised by this species. The sedge fields do not appear as attractive to birds although Reed Buntings are found there in large numbers in the winter. It is on newly cut sedge fields that Snipe are often found feeding in the winter and where they often nest in spring. Nesting duck seem to favour the rush dominated area around the Mere. Blackcaps occur on Adventurers' Fen in only small numbers but are much more common on the more wooded Wicken Fen. The trees and carr of Wicken Fen provide many acres of roosting sites for the large winter flocks of Starlings, Thrushes and Finches.

But all this is small beer; we hope that future years' vintage will possess more body.

DIURNAL AND SEASONAL CHANGES IN REED WARBLER AND SEDGE WARBLER WEIGHTS.

One of the main activities of the group over the past two years has been participation in the National Acrocephalus Enquiry of the British Trust for Ornithology. This enquiry is concerned chiefly with the Reed and Sedge Warblers and is aimed at providing information on the proportion of adults which change colony from year to year; the area to which first year birds return; the timing of migration; the possible movement of birds from colony to colony prior to a Channel crossing and the pattern of weight changes throughout the year.

Particular emphasis has therefore been placed on catching the two species and they, fortunately, occur at the head of the ringing totals list. Table 1 shows the number of individuals ringed and the total number of handlings in both 1968 and 1969.

Table 1: Number of birds ringed and handled in 1968 and 1969.

	Reed Warbler		Sedge Warbler	
	Number ringed	Number of handlings	Number ringed	Number of handlings
1968	34	57	103	176
1969	222	341	199	359

This note examines the data accumulated over the two years on the weights of the two species, it should not be considered to be other than a preliminary study, for the samples are too small to allow any firm conclusions to be arrived at.

Diurnal weight changes.

Since the time of capture of all birds is known it is possible to examine the way in which weight varies over the course of the day. In Figure 1 the three hour running mean weights of adult birds are plotted against the number of hours from sunrise, data from all sites and from both years were combined in calculating these means. (Note:- The value plotted at 1.5 hours is the mean weight of all birds caught in the first, second and third hours from sunrise. The value at 2.5 hours is the mean weight for hours 2, 3 and 4, and so on.) Also plotted on this graph are the three hour running means of 'activity' as measured by the feet of net erected per bird caught over the whole period April to September. Data for calculating this index is only available for 1969.

The Sedge Warbler shows a fairly steady increase in weight throughout the day. A linear regression of the form $y = a + bx$ may be fitted to the mean values, this can be interpreted as meaning that weight y at hour x after sunrise will be the total of the dawn weight a plus x hours of increase at b grams per hour. The regression equation for the Sedge Warbler data is, $y = 10.87 + 0.054x$, the standard error for b being ± 0.0025 . The value for b is significantly different from zero ($P < 0.001$). The calculated increase in weight over a day is at least 0.81 grams, this is also a measure of overnight weight loss.

The data for Reed Warbler weights does not show such a smooth pattern as does that of the Sedge Warbler. Examination of the graph suggests that maximum weight is attained about 10 hours after sunrise with the mean weight then remaining constant, or even falling slightly towards nightfall. A regression equation fitted to the complete data gives, $y = 11.22 + 0.0415x$, with the standard error of b being ± 0.00724 . This value of b is significantly different from zero and from the value of 0.054 obtained for the Sedge Warbler ($P < 0.001$ in each case).

The possibility that the weight of this species reaches a maximum at about 10 hours and then remains constant may be tested by dividing the graph into two sections, from 1.5 to 9.5 hours and from 10.5 to 15.5 hours, and applying regression analyses to each section. The regression equations obtained when this is done are given in Table 2.

Table 2: Regression equations relating weight (y) to time (x)

	a	b	Standard error of b	Significance level of differences	
				Between b & zero	Between b and Sedge Warbler b
1.5 - 9.5 hours	$y = 11.038 + 0.0748x$		± 0.0109	$P < 0.001$	$P < 0.0001$
10.5 - 15.5 hours	$y = 11.758 - 0.0249x$		± 0.0527	n.s.	-

The suggestion that weight increased up to about ten hours and then stabilised is consistent with these results. The 1.5 - 9.5 hour regression coefficient suggests a daily weight change of at least 0.60 grams.

Both species show a peak of activity shortly after sunrise. Reed Warbler activity then declines steadily to reach a low level at

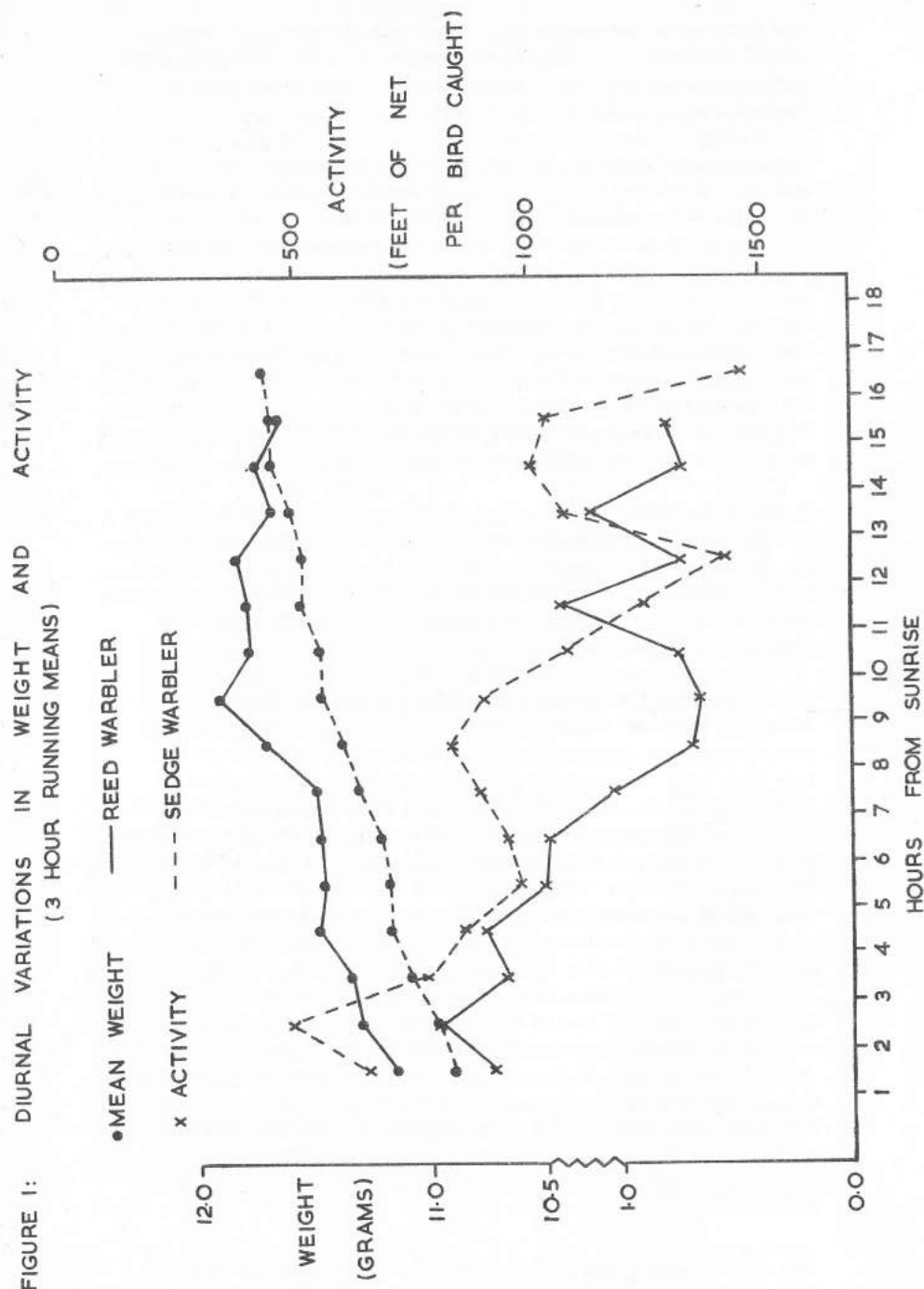


FIGURE 1:

about 10 hours, corresponding to the time at which maximum weight is attained, no consistent pattern is visible after that time. In the Sedge Warbler there appears to be a secondary peak at about 9 hours and there is a marked evening peak.

These results illustrate two interesting differences between the species. Firstly the species differ in their overnight weight loss, this being at least 0.60 grams in the Reed Warbler but at least 0.81 grams in the Sedge Warbler, if the regressions hold for the period 0 to 1.5 hours from sunrise then the weight losses are at least 0.71 and 0.89 grams. Secondly it seems that the Reed Warbler can replace its overnight weight loss within about 10 hours but the Sedge Warbler takes at least 16 hours to do so. The Sedge Warbler data is of course susceptible to other explanations, for example that Sedge Warblers are not caught once they have reached their pre-night weight, although activity data would suggest that this explanation at least is unlikely.

These differences, if real, may be due to inherent physiological or behavioural characteristics of the species or they may reflect the suitability of the environment for the two species; it possibly being marginal for the Sedge Warbler. If the differences are real then they may have a number of implications for the migration pattern of the species.

Overnight weight loss may be used as a measure of basal metabolic rate and since it is generally assumed that the energy requirements of migratory flight are a constant function of this rate then migratory energy requirements may be estimated. Assuming that the relationship between basal metabolic rate and migratory energy requirements is the same for both species this study would suggest that for birds with similar reserves of fat the migratory flight range of the Reed Warbler would be greater than that of the Sedge Warbler. If the value of the regression coefficient (b) is limited by the physiological characteristics of the species then certain limitations may be imposed on the ability of the species to accumulate the fat reserves needed for migration. This is particularly true of the Sedge Warbler and the known pre-migratory weight increases in this species would appear somewhat difficult to explain. If the previous argument concerning migratory energy requirements is correct the Sedge Warbler will need high departure weights if it is to migrate, as has been suggested on the basis of ringing recoveries, by long sustained flights as compared to the short hops which appear to be used by the Reed Warbler.

The data on which this study is based is rather slim and a great deal of further study is obviously needed. The ideas advanced

here would suggest that such further work should include study of weight variations in contrasting habitats; observations on feeding behaviour and food organisms utilized, again in contrasting habitats but also at different times of year; and a detailed investigation of the physiology of the two species. Such studies would not only throw light on the problem of migratory weight change but might also explain the apparent coexistence of two species which appear to be ecologically homologous.

Seasonal weight changes.

Figures 2 and 3 show the mean weights of Reed and Sedge Warblers for each ringing period, generally two days each week-end, during the summer of 1969. Once again certain samples are small and the picture is confused by the fact that two separate sites were being operated. The lines on each graph have been fitted by eye and no great significance should be attached to them, possible variations between sites have been ignored.

A number of points may be made about this data although coverage was probably not sufficiently extensive in August and early September to accurately observe departure weights. These must be looked upon as stimulants to further study.

- i. Adult Reed Warbler departure weights appear to be no higher than maximum summer weights.
- ii. Juvenile Reed Warblers appear to put on weight before departure and to have heavier departure weights than adults.
- iii. There is a tendency for adult Sedge Warbler weights to increase towards the time of departure.
- iv. The departure weight of juvenile Sedge Warblers does not appear to be higher than that of adults.

Unfortunately these observations throw no light on the discussion in the previous section.

Summary

Two years data on the weights of Reed and Sedge Warblers was analysed to examine diurnal and seasonal variations. Marked diurnal fluctuations were observed. The significance of differences in the diurnal pattern of the two species is discussed in relation to migratory behaviour.

FIGURE 2: MEAN WEEKEND WEIGHTS OF REED WARBLERS DURING 1969

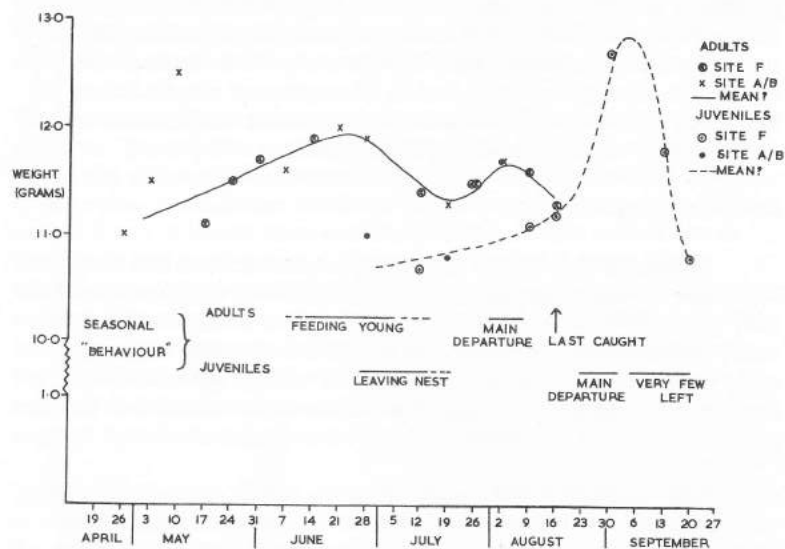
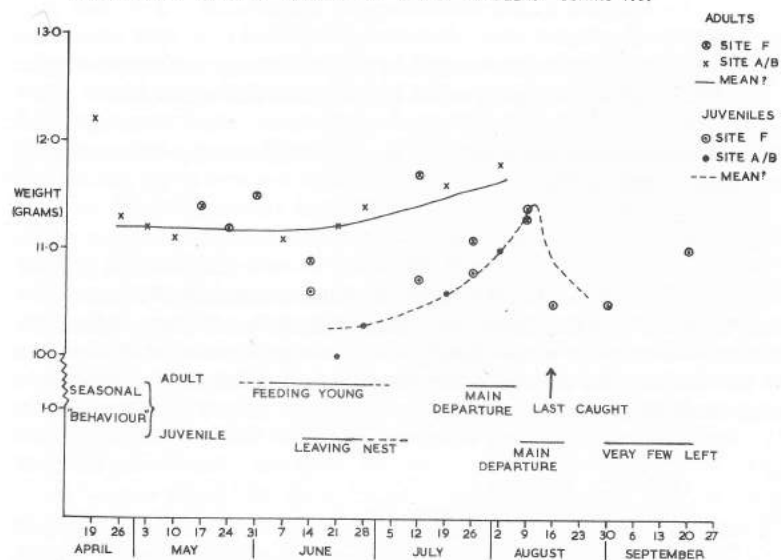


FIGURE 3: MEAN WEEKEND WEIGHTS OF SEDGE WARBLERS DURING 1969



WEIGHT VARIATIONS OF CERTAIN FINCHES, BUNTINGS AND SPARROWS

During 1969, sufficient numbers of Greenfinch, Bullfinch, Linnet, Reed Bunting, Tree Sparrow and Redpoll were handled on the Fen to provide a reasonable sample for the study of variations in the weight of these species. This note examines weight variation in relation to time of day, time of year and sex, and discusses the possible reasons for such variations.

The data analysed here were collected during the group's normal ringing activities, and examination of the data suggests that on the whole little bias between samples due to uneven catching times occurred, so that seasonal weight trends should not be confused with diurnal weight variations. All birds were weighed to the nearest 0.5 gram.

SEASONAL WEIGHT VARIATIONS

Figure 1 shows the mean weights for the six species during those months for which sufficiently large samples are available. The almost parallel weight changes of the six species are more likely to be due to physiological than ecological factors. It is unlikely that the food of all six species would fluctuate in a similar manner during the summer, and the fairly similar timing of the breeding season of the six suggests it is most likely that the weight changes are associated with this.

Earlier in the year, both Bullfinch and Reed Bunting were considerably heavier in February and March than in the breeding season. Data are not available at this time for the other species, but the lines for Greenfinch and Linnet weights suggest that they may show a similar trend.

It could be argued that higher winter weights reflect the accumulation of fat reserves for use either during times of stress, or during longer winter nights. Both are probably true to some extent, but data from Cambridge Sewage Farm of the weights of Tree Sparrows caught in the days following heavy snowfall, and some later Wicken weights are applicable and are shown in figure 2. Unfortunately no figures are available of weights before the snow, but a very rapid increase in weight starting two days after the snowfall shows how rapidly weight can be put on in winter. It is probable that the high weights of the Wicken Bullfinches and Reed Buntings in February reflect the need for a food reserve in case of adverse conditions, with some extra fuel being needed for the long winter nights.

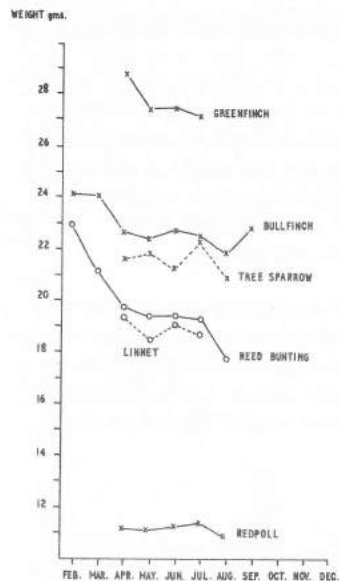


FIGURE 1.
Mean weights by month for six species.

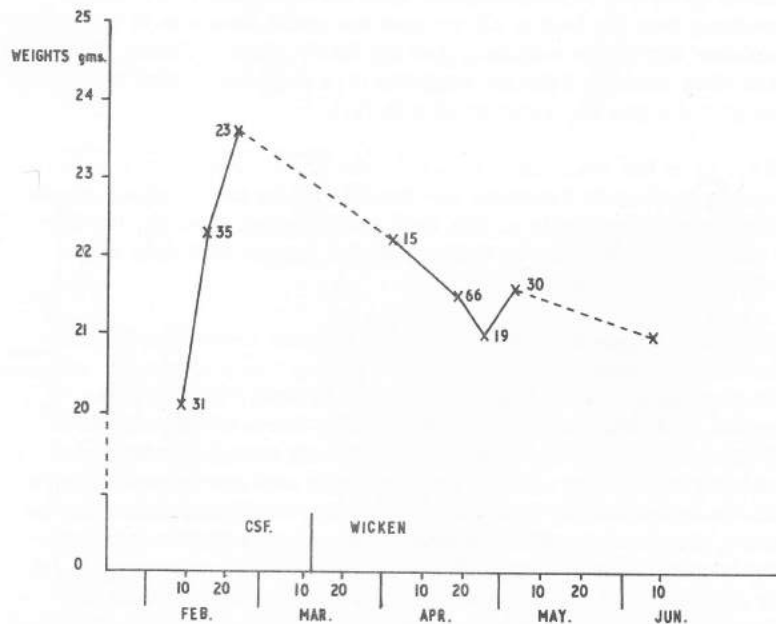


FIGURE 2. Mean weights of Tree Sparrows on certain days, the early ones from the Cambridge Sewage Farm, during a period of thaw, following heavy snow. Later weights refer to birds caught at Wicken Fen.

DIURNAL WEIGHT VARIATIONS

It was only possible to study this for the Tree Sparrow, when a total sample of sixty birds were handled between 11.00 and 21.00 on 19 and 20 April. The two hour mean weights of these individuals are plotted in figure 3. This shows a steadily increasing mean weight change of 1.5 grams over 10 hours, which would give a diurnal variation of about 2 grams extrapolating back to just after dawn.

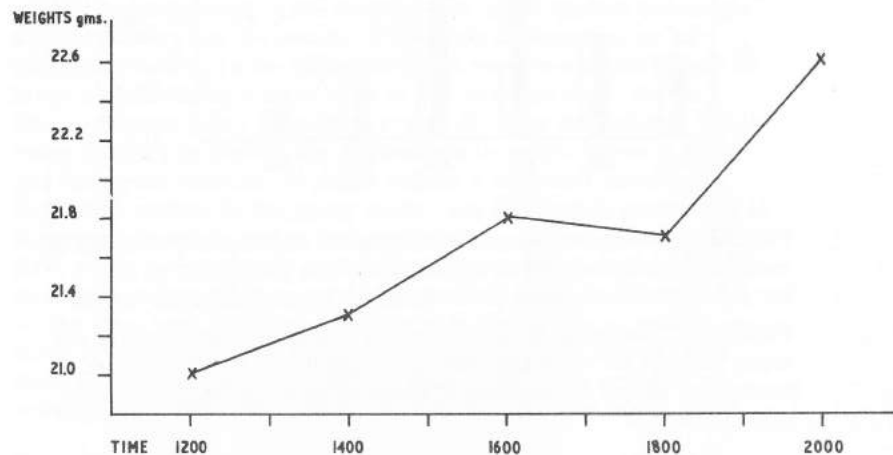


FIGURE 3. Mean weights of Tree Sparrows by two hour periods. These data were collected on April 19th and 20th.

WEIGHT DIFFERENCES BETWEEN SEXES

Figure 4 shows the seasonal weight variation of male and female Bullfinches, with the number of each sex caught in each month. Figure 5 shows the same data divided both by age and sex. Although birds in all four categories have similar weights in March and April, large differences appear in May, June and July, females becoming markedly heavier than males, with adult females heavier than first year females.

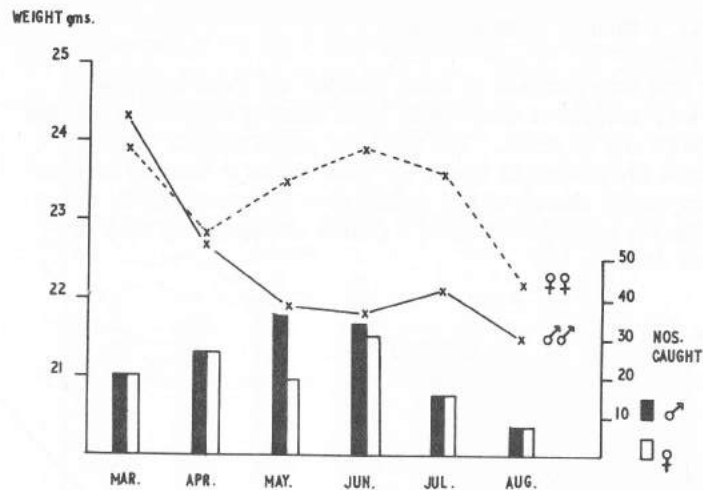


FIGURE 4. Seasonal weight variations of Bullfinches, showing the mean weights for each sex by months. The histogram at the bottom shows the number of birds of each sex caught per month.

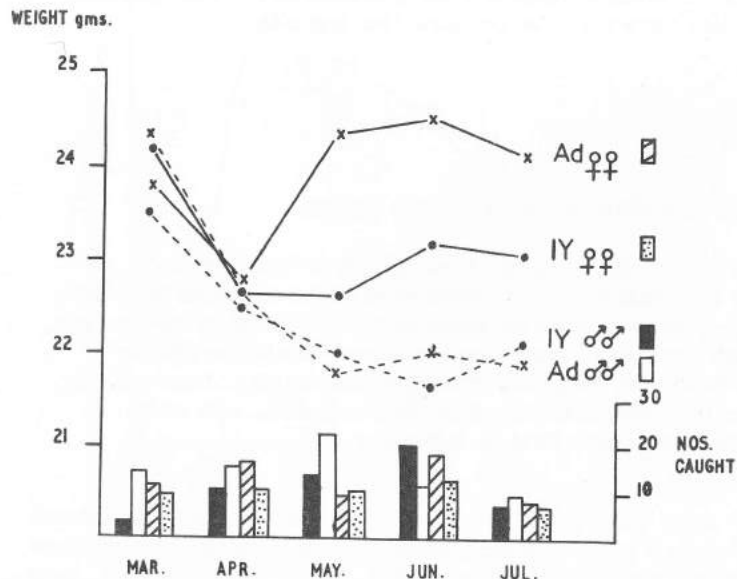
FIGURE 5. Seasonal weight variation of Bullfinches, showing the mean weights for each age and sex by months. The histogram at the bottom shows the number of birds of each age and sex caught per month.

The explanation of these differences may lie in the behavioural differences between the two sexes during the breeding season. The Handbook states "Breeding: Exceptionally latter half April, but generally in May, and second brood a month later. Incubation - chiefly by hen, but cock plays small part and feeds hen on nest. Period - 12/14 days. Fledging - Both sexes feed young by regurgitation: Cock alone provides food at first, administered by hen."

This division of labour would involve the male in a much higher energy expenditure than the female, and might explain the weight difference between the sexes. A possible alternative, or an additional factor, is the presence of fat reserves in the female to allow rapid development of eggs at the required time, or the female may be heavy through carrying the eggs themselves. It is more difficult to explain the differences in weight between adult and first year females, it might reflect a less well developed endocrine system in the young birds. An alternative possibility is that young females tend to mate with inexperienced males, either first year, or previously unmated adult males. Pair data showed that adult males did form partnerships with first year females. As the first year females were shown to be capable of putting on large fat reserves from the mean weight values of March, they must at least be capable of putting on weight in the breeding season, but which of the above possibilities applies is not clear.

Two other points reflected the outline given in the Handbook. First while almost all females had brood patches in the summer, only 4 males (2 adults, 2 first year) were reported as having them. Secondly the relative numbers of males and females caught in each month were almost equal, except in May, when females would be expected to be incubating, and only about half as many females as males were caught. There was no evidence for a second brood, but this could have been spread out in time so that no clear cut pattern would emerge.

Figure 6 shows the monthly weights and numbers for Reed Bunting males and females during the breeding season. The female Reed Bunting is much lighter than the male, and both play an equal part in feeding the young. It is difficult to draw any conclusions from the small amount of data available.



WEIGHT gms.

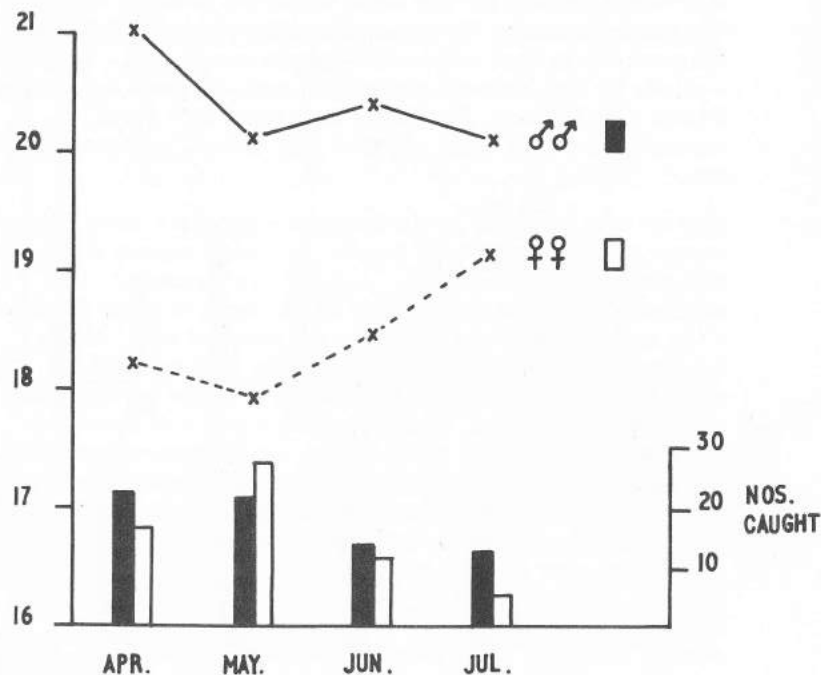


FIGURE 6. Seasonal weight variations of Reed Buntings, showing the mean weights for each sex by months. The histogram at the bottom shows the number of birds of each sex caught per month.

CONCLUSION

Few conclusions can be drawn from the data obtained in the course of only one year's work, but this analysis may indicate some of the fields of study which may prove fruitful in subsequent years and might stimulate the collection of further data to substantiate or invalidate some of the ideas put forward here.

BROOD PATCHES AS A GUIDE TO SEXING

It is necessary for an incubating bird to lose some of the feathers from its underside, to maintain the temperature of the eggs. The brood patch, as it is called, consists of a completely bald area on the belly, extending right up to the tracheal pit. Blood vessels are clearly visible on the whole surface. Other adult birds are frequently thinly feathered on the underneath, but a small amount of down is usually visible, and the blood vessels are not conspicuous. Juveniles are also unfeathered in this region but can usually be distinguished by conventional means. The brood patch appears to develop after the birds are paired, and shortly before laying commences. It seems that incubation is mainly by the female in many passerine species, though data are lacking; thus only females might be expected to have brood patches in many species.

This note aims to show the relationship between sex and the incidence of brood patches. In species which are not sexable on plumage characteristics, and for which this method might be useful, wing-length is used as an indication of the sex. The presence or absence of brood patches was recorded for most birds caught between May and July. Some birds were released without examination, but there is no reason to suspect that serious bias was introduced in this way. It is known that the accuracy of some of the recorders leaves a certain amount to be desired - some birds changed their classification within a few hours! In the opinion of the author, this does not happen if the bird is examined carefully, and the general trend is more important than a few erroneous observations may suggest.

Table I shows the distribution of brood patches amongst birds whose sex was known, as a control on subsequent suggestions. The comment on which sex is thought to incubate is taken from the Handbook. In all cases save the Blackcap, and possibly the Whitethroat, the percentage of males recorded as having brood patches is small. In general, this is in agreement with the Handbook. A possible exception is the Reed Bunting, in which very few males have brood patches, although it is suggested that they incubate.

Table I

Incidence of brood patches (between May and July) in certain species, with comments from the Handbook on the incubation. BP represents the number of individuals with brood patches and NBP those without.

Species	Males		Females		Handbook - incubation by:-
	BP	NBP	BP	NBP	
Swallow	0	8	4	1	Apparently mainly female
Great Tit	1	3	5	0	Apparently female only
Blackbird	2	52	32	4	Usually female alone
Blackcap	6	7	7	2	Both sexes
Whitethroat	1	2	4	2	Both sexes
Redpoll	0	16	15	5	Apparently female alone
Linnet	1	5	10	3	Chiefly female
Greenfinch	0	9	5	0	Female alone
Goldfinch	0	8	7	4	Female alone
Chaffinch	0	7	9	0	Usually female alone
Bullfinch	3	68	56	7	Chiefly female
Reed Bunting	3	30	30	4	Both sexes
Yellowhammer	0	1	4	1	Chiefly female

The general conclusion of this, is that in assuming that all birds having brood patches are females, there is only a limited chance of making an error, provided the male does not usually incubate in the species concerned. The converse is obviously not true due to the presence of non-breeding females, particularly early in the season. The result of this suggestion is compared with the wing lengths of birds with and without brood patches, in six species which were caught in moderate numbers, and which are not currently sexable by plumage characteristics.

In these species, the distribution of wing lengths of all birds together is bimodal, as the females tend to be smaller than the males. It is possible to estimate the wing lengths of the two sexes separately, by a simple and somewhat inaccurate graphical technique, and this has been done. Table II shows the estimated mean wing-lengths of the two sexes, as well as their standard deviations; alongside these are the separate values for birds with and without brood patches. The agreement between these sets of results is almost too good to be true. It is notable that birds with brood patches and females tend to be more similar than those without brood patches and males; this is probably caused by the inclusion of non-breeding females. The Handbook suggests that in all these species, except the Reed and Sedge Warblers, incubation is by the

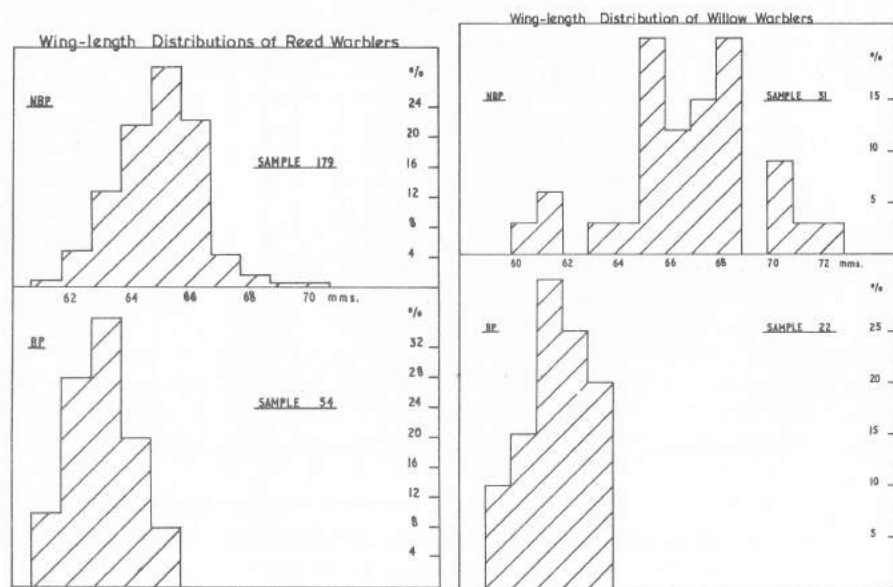
female. Incubation is said to be chiefly by the female in the Sedge Warbler, and by both sexes in the Reed Warbler. The data presented here seem to suggest a disagreement in the cases of these two species, and further investigation will be required.

Table II

Mean wing-lengths in mms. of birds with (BP) and without (NBP) brood patches compared with the estimated wing-lengths of males and females, and their standard deviations. Sample sizes are shown in brackets.

Species	No brood patch		Males (estimated)		Brood patch		Females (estimated)	
	(No.)	wing	wing	s. d.	(No.)	wing	wing	s. d.
Wren	(28)	49.7	50.2	1.21	(17)	46.9	47.0	1.57
Song Thrush	(39)	117.3	117.8	1.19	(24)	115.0	115.2	2.39
Duncock	(80)	69.1	69.6	1.25	(39)	67.4	67.6	2.12
Sedge Warbler	(181)	63.8	64.2	1.41	(97)	62.0	62.0	1.46
Reed Warbler	(179)	64.7	64.7	1.38	(54)	62.9	62.9	1.09
Willow Warbler	(31)	66.3	66.7	1.97	(22)	61.3	61.3	1.36

Figures I and II show graphic representations of the differences discussed for the Reed Warbler and the Willow Warbler, these having respectively the smallest and the largest difference of wing-lengths between the sexes. In both cases the few birds with small wings and no brood patches are evident; these are thought to be non-breeding females as suggested previously.



It may be concluded that in certain species there is a fair (but as yet unknown) degree of certainty that birds with brood patches are females. Complete confidence cannot however be placed in this method until a collection of birds of known sex can be examined; birds caught in pairs during the breeding season could provide this data. It may be that in some species a proportion of males do develop brood patches, and it should ultimately be possible and indeed highly desirable to estimate this proportion, in which case the error involved in the use of this method of sexing would be known. If, as seems probable, this error is small, then the method will still be of use at the population level, which is probably of more use, than the sexing of individuals.

This study has dealt with only six species, but it is probable that similar results would be obtained in other cases. As further data are obviously needed, the recording of the incidence of brood patches is strongly recommended for all species during the breeding season.

TONGUE SPOTS AND THE AGE OF BIRDS

In many species, the nestling birds have brightly coloured mouths and very often marks in the form of spots in certain places on the tongue. The tongue spots do not last for ever, and thus their presence or otherwise is related to the age of the bird. In most species, the spots have become so inconspicuous by the subsequent summer, that they can only be seen with very careful looking. Tongue spots in young birds are on the other hand often extremely conspicuous. Experience of the appearance of the spots is easily acquired by looking at birds of known age. This is of particular importance in the acrocephalus warblers, in which the adults frequently have two grey spots on the spurs. The young birds on the other hand have very large black spots, which are oblong rather than round as in the older birds. It seems that in many species, these spots will provide useful ageing criteria in autumn, but further investigation is required. Set out below is a table of the spots exhibited by a selection of species, and brief comments on their possible use. Closely related to this matter is the actual colour of the mouth, which changes in the first six months or so of life in many birds. This technique, often used in the ageing of various Turdinae, may well have wider application, and deserves study.

<u>Species</u>	<u>Colour and location of spots,</u>	<u>Possible use as an ageing criterion,</u>
Skylark	2 at base, 1 at tip black.	?
Swift	1 at tip - brown	?
Dunnock	2 at base - brown	fades fast
Grasshopper Warbler	2 at base - black	very good
Reed Warbler	2 at base - black	very good
Sedge Warbler	2 at base - black	very good
Garden Warbler	2 at base - white	useful with care
Blackcap	2 at base - brown	fades fast

Whitethroat	2 at base - black	Sometimes helpful
Lesser Whitethroat	2 at base - black	?
Willow Warbler	2 at base - brown	could be useful sometimes
Chiffchaff	2 at base - brown	as above
Meadow Pipit	2 at base - yellow	?
Redpoll	2 on roof of mouth	probably fade too fast
Bullfinch	all over mouth - puce	plumage easier
Tree Sparrow	1 at tip - black	probably fades too fast

I hope that this note will serve to draw attention to another possible method of ageing birds which could have widespread uses. Further observations are needed to remove many question marks.

PIED WAGTAILS. A Roost at Milton, October 1969.

In October this year members of the group discovered Pied Wagtails roosting in glasshouses full of tomatoes at Milton. 185 birds were caught and ringed in four catches before the tomato plants were pulled out. An estimate by the Lincoln Index of the number present gave a figure of 263 birds. Five birds were controlled, which all proved to have been ringed at Burwell in Autumn 1967, three, in fact, on the same day. The numbers caught provided a good opportunity for rationalising ageing and sexing criteria and the following features proved the most useful. They are best used in the order presented below and will probably determine a high percentage of birds in October, but the extent to which these characteristics vary and body moult progresses through the winter are clearly not known.

AGE

Greater Coverts:

Adult	Uniform, black-centred with whitish fringe and tip.
1st Y	Most birds have some outer, unmoulted feathers; some 1st Y ff. do not moult these at all, some 1st Y mm.

may have moulted them all. The unmoulted feathers are brownish and have a comparatively small pale fringe.

Primaries:

Adult	Black or dark grey, no contrast with coverts.
1st Y	Dark brown, contrasting with any moulted greater coverts and lesser coverts.

Tertials:

Adult	New, all moulted.
1st Y	Outer tertial (secondary 7) unmoulted and brown in some birds.

Notes:- The white on the forehead and ear-coverts of 1st Y birds tends to be tinged dirty olive-lemon and comes further back on the head (level on the forehead with the eye) than in the adults. In adult birds the forehead is generally pure white (although some have pure lemon, particularly on the ear-coverts), is more clearly demarcated and the white stops well before the eye. It is probably possible to age some birds on the colour of the interior of the upper mandible as in Robin etc., - 1st Y birds yellowish-pink, adults dark - grey or black.

AGE/SEX

Mantle:

Ad m	Very dark grey-black. A mixture of dark-grey feathers with black centres and pure glossy black feathers, giving the impression of being completely black.
Ad f	Dark grey-black, but rarely any completely black feathers. Dark centres to most feathers give smudgy effect similar to 1st Y mm.
1st Y m	Dark olive-grey, with variable amounts of dark (not black)-centred feathers, occasionally some black feathers. These birds vary from being very heavily smudged to being uniform dark-olive with only a few dark-centred feathers.
1st Y f	Ground colour pale olive-grey, always paler than the palest 1st Y m. Only rarely some dark centres.

Crown/Nape:

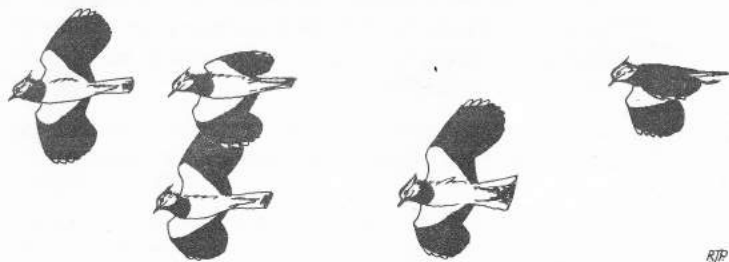
- Ad m Uniform black.
Ad f Uniform black. A few feathers have grey tips in some birds.
1st Y m Mostly black. Most nape feathers have mantle-colour tips, giving singed effect.
1st Y f As mantle, but some dark centres to crown feathers.

Notes:- The rump does not seem to be a helpful feature; most birds have grey rumps, getting blacker towards the tail. As one would expect, 1st Y ff. have the palest rumps, and those of Ad mm. are black quite high on the rump, with little or no grey. Ad ff. and 1st Y mm. have blotchy rumps due to black or dark-centred feathers amongst the grey. The clarity of the demarcation between the mantle and the nape seems very variable - it is clearer in 1st Y mm. and Ad ff. than in Ad mm. and 1st Y ff.

MEASUREMENTS

These may be useful when used in conjunction with the above features.

15 Ad mm.	(86) 89 - 93	median 90
14 Ad ff.	85 - 92	median 89
73 1st Y mm.	83 - 92	median 88
85 1st Y ff.	79 - 89 (93)	median 84



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