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THE LONDON NATURALIST

**the journal of the
LONDON NATURAL HISTORY SOCIETY**

Published: May 1972

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**THE
LONDON
NATURALIST**

the journal of the
LONDON NATURAL HISTORY SOCIETY

No. 50
for the year 1970

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Erratum for *Lond. Nat.* 49:3.

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Contents

| | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|
| Officers for 1971 | ... | ... | ... | ... | ... | ... | ... | 2 |
| The Presidents of the London Natural History Society | ... | ... | ... | ... | ... | ... | ... | 3 |
| Report of the Society for 1970 | ... | ... | ... | ... | ... | ... | ... | 5 |
| The past and present bird life of the Brent Reservoir and its vicinity—L. A. BATTEN | ... | ... | ... | ... | ... | ... | ... | 8 |
| London fishes to 1971—DAVID MARLBOROUGH | ... | ... | ... | ... | ... | ... | ... | 63 |
| The dragonflies of Richmond Park—A. K. S. BUSH | ... | ... | ... | ... | ... | ... | ... | 79 |
| Hemiptera-Heteroptera of the London area: part VII—ERIC W. GROVES | ... | ... | ... | ... | ... | ... | ... | 87 |
| A note on the plant mapping scheme—A. G. SIDE | ... | ... | ... | ... | ... | ... | ... | 95 |
| Survey of Bookham Common: twenty-ninth year Progress report for 1970 | ... | ... | ... | ... | ... | ... | ... | 98 |
| Conservation report 1970—DAPHNE C. HERSEY | ... | ... | ... | ... | ... | ... | ... | 109 |
| Botanical records for 1970—J. EDWARD LOUSLEY | ... | ... | ... | ... | ... | ... | ... | 113 |
| Mammals in the London area, 1970—M. TOWNS | ... | ... | ... | ... | ... | ... | ... | 116 |
| Obituary: Miss I. Darlington, M.A., F.L.A., F.S.A. | ... | ... | ... | ... | ... | ... | ... | 118 |
| Statement of affairs at 31st October 1970 | ... | ... | ... | ... | ... | ... | ... | 120 |
| General account and publications account | ... | ... | ... | ... | ... | ... | ... | 122 |

Report of the Society for 1970

Since the last Report, our membership has once more shown an overall drop in all classes. Losses by death or resignation have exceeded new enrolments by 54, the resulting totals of paid-up members as at 31 October 1970 being as follows:

| | |
|--------------------|-------|
| Ordinary members | 940 |
| Affiliated members | 23 |
| Family members | 76 |
| Junior members | 73 |
| Honorary members | 17 |
| Life members | 19 |
| | <hr/> |
| | 1,148 |
| | <hr/> |

With deep regret we have to report the death of the following members: Miss I. Darlington, James Fisher, J. B. Foster, A. Gilbert, Mrs D. Kendrick, Miss K. Marks, Miss R. Skinner and L. Tearman.

The estate of the late M. T. Hindson is still in the hands of the executors and no payments have been made beyond the amount of £14,000 reported last year. At the moment of writing, we do not know what the final total will amount to. We do, however, anticipate a further substantial sum and it is intended that the Bequest will be used to provide permanent headquarters for the Society. Once the total accruing from the Bequest is known, it will be Council's primary task to seek and secure suitable premises.

In the hope of attracting new members to the Society, a modest advertising campaign has been initiated and posters have been sent to public libraries in the London Boroughs for display. Thanks are due to Miss J. M. Stoddart and L. Baker for their work on this campaign.

A new category of membership, that of Senior Member, was created by a change of rule 14 adopted by a Special General Meeting held on 10 September 1970. This entitles members over the age of 65 who have belonged to the Society for 10 years or more to enjoy the benefits of membership at a concessionary rate upon application to the Treasurer. The new rule comes into effect on 1 January 1971 and Council has decided that, for the time being, the rate of subscription for Senior Members shall be £1.25 per annum. It is hoped that few of our long-standing members in future will find themselves obliged to resign from the Society when they reach retirement age.

To mark European Conservation Year 1970, a special programme of activities was sponsored by the Society. A full report will be published in due course, but we would wish here to express our gratitude to Mrs L. M. P. Small, who undertook the organisation

of the events with her customary vigour and enthusiasm, and to congratulate her on a most successful and worthwhile undertaking.

All the Sections report successful programmes of indoor and field meetings, but on the whole there seems to have been a slight drop in average attendances at formal meetings. Informal meetings always provide an excellent opportunity for members to meet one another and are much enjoyed by those attending, but here too the numbers have dropped. Part of every Section's programme this year has formed a contribution, great or small, to the events for E.C.Y. 1970 mentioned above and these contributions will be dealt with in the special report.

The Botany Section has completed six years of plant mapping, but the Committee is disappointed that so much remains to be done. A map has been prepared to show where the gaps are and it is hoped that members will strive to fill these next year. A Spring Bank Holiday week-end based on Rye, Sussex, was happy and successful and it was a particular pleasure to meet members of the Rye Natural History Society.

The Ecology Section's soil survey at Bookham Common ran into serious administrative difficulties during the year to the point where the Society found itself unable to comply with the terms under which the grant claimed from the Carnegie Trustees had been made. The amount already received was refunded to the Trustees and we asked to be released from our commitments under the terms of the grant. However, we are pleased to report that the survey is to continue in a modified form, so that the considerable amount of work already put into it will not be lost. In addition, a number of special research projects have been initiated. The regular team will welcome beginners and introduce them to the techniques employed, but a particular appeal is made to experienced naturalists to assist in the field work.

The ladybird survey, organised by D. G. Hall for the Entomology Section, has continued into its third year, concentrating on the two commonest species, the two-spot and the seven-spot ladybirds.

The research efforts of the ornithologists have been concentrated on continuing the Atlas project. A map showing progress in the first two years was distributed in the March Bulletin and a special drive is needed in the remaining two years to cover blank or poorly recorded tetrads.

To summarise the preceding few paragraphs: participation by members is vital to the success of every scheme or project organised by the Sectional Committees. Support these schemes and send records of your observations to the appropriate Recorders. By so doing, you will make your natural history something more than just a pleasant walk in the country from time to time.

Access to the Library has been restricted since July, when a quite serious fire damaged the Ealing Reference Library, closing it to the public and curtailing the hours when the Ealing Library staff could be on duty to deal with members' queries. The Library should be reopened shortly. None of the Society's property was damaged in the fire.

Ealing Library staff worked hard on our behalf this year and thanks are due to them.

We have recorded above our thanks to members and others for special services provided during the year. We are no less conscious of the year's work entailed in arranging an attractive programme of meetings, producing various publications and organising research projects, as well as merely running the Society. To all those officers, members and friends who have cheerfully undertaken these tasks, we express our thanks.

The Past and Present Bird Life of the Brent Reservoir and its Vicinity

by L. A. BATTEN

(Populations Section, British Trust for Ornithology)

Contents

| | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|----|
| Introduction | ... | ... | ... | ... | ... | ... | ... | 8 |
| History of the Area | ... | ... | ... | ... | ... | ... | ... | 9 |
| The Study Area in 1970 | ... | ... | ... | ... | ... | ... | ... | 13 |
| Changes in Breeding Birds since 1833 | ... | ... | ... | ... | ... | ... | ... | 13 |
| The Present Breeding Population | ... | ... | ... | ... | ... | ... | ... | 21 |
| Suburban Gardens | ... | ... | ... | ... | ... | ... | ... | 21 |
| The Allotments | ... | ... | ... | ... | ... | ... | ... | 24 |
| Barn Hill and the Farm | ... | ... | ... | ... | ... | ... | ... | 25 |
| The Scrub and Woodland | ... | ... | ... | ... | ... | ... | ... | 27 |
| The Willow Swamp and <i>Phalaris</i> Marsh | ... | ... | ... | ... | ... | ... | ... | 29 |
| Other Areas | ... | ... | ... | ... | ... | ... | ... | 31 |
| Factors Influencing Nesting Success | ... | ... | ... | ... | ... | ... | ... | 32 |
| Causes of Mortality after leaving the Nest | ... | ... | ... | ... | ... | ... | ... | 32 |
| Roosts | ... | ... | ... | ... | ... | ... | ... | 33 |
| Migration | ... | ... | ... | ... | ... | ... | ... | 35 |
| The Winter Population and Cold Weather Movements | ... | ... | ... | ... | ... | ... | ... | 37 |
| Systematic List of Species | ... | ... | ... | ... | ... | ... | ... | 39 |
| Summary | ... | ... | ... | ... | ... | ... | ... | 60 |
| Acknowledgments | ... | ... | ... | ... | ... | ... | ... | 61 |
| References | ... | ... | ... | ... | ... | ... | ... | 61 |

Introduction

This paper presents the results of an enquiry into the changing bird life of an area of north-west London which has been subjected to a considerable amount of urbanisation. The study area (Fig. 1) is located approximately six to seven miles north-west of Marble Arch, and is bounded on the south side by the North Circular Road, and on the east by the Watford Way and Hendon Way. Kingsbury Road forms the northern limit joining with the Watford Way via Rushgrove Avenue and Colin Deep Lane. Finally the western perimeter follows Neasden Lane, Forty Lane and then along the Bakerloo electric railway to Kingsbury. Dollis Hill was omitted from this study because it has already been covered comprehensively by Simms (1962, 1965).



FIG. 1. The study area in 1970 showing the distribution of the main habitat types.

In all, the study area covers 817 hectares (2,018 acres), the highest point being Barn Hill at 282 feet from where the land slopes away to 100 feet on the banks of the Brent Reservoir and again rises to just over 200 feet in the north-eastern corner of the area. The ground in the centre also rises to 200 feet so that the whole area takes on the form of a shallow bowl raised at the centre.

History of the Area

The Brent Reservoir came into existence at the completion of a dam across a small part of the Brent valley in 1833. The completion of that task marks the beginning of the study period of this paper. The Reservoir itself was not finished until 24 November 1835. Later a small extension was added, the whole construction being finally completed on 15 December 1837 (Macpherson, 1928).

It is fortunate that this stretch of water and the surrounding districts of Kingsbury, Hendon and Barn Hill have received the attention of generations of naturalists since the moment the reservoir was formed. Frederick Bond, one of the founders of the *Zoologist* was living in Kingsbury at the time and is primarily remembered for the number of rare birds which he obtained at the Reservoir in the early years of its existence. Birds such as *squacco heron, night heron, little bittern, pomarine skua and Temmink's stint figure amongst his frequent records to the *Zoologist* at that time.

*Scientific names of birds are given after each species in the systematic list.

The variety of bird life which frequented the Reservoir in the early years is astonishing, but then it was, for the first ten years of its existence, in many different conditions. The first four years saw it as an expanding shallow stretch of water flooding wet meadow land. After a few years as a completed Reservoir a particularly stormy period in January 1841 resulted in all the fields between Neasden and Stonebridge being flooded from excess water from the Reservoir. For a whole week water poured over the floodgate with a mighty roar, which a chronicler of the time has recorded as rendering the chimes of Old Kingsbury Church almost inaudible. The rain continued and on the stormy night of 16 January 1841, the dam finally burst. The waters swept on unimpeded and many people and much live-stock were drowned. Once again the water level in the Reservoir was low and until the dam was repaired it would have been in a superb state to attract marshland species of birds.

It was Bond's influence which stimulated J. E. Harting to compile his book *Birds of Middlesex*, published in 1866. As much of the information in that book refers to north-west Middlesex especially around the Brent or rather Kingsbury Reservoir as it was then known, it was the main source of information on the bird life of those times, when it was a rural beauty spot.

Bond died in 1888 and part of his obituary written by Harting contains a graphic description of the area in its heyday (Harting 1889). To quote: "Kingsbury reservoir was our happy hunting ground in those days (twenty or five and twenty years ago) it was a paradise for an ornithologist. There was no railway viaduct at one end of it then as now, the extension of the midland line to Bedford had not been commenced. When we visited London we had to drive our own horses, or go by one of the two coaches which were then on the road, one of them going to and from St. Albans, the other to Stanmore and Elstree. It was no uncommon thing as we crossed the two bridges over the reservoir and the Hyde Water to see Wild Ducks there, and gulls and terns flying about at the period of the migration in spring and autumn. About the end of April and beginning of May and again in August to about the middle of September the number and variety of wading birds which visited this fine sheet of water were most remarkable. Plovers and Sandpipers, Snipe and Jack Snipe, were all there in their proper season, and there were always a few Herons about which came either from Osterley Park, Black Park, Uxbridge or Wanstead Park in Essex. The water was very little disturbed then by human visitors and we have many a time walked round it, about two miles, and followed the Brent towards Hendon or in the other direction towards Brentford without meeting anyone but farm labourers, or perhaps one or two anglers. Here in the early morning might be heard the note of the Ringed Plover as it ran along the shingle at the head of the reservoir, or the musical cry of the high flying Redshank which we marked down, to be stalked and

shot. On the muddy margins in the bed of the brook, especially at a bend devoid of trees, the Green Sandpiper might be found every spring and autumn, and more rarely the Wood Sandpiper and Temminck's Stint. We shot over four parishes, including a bare open tract lying between Kingsbury, Kenton and Edgware, known as Hungry Downs, where Golden Plover and Peewits came in winter and the Dotterel appeared in spring and autumn".

The rest of the area at that time was essentially mixed farmland with scattered copses, overlooked by the wooded height of Barn Hill. Apart from the construction of the railway in 1868 which crossed the eastern extension of the Reservoir, little change in land use occurred until the 1890s when rows of houses were built close to the northern end of the Reservoir.

Harting revised his book at about that time bringing the situation up-to-date. Unfortunately, although a prospectus of it appeared in Fisher Unwin's spring edition of forthcoming books for 1906, the manuscript was never actually published. Fortunately in addition to Harting, two other ornithologists made contributions to the knowledge of the avifauna of the area in the late nineteenth and early twentieth centuries. Robert H. Read, a London business man, published an account of the bird life of the lower Brent valley in 1896 incorporating a lot of information relevant to the study area. Kendall compiled a list of birds of Willesden and district in 1907. This was never published but copies were deposited in Willesden Reference Library and it is easily available.

By 1913 urbanisation of the area had got under way and by then 10 per cent. of the land surface had been built on, mainly towards the north and east of the Reservoir. Further development took place in the 1920s when the North Circular Road was constructed, and by 1930 30 per cent. of the area was under development. The gradual increase in urbanisation is illustrated in Fig. 2 which shows the area at intervals since 1830. It is just at this time, when the study area was undergoing a series of major transformations into a suburb of London that knowledge of the bird life of the area is sparse. Even Glegg's book *The Birds of Middlesex*, published in 1935, is of limited use as it is lacking in local information.

Since Glegg's book the availability of information improved gradually by means of the *London Bird Report* and the book *Birds of the London Area* first published in 1957 by the London Natural History Society. By the 1960s a considerable amount of attention was centred around the Reservoir once again. In these later years apart from regular observations, organised census work, breeding biology, ringing studies and bird atlas work have been carried out, and for the first time quantitative ideas of the avifauna have been obtained. Major alterations to the area are now taking place in the form of new high density housing estates, replacing luxurious houses with large wooded gardens. Further changes are envisaged for the future and

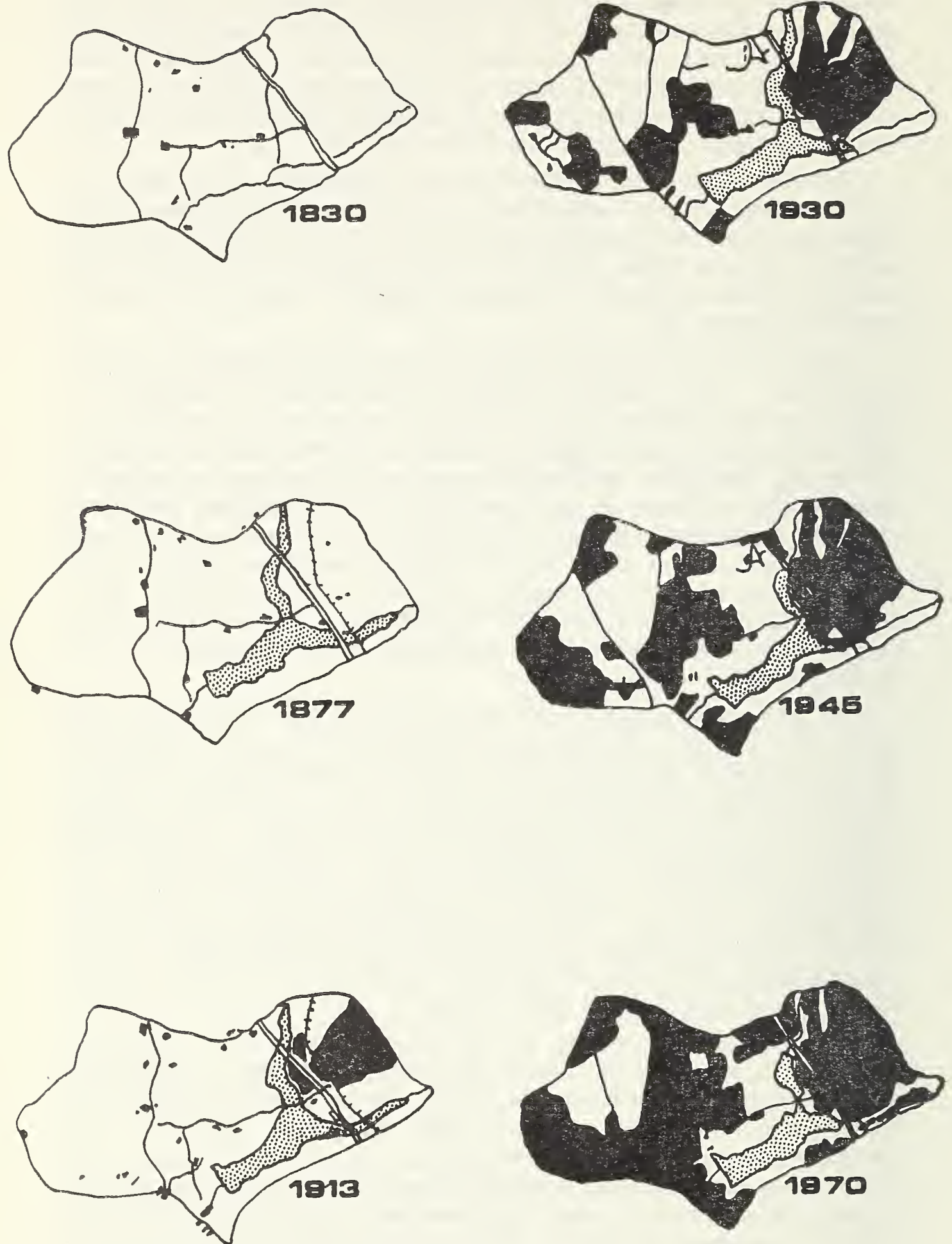


FIG. 2. The study area at intervals from 1830 to 1970.

at this stage it is difficult to feel optimistic about the effects these will ultimately have on the bird life, but at least these effects are likely to be well documented.

The Study Area in 1970

At present the study area consists of nine main sub-habitats; out of the 817 hectares (2018 acres), houses and factories account for 530.4 hectares (1288 acres), the farm at Barn Hill 97.1 hectares (240 acres), open water about 50.6 hectares (125 acres), playing fields 52.2 hectares (129 acres), woodland and scrub 36.4 hectares (90 acres), allotments 17.8 hectares (44 acres), reed swamp and shallow water 13.3 hectares (33 acres), parkland 11.7 hectares (29 acres), and finally rubbish dump 7.2 hectares (18 acres). As a result of Man's influence there is surprisingly more diversity of the environment than there was between 1833-1877 when the main sub-habitats consisted of farmland, homesteads, stony downland, wood and scrub, open water and reed swamp. These will be dealt with in more detail later under their respective headings.

Changes in Breeding Birds since 1833

In any area of land one must expect changes in the composition of breeding species over a long period of time such as 137 years. Some of these changes will be due to extrinsic factors such as variation in climate, or possibly long term and general population changes in the birds themselves. Other intrinsic differences will be caused by modifications to the area itself. It is often difficult to be sure which of these factors may be responsible for changes in status of certain species particularly as there is a possibility that suburban habitats may be second rate habitats for certain species and are only occupied in years of high population level. Long term population changes which might occur nationally or internationally and go unnoticed elsewhere could be accentuated in this sort of area.

The study area underwent urbanisation during the period under consideration, and this, with its effects of loss of breeding habitat and increased disturbance, is one of the most drastic transformations which can occur to any piece of land, rendering the locality unsuitable for certain species with specialised requirements. Nevertheless, the apparent relationship between increased urbanisation and the loss or gain of particular species needs to be treated with reservation in this area in the light of possible extrinsic factors which could be operating.

Table 1 summarises the status of birds at intervals which have bred at least once since about 1833.

It is clear from an examination of the ninety-two species in Table 1 that the number of species present in the breeding season has decreased as the area has become increasingly urbanised. Fig. 3 illustrates this graphically. Although the total number of species

| Species | 1833-60 | 1861-66 | 1867-96 | 1897-1909 | 1910-35 | 1936-45 | 1946-55 | 1956-60 | 1961-65 | 1966-70 |
|---------------------------|---------|---------|---------|-----------|---------|---------|---------|---------|---------|---------|
| Wryneck | B | B | B | B | B | — | — | — | — | — |
| Green woodpecker | B | B | — | b | B | B | B | B | — | — |
| Great spotted woodpecker | B | — | — | b | B | B | B | B | b | p |
| Lesser spotted woodpecker | B | B | B | B | B | — | — | — | — | — |
| Woodlark | B | — | B | — | B | — | — | — | — | — |
| Skylark | B | B | B | B | B | B | B | B | B | B |
| Swallow | B | B | B | B | B | P | P | P | P | P |
| House Martin | B | B | B | B | B | B | B | B | B | B |
| Tree pipit | B | B | B | B | B | B | b | — | — | — |
| Meadow pipit | B | B | B | B | B | — | — | — | — | — |
| Yellow wagtail | B | B | B | B | B | B | B | B | B | B |
| Grey wagtail | — | — | — | — | b | — | — | b | b | b |
| Pied wagtail | B | B | B | B | B | B | B | B | B | B |
| Red-backed shrike | B | B | B | B | B | b | b | — | — | — |
| Wren | B | B | B | B | B | B | B | B | B | B |
| Dunnock | B | B | B | B | B | B | B | B | B | B |
| Grasshopper warbler | B | B | B | B | B | b | b | b | b | b |
| Sedge warbler | B | B | B | B | B | B | B | B | B | B |
| Reed warbler | B | B | B | — | B | b | B | B | B | B |
| Blackcap | B | B | B | B | B | B | B | B | B | B |
| Garden warbler | B | B | B | B | B | B | b | b | b | b |
| Whitethroat | B | B | B | B | B | B | B | B | B | B |
| Lesser whitethroat | B | B | B | B | B | B | B | B | B | B |
| Willow warbler | B | B | B | B | B | B | B | B | B | B |
| Chiffchaff | B | B | B | B | B | B | b | — | — | b |
| Wood warbler | B | B | B | B | — | — | — | — | — | — |
| Goldcrest | B | B | B | B | — | — | — | — | — | p |
| Spotted flycatcher | B | B | B | B | B | B | B | B | B | B |
| Whinchat | B | B | B | B | B | B | — | b | — | — |
| Stonechat | B | B | B | B | B | B | — | — | — | — |
| Wheatear | B | B | — | — | — | b | — | — | — | — |
| Redstart | B | B | B | B | — | — | — | — | — | — |
| Robin | B | B | B | B | B | B | B | B | B | B |
| Nightingale | B | B | B | B | — | — | — | — | — | — |

| Species | 1833-60 | 1861-66 | 1867-96 | 1897-1909 | 1910-35 | 1936-45 | 1946-55 | 1956-60 | 1961-65 | 1966-70 |
|-----------------------|---------|---------|---------|-----------|---------|---------|---------|---------|---------|---------|
| Blackbird | B | B | B | B | B | B | B | B | B | B |
| Song thrush | B | B | B | B | B | B | B | B | B | B |
| Mistle thrush | B | B | B | B | B | B | B | B | B | B |
| Long-tailed tit | B | B | B | B | b | — | — | — | — | — |
| Marsh tit/willow tit* | B | B | B | B | B | b | b | b | b | B |
| Coal tit | B | B | B | B | B | B | B | B | B | B |
| Blue tit | B | B | B | B | B | B | B | B | B | B |
| Great tit | B | B | B | B | B | B | B | B | B | B |
| Nuthatch | B | — | — | B | B | b | b | b | b | — |
| Treecreeper | B | B | B | B | B | b | b | — | — | — |
| Corn bunting | B | B | B | B | B | — | — | p | — | — |
| Yellowhammer | B | B | B | B | B | B | B | B | B | B |
| Cirl bunting | — | b | b | — | — | — | — | — | — | — |
| Reed bunting | B | B | B | B | B | B | B | B | B | B |
| Chaffinch | B | B | B | B | B | B | B | B | B | B |
| Greenfinch | B | B | B | B | B | B | B | B | B | B |
| Goldfinch | B | — | — | — | — | b | b | B | B | B |
| Linnet | B | B | B | B | B | B | B | B | B | B |
| Redpoll | — | — | — | — | — | — | — | — | — | b |
| Bullfinch | B | — | B | B | B | — | b | — | B | B |
| Hawfinch | B | B | B | B | — | — | — | — | — | — |
| House sparrow | B | B | B | B | B | B | B | B | B | B |
| Tree sparrow | — | — | B | B | B | B | B | B | B | B |
| Starling | B | B | B | B | B | B | B | B | B | B |
| Jay | B | B | — | B | B | B | B | B | B | B |
| Magpie | — | — | B | B | — | — | — | — | — | — |
| Jackdaw | B | B | B | B | B | b | b | P | — | — |
| Rook | B | B | B | B | B | B | B | b | P | P |
| Carrion crow | B | B | B | B | B | B | B | B | B | B |
| Total B | 72 | 67 | 68 | 71 | 64 | 53 | 47 | 47 | 44 | 43 |
| Total B + b | 77 | 72 | 72 | 75 | 69 | 61 | 59 | 57 | 52 | 52 |
| Total B + b + P | 78 | 73 | 73 | 76 | 70 | 63 | 60 | 61 | 55 | 54 |
| Total B + b + P + p | 78 | 73 | 73 | 76 | 70 | 64 | 63 | 63 | 58 | 60 |

*Willow tit has been the only one present since 1957. Earlier records of Marsh tits may well refer to Willow tits.

regularly breeding has dropped from seventy-two to forty-three only thirty-seven of the species breeding before 1860 still do so. This means that six regular breeding species have been gained: little grebe, mute swan, tawny owl, magpie, swift and tree sparrow. In addition to this a further three species are now recorded as occasional breeders but were unknown at that season before 1860. These are great crested grebe, tufted duck and grey wagtail.

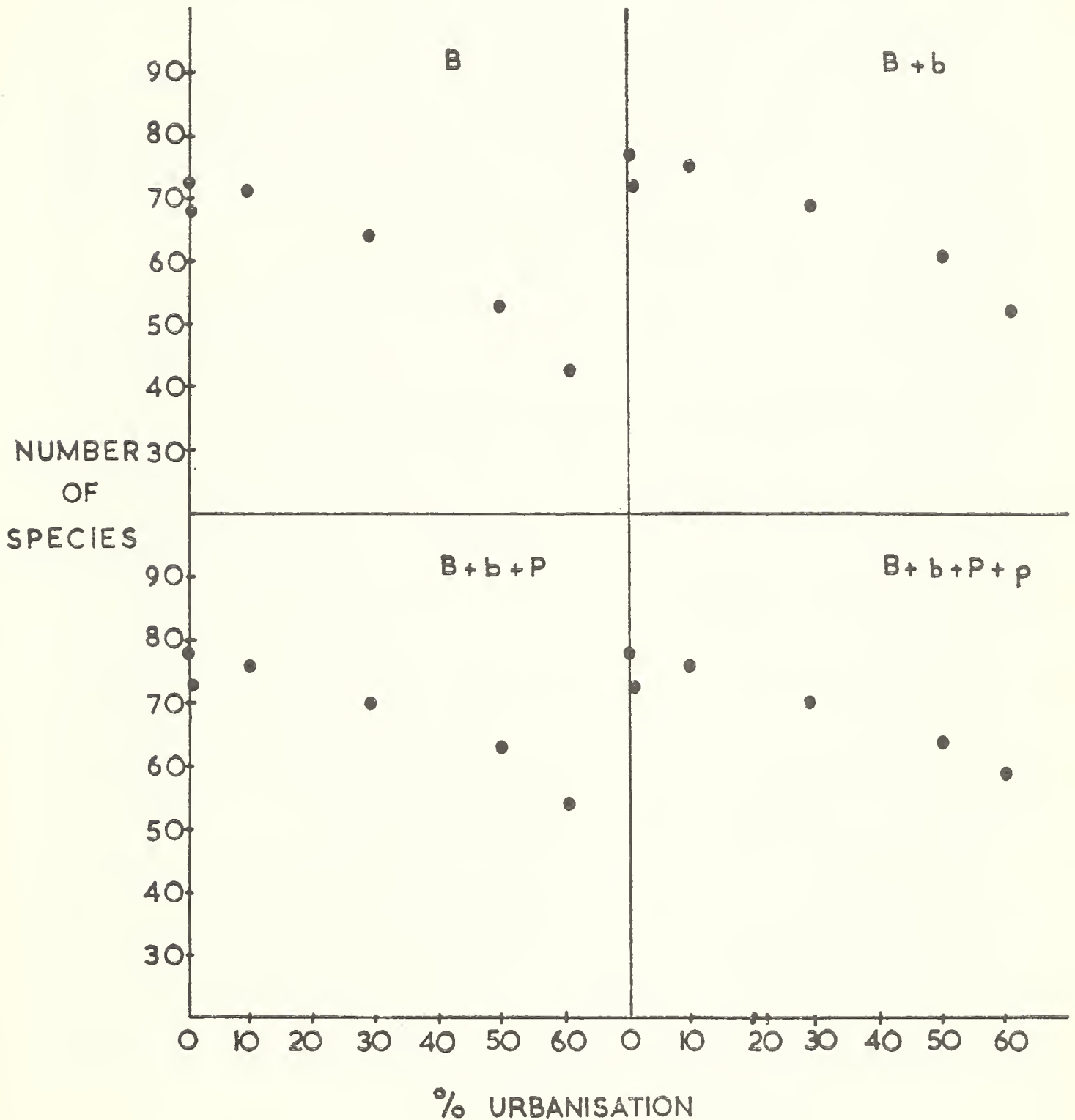


FIG. 3 The number of species resident in the summer in relation to the increase in urbanisation. (See Table 1 for definition of symbols.)

During the course of the study period several other species have appeared and disappeared, such as red-legged partridge, stock dove and little owl. Of the species which have been lost to the area at least for the time being, nearly 60 per cent. are considered to have declined nationally (Parslow 1967) and this probably at least contributed to their disappearance in the study area. This leaves turtle dove, all the three woodpeckers, swallow, meadow pipit, wood warbler, nightingale, long-tailed tit, nuthatch, treecreeper, hawfinch and jackdaw which are presumably victims of the changes inflicted on the study area. It is surprising that jackdaw, treecreeper and nuthatch figure in this list as these species appear to survive in some other parts of suburban London.

Of the species which have colonised the area, all except willow tit are considered to have increased nationally (Parslow 1967). The willow tit was not recognised as a British bird until the end of the nineteenth century and even though it was not recorded from the area until the 1950s it could have been present for many years and have been recorded as the marsh tit.

Detailed information on species present in each breeding season since 1957 is available (see Table 2) for that part of the area which is not urbanised and which surrounds the Reservoir. This does not therefore include Barn Hill or the open ground at the eastern end of the study area.

During the fourteen years covered there have been a number of changes both in species present and in land use. The most important was the conversion of some eight hectares of derelict allotments into playing fields, and the destruction of 7.5 hectares of wet grassland by a rubbish dump. This period however saw the rapid colonisation of the shallow muddy eastern end of the reservoir by a succession of plants which has now resulted in a willow swamp with *Phalaris arundinacea*, *Scirpus lacustris* and *Salix* sp. as the main vegetation types. Apart from some clearing of scrub by the local councils and the construction of a few small buildings no other noticeable changes have occurred.

Table 2 indicates that there have not been any trends in the numbers of species breeding, holding territory or observed in the area during the period covered. There is however considerable variation in the actual species involved, for example out of the fifty-two which bred at least in one of the years only twenty-five of these bred every year from 1957-1970 and out of the sixty-six species which were observed in at least one breeding season only thirty-seven were seen in all the years concerned.

Although one cannot be certain a species has been lost permanently, partridge, stock dove, green woodpecker, great spotted woodpecker, jackdaw and rook which were regularly resident during the

| Species | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|
| Wren | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 38 |
| Mistle thrush | | | B | O | O | | | | | | | | | | 43 |
| Song thrush | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 49 |
| Blackbird | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Whinchat | | | O | B | | | | | | | | | | | |
| Robin | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Grasshopper warbler | | | | T | | | | | | | | | | | |
| Reed warbler | | | B | B | B | B | O | B | B | B | B | B | B | B | |
| Sedge warbler | B | B | B | T | T | | | | | | | | | | |
| Blackcap | T | | | B | B | | | | | | | | | | |
| Garden warbler | B | B | | B | B | | | | | | | | | | |
| Whitethroat | B | B | | B | O | B | B | B | T | T | B | B | B | B | |
| Lesser whitethroat | B | B | | B | B | B | B | B | B | B | B | B | B | B | |
| Willow warbler | | | | B | B | | | | | | | | | | |
| Chiffchaff | | | | | | | | | | | | | | | |
| Goldcrest | | | | | | | | | | | | | | | |
| Spotted flycatcher | B | T | | B | O | B | B | T | T | T | B | B | B | O | |
| Duncock | B | B | | B | B | B | B | B | B | B | B | B | B | B | |
| Meadow pipit | B | B | | B | B | B | B | B | B | B | B | B | B | B | |
| Pied wagtail | B | B | | B | T | B | B | B | B | B | B | B | B | B | |
| Grey wagtail | | | | | | | | | | | | | | | |
| Yellow wagtail | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Starling | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Greenfinch | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Goldfinch | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Linnet | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Redpoll | | | | | | | | | | | | | | | |
| Bullfinch | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Chaffinch | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Yellowhammer | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Corn bunting | | | | O | O | | | | | | | | | | |
| Reed bunting | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| House sparrow | B | B | B | B | B | B | B | B | B | B | B | B | B | B | |
| Tree sparrow | T | B | | T | B | T | T | O | B | B | B | B | O | B | |
| Total B | 38 | 36 | 34 | 38 | 33 | 32 | 30 | 31 | 32 | 28 | 34 | 38 | 39 | 35 | |
| Total B + T | 43 | 39 | 37 | 44 | 37 | 39 | 33 | 35 | 36 | 36 | 37 | 41 | 43 | 42 | |
| Total B + T + O | 49 | 44 | 46 | 54 | 53 | 47 | 47 | 44 | 44 | 44 | 45 | 49 | 52 | 53 | |

summer in the late 1950s show no sign of being so again. On the other hand the magpie re-established itself during this period and there are also some indications that coal tit, garden warbler, chiffchaff and redpoll may become more regular.

The Present Breeding Population

Since 1968 bird census work has been carried out on the six most important habitat types in the area. The census method adopted was essentially the mapping technique employed in the Common Birds Census organised by the British Trust for Ornithology. Basically it consists of plotting the positions of all birds encountered, on 25 inch maps of the census plot during a number of visits to the area. These are then transferred to species maps and provide the basis for estimating the number of established territories present for each species. Further details of the technique which is similar to the mapping method proposed by Enemar (1959) can be found in Williamson (1964). The terminology and techniques of this method have now been standardised internationally. (The International Bird Census Committee 1969).

Suburban Gardens

A census plot of 19·4 hectares (49 acres) was established in an area of about thirty-year-old houses with fairly large gardens. The whole area is amply provided with a considerable variety of both indigenous and exotic species of shrubs and trees now at a suitable stage to provide nesting sites for thrushes and finches. The most frequent include Monterey cypress, willows, beech, mountain ash, cherry, lilac, laburnum, laurel, apple, pear, silver birch, oak, privet and elm. A good many of the elms are mature and were left standing when the estate was marked out on the wooded farmland. These now tower over the houses and add to the already diverse habitat. Grey squirrels are not uncommon in the gardens and hedgehogs and several species of mice and shrew are frequent. Although not actually seen in this study plot, foxes are being seen more frequently in gardens and streets and have started to raid dustbins.

The plot fell about midway between the extremes of poor quality crowded estates with small gardens which are found in the eastern end of the area and the luxurious large detached or semi-detached houses with huge, well-wooded gardens in the south-western section.

Only thirteen species were detected as breeding on this census plot and these, with the exception of the house sparrow, are shown in Table 3 together with the number of territories and density per square kilometre. The house sparrow is not amenable to this sort of census technique but was undoubtedly the commonest species.

Swifts were seen flying over the houses from time to time but did not appear to be breeding in the area. A much larger census plot may have added several more species, such as house martin and tawny owl or even kestrel, pied wagtail, magpie and bullfinch which frequent the more extensive gardens. In the 1950s great spotted woodpecker and little owl could also have been added to this list. Even so, this habitat is very poor in bird species although the total density of all species excluding house sparrow is nearly 600 'pairs' per square kilometre. If an accurate assessment of house sparrow could be made the combined result would certainly be comparable with densities recorded in the richest British broad-leaved woodland. A density of 641 territories per square kilometre was obtained in 1965 by D. Ferguson for an area of suburban gardens in Ealing. Almost all the same species were involved except that carrion crow was absent, but swifts were found to be breeding. The higher density was due mainly to the large number of starlings present, but these were estimated rather than counted. House sparrows were not included.

TABLE 3. Census of suburban gardens in 1970.

| Species | No. of "territories" | "Territories" per sq. km. |
|--------------|-------------------------|------------------------------|
| Blackbird | 57 | 287.2 |
| Starling | 13 | 65.5 |
| Robin | 11 | 55.4 |
| Song thrush | 10 | 50.4 |
| Dunnock | 8 | 40.3 |
| Blue tit | 4 | 20.2 |
| Great tit | 3 | 15.1 |
| Greenfinch | 3 | 15.1 |
| Woodpigeon | 3 | 15.1 |
| Wren | 3 | 15.1 |
| Chaffinch | 2 | 10.1 |
| Carrion crow | 1 | 5.0 |
| Total | 118 | 594.5 |

All the species listed in Table 3 are typically woodland birds and yet five of them exist at a higher breeding density than they do in their ancestral woodlands. The average relative woodland densities were calculated from data given by Batten (1969). Of the rest, the carrion crow has the same density, robin and dunnock were just under their woodland densities but blue tit and great tit were only half as common and chaffinch was just over one fifth as frequent. The dominance (percentage of total pairs) for all habitats is illustrated in Fig. 4.

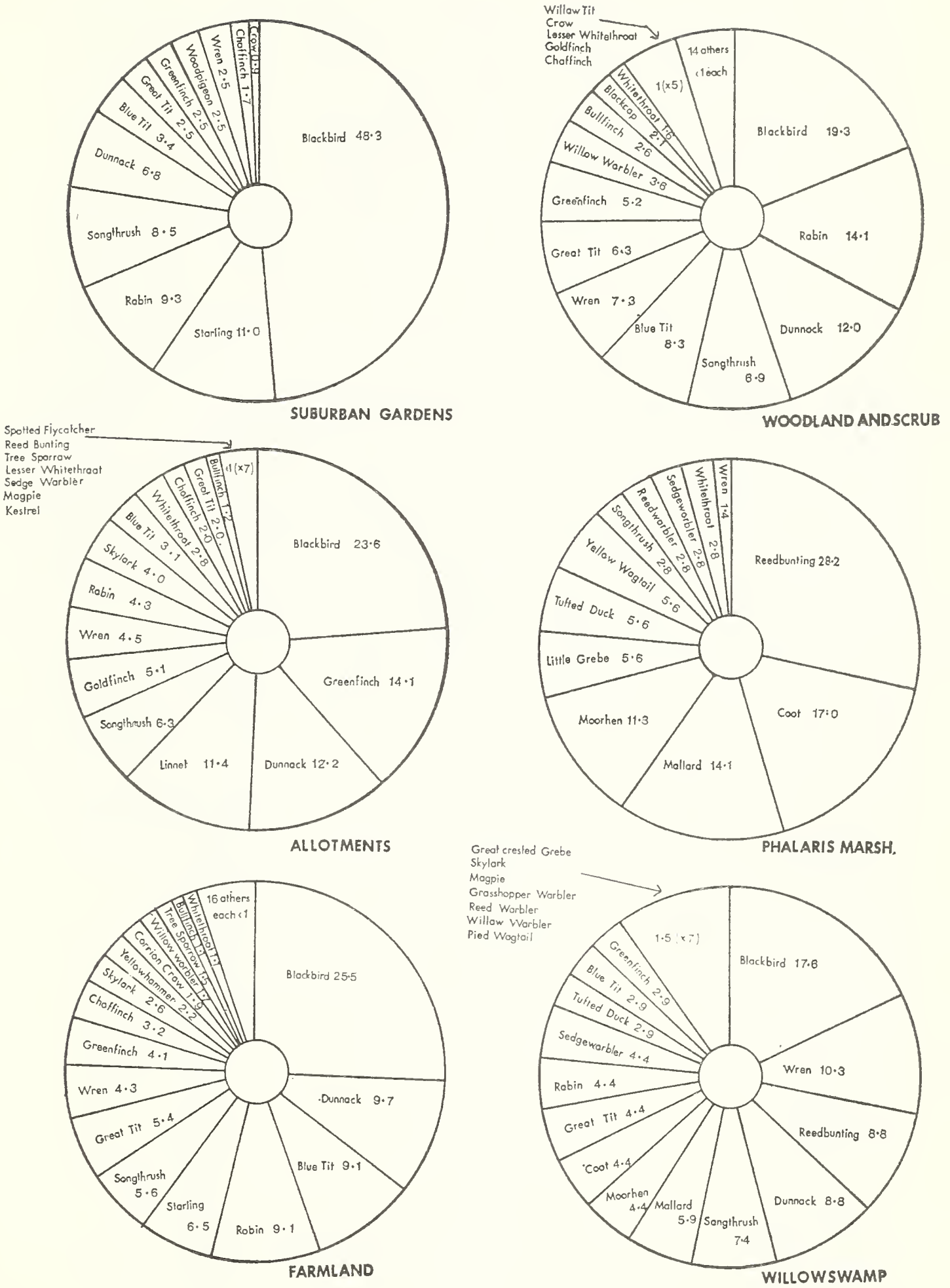


FIG. 4. Dominance (percentage of total pairs) for the habitats.

The Allotments

During and after the Second World War a considerable part of the study area was given over to allotments but these have been gradually reduced until at present there are only 17·8 hectares (44 acres) left. A census was carried out on 11·8 hectares (29·2 acres) in 1968 and 1969 by J. H. Wood and Table 4 gives the average number of 'pairs' of each species together with relative densities. The census plot is a mosaic of small holdings with a considerable variety of crops including potatoes, turnips, strawberries, runner beans, tomatoes and other vegetables. There are also a number of dense hawthorn thickets and a thick, predominantly hawthorn hedge, along one side and another bordering a track which almost bisects the area. The other sides are fenced but have a number of tall trees, such as elms and oaks, along the perimeter. There are also numerous small sheds which provide nesting sites for a variety of species such as house sparrow, robin and blackbird. Unfortunately, it was not possible to census house sparrows as these need a nest count and this was out of the question as the sheds were usually locked. This habitat was rich in bird life with a community structure resembling that of farmland and a total density of 1078·5 pairs per square kilometre (excluding house sparrow) involving twenty-one species. These allotments are the main stronghold of the linnet and goldfinch in the area. Skylarks are also at their highest density here.

Although not supporting as many birds as the scrubby plots, allotments are a valuable bird habitat and the conversion of the war time allotments into playing fields must have reduced the finch population of the area considerably, at least to the pre-war level.

TABLE 4. Average results for the 1968 and 1969 allotments census.

| Species | No. of "territories" | "Territories" per sq. km. |
|--------------------|-------------------------|------------------------------|
| Blackbird | 30·0 | 253·8 |
| Greenfinch | 18·0 | 152·3 |
| Dunnock | 15·5* | 131·1 |
| Linnet | 14·5 | 122·7 |
| Song thrush | 8·0 | 69·7 |
| Goldfinch | 6·5 | 55·0 |
| Wren | 5·8 | 48·6 |
| Robin | 5·5 | 46·5 |
| Skylark | 5·0 | 42·3 |
| Blue tit | 4·0 | 33·8 |
| Whitethroat | 3·5 | 29·6 |
| Chaffinch | 2·5 | 21·2 |
| Great tit | 2·5 | 21·2 |
| Bullfinch | 1·5 | 12·7 |
| Spotted flycatcher | 1·0 | 8·5 |
| Reed bunting | 1·0 | 8·5 |

TABLE 4.—*continued.*

| | | |
|--------------------|-------|--------|
| Tree sparrow | 0·5 | 4·2 |
| Lesser whitethroat | 0·5 | 4·2 |
| Sedge warbler | 0·5 | 4·2 |
| Magpie | 0·5 | 4·2 |
| Kestrel | 0·5 | 4·2 |
| Total | 127·3 | 1078·5 |

*Decimal fractions of a pair result if a territory was only half on the census plot, or if one pair was present in only one of the years.

Barn Hill and the Farm

Rising to 282 feet Barn Hill is the highest point in the study area. Harting described it, writing in 1866 as “a woody height overlooking the parishes of Kingsbury, Willesden and Harrow”. It is pleasing to relate that now over one hundred years later the same description is still applicable at least to the top of the Hill. Although the total area of open ground around Barn Hill is over 300 acres, the Hill itself is just about 50 acres in extent. A broad belt of mature oak, elm, hornbeam, ash and beech separates this area from the farm on two sides, the remaining sides border on to gardens. This mature belt of trees gives way either to open grassland or scattered hawthorn and blackthorn scrub with regenerating oak on the slopes of the Hill. This in turn gives way to more mature timber in the form of oak, elm, lime, horse chestnut and beech growing on the crown of the Hill around an almost barren pond of just over half an acre. Although much frequented by the public the dense scrubby areas on the Hill still provide habitats and nesting sites for a comparatively diverse and abundant avifauna.

Barn Hill or Big Bush Farm as it is more correctly known, covers an area of some 97 hectares, the second largest habitat type. It was until 1967 a dairy farm with moderately small fields and thick old mature hedgerows. In that year however the farm changed tenants and became primarily an arable farm but with a few fields kept aside for grazing and hay. The entire side east of the B4566 was planted with a monoculture of wheat in 1968. Before planting however, virtually all the existing hedgerows were removed although the mature timber consisting of oaks and elms was left. It is intended to keep the regenerating hedges to about four feet in height by mechanical trimmers.

The presence of these old trees on the farm and the fact that gardens and a thick woody border surround it on most sides, are important features enabling the farm to retain much of its bird life after the removal of most of the hedges. Unfortunately no census work was carried out here until 1968 so that no quantitative data

exists on the loss of bird life as a result of the changing agricultural policies at that time.

The rest of the farm is situated on the west of the B4566 and this has been left unchanged, with largely uncontrolled thick and varied ditched hedgerows with a good deal of mature timber mainly in the form of elm and oak growing up through the predominantly hawthorn hedges. Distributed over the farm are four ponds but although these are rich in invertebrate life and support a restricted marsh flora they are too small to be of much significance as far as the avifauna is concerned except to provide water and possibly food during drought conditions in late summer.

TABLE 5. Average results for the 1968-70 farmland census.

| Species | No. of "territories" | "Territories" per sq. km. |
|--------------------|-------------------------|------------------------------|
| Blackbird | 118 | 100.4 |
| Dunnock | 45 | 38.3 |
| Blue tit | 42 | 35.7 |
| Robin | 42 | 35.7 |
| Starling | 30 | 25.5 |
| Song thrush | 26 | 22.1 |
| Great tit | 25 | 21.3 |
| Wren | 20 | 17.0 |
| Greenfinch | 19 | 16.2 |
| Chaffinch | 15 | 12.8 |
| Skylark | 12 | 10.2 |
| Yellowhammer | 10 | 8.5 |
| Carrion crow | 9 | 7.7 |
| Willow warbler | 8 | 6.8 |
| Tree sparrow | 7 | 6.0 |
| Bullfinch | 5 | 4.3 |
| Whitethroat | 5 | 4.3 |
| Magpie | 3 | 2.6 |
| Mistle thrush | 3 | 2.6 |
| Linnet | 3 | 2.6 |
| Coal tit | 2 | 1.7 |
| Goldfinch | 2 | 1.7 |
| Spotted flycatcher | 2 | 1.7 |
| Lesser whitethroat | 2 | 1.7 |
| Blackcap | 2 | 1.7 |
| Mallard | 1 | 0.9 |
| Kestrel | 1 | 0.9 |
| Cuckoo | 1 | 0.9 |
| Jay | 1 | 0.9 |
| Chiffchaff | 1 | 0.9 |
| Tree pipit | 1 | 0.9 |
| Total | 463 | 394.5 |

The farm and the adjoining scrubland of Barn Hill have been censused as a unit, as many farms in the British Isles contain up to 15 per cent. scrub or copses. The thirty acres of scrub form about 10 per cent. of the total area the rest being taken up with open, rough or mown ground. Table 5 shows that the farm supports a considerable range of species which together average at just over 460 territories, which is about 394 per square kilometre. This compares favourably with rural farms which usually have between 100-400 pairs per square kilometre, so that the farm at Barn Hill ranks among the high density farms of the country. The total density was remarkably constant in the three years it was censused, being 459, 463 and 459 in 1968, 1969 and 1970 respectively. Surprisingly only about 6 per cent. of the territories detected were based mainly in the surrounding gardens, but there was evidence that some species such as blackbird and starling were using gardens as feeding areas, and possibly this is one reason why the blackbird density on this farm of 100 pairs per square kilometre ranks amongst the highest farmland densities in the country. There is no doubt that this unit of open land enables many more species to survive in the area than an equivalent sized area of houses and gardens. In fact, excluding house sparrows and woodpigeons which were not counted, thirty-two species of birds held territory in the three years the area was censused. These included all the suburban garden species and one tree pipit which is not found on any other part of the study area as a breeding species. The last pair of partridge lingered on here until 1968. One pair of reed buntings bred in 1970.

The technique employed in the census enables one to look at aspects of breeding biology such as habitat requirements and location of territories. It has already been mentioned that the side east of the main road which bisects the farm changed tenants and a monoculture of wheat was sown in 1968, alternating with barley in 1969 and back to wheat again in 1970. An average total of 155 territories were located here which again varied little from year to year ranging from 156 in 1968, 158 in 1969 and 152 in 1970. The annual total of certain species however showed somewhat greater fluctuations. This gave an overall density of 254 territories per square kilometre, still quite high for farmland and remarkable in view of the sparsity of the hedgerows.

The Scrub and Woodland

The most important area of woodland and scrub was at one time destined to be a cemetery. In 1965 Willesden and Wembley were amalgamated to form the London Borough of Brent. There was a large cemetery with plenty of room in Wembley and therefore this area was no longer needed. Before this event was foreseen all the necessary preparations had been completed, including the construction of a chapel, a shelter and work accommodation for the cemetery

staff. The rest of the plot consists of a wide belt of mature elm and oak bordering dense hawthorn, blackthorn and oak scrub up to 25 feet high. There are also patches of gorse, probably relict. A small wooded stream borders on one side. This and one other side is bordered by houses, the rest by roads and open fields. Also included in the census plot is a long disused playing field which has a wide belt of mature trees and scrub down one side. The field itself is rapidly becoming colonised by regenerating elm. The whole plot is 9.7 hectares (24 acres).

The area is very rich in wild life generally with moles, foxes, grey squirrels, weasels, short-tailed voles, pigmy shrews, hedgehogs and recently rabbits being present. There is also a good variety of Hymenoptera and Lepidoptera. It was here that the first Essex skippers for Middlesex were recorded and these have since been shown to be as common as the small skipper. The profusion of plant species includes the greater burnet which is not uncommon on this plot.

The variety and density of breeding birds is remarkable. Excluding woodpigeons, starlings and house sparrows there are on average nearly 2000 pairs per square kilometre, and this is the highest density yet recorded in any British woodland type whether native or exotic. The only area which approaches this figure is a plantation of Norway spruce inter-planted with beech in 1960 at Homefield Wood in the Chilterns near Marlow. Here the density is about 1800 pairs per square kilometre (Williamson 1970). A census of Perivale Wood Sanctuary by P. J. Edwards further down the Brent valley which consists of areas of mature oak and hazel with bramble understorey, alternating with hawthorn/blackthorn scrub, carried 1930 pairs per square kilometre in 1968.

Breeding season census work has been carried out in this scrubby area near the Reservoir every year since 1962. It was however only since 1968 that the mapping technique has been used and the average assessment for 1968-70 is shown in Table 6. In addition to the species listed in that table, cuckoo, pheasant, spotted flycatcher, mistle thrush, and redpoll held territory for one of the years only. Turtle dove, skylark, swallow, house martin, tree pipit and linnet were also seen but were not considered to be holding territory. A grasshopper warbler was present during the summer of 1960 and was proved to breed in 1964. Whinchats bred in 1960 and these were among the nearest to the centre of London. Green woodpecker, great spotted woodpecker and little owl have been lost within the last decade.

Why the density should be so high is obscure; however it is typical of suburbia to have high densities in wooded areas. It is known also that many birds use the surrounding gardens for feeding; furthermore the diversity of the habitat also provides a large variety of food. There are for example several acres of lawns which are ideal for thrushes.

Although no regularly breeding species is confined to this plot in the study area, if the present proposal for the area to be given over to housing is carried out, then the number of breeding birds is likely to decrease considerably in the vicinity of the Reservoir.

TABLE 6. Average results of the scrub and woodland census 1968-70.

| Species | No. of "territories" | "Territories" per sq. km. |
|--------------------|-------------------------|------------------------------|
| Blackbird | 37 | 380.7 |
| Robin | 27 | 277.8 |
| Dunnock | 23 | 236.7 |
| Song thrush | 17 | 174.9 |
| Blue tit | 16 | 164.6 |
| Wren | 14 | 144.1 |
| Great tit | 12 | 123.5 |
| Greenfinch | 10 | 102.9 |
| Willow warbler | 7 | 72.0 |
| Bullfinch | 5 | 51.5 |
| Blackcap | 4 | 41.2 |
| Whitethroat | 3 | 30.8 |
| Willow tit | 2 | 20.5 |
| Carrion crow | 2 | 20.6 |
| Lesser whitethroat | 2 | 20.6 |
| Goldfinch | 2 | 20.6 |
| Chaffinch | 2 | 20.6 |
| Mallard | 1 | 10.3 |
| Kestrel | 1 | 10.3 |
| Magpie | 1 | 10.3 |
| Jay | 1 | 10.3 |
| Coal tit | 1 | 10.3 |
| Garden warbler | 1 | 10.3 |
| Chiffchaff | 1 | 10.3 |
| Yellowhammer | 1 | 10.3 |
| Reed bunting | 1 | 10.3 |
| Total | 194 | 1996.5 |

The Willow Swamp and Phalaris Marsh

Most of the Reservoir is surrounded by a narrow reed bed. Unfortunately the predominant grass is *Phalaris arundinacea*, which is rather inferior to *Phragmites communis* as a bird habitat. The stems of *Phalaris* are normally too weak to provide an anchorage for nests. At the northern and eastern ends of the Reservoir the marshy ground is rather more extensive. The eastern site owes its origin to the dry summer of 1959 when vegetation secured a stronghold on the exposed silt banks formed by the River Brent over the last thirty to

forty years. The silt being extremely fertile supports a lush vegetation composed of *Phalaris* and *Salix* sp. Some willows are now almost thirty feet high. There are a number of sheltered pools and an expanding *Phragmites* reed bed of about one acre, as well as extensive patches of *Typha latifolia*. The census plot also consists of about twelve acres of shallow water with many tiny islands of willow bushes, the whole area being bisected by the River Brent. Nearly 11.7 hectares (29 acres) of this habitat were censused in 1970 and the results are shown in Table 7.

TABLE 7. Willow swamp census in 1970.

| Species | No. of "territories" | "Territories" per sq. km. |
|---------------------|-------------------------|------------------------------|
| Blackbird | 12 | 102.12 |
| Wren | 7 | 59.57 |
| Reed bunting | 6 | 51.06 |
| Dunnock | 6 | 51.06 |
| Song thrush | 5 | 42.55 |
| Mallard | 4 | 34.04 |
| Moorhen | 3 | 25.53 |
| Coot | 3 | 25.53 |
| Great tit | 3 | 25.53 |
| Robin | 3 | 25.53 |
| Sedge warbler | 3 | 25.53 |
| Tufted duck | 2 | 17.02 |
| Blue tit | 2 | 17.02 |
| Greenfinch | 2 | 17.02 |
| Great crested grebe | 1 | 8.51 |
| Skylark | 1 | 8.51 |
| Magpie | 1 | 8.51 |
| Grasshopper warbler | 1 | 8.51 |
| Reed warbler | 1 | 8.51 |
| Willow warbler | 1 | 8.51 |
| Pied wagtail | 1 | 8.51 |
| Total | 68 | 578.68 |

The *Phalaris* marsh is rather less exciting, consisting of a few willow and hawthorn bushes in a sea of *Phalaris*. A census was carried out on a plot of 2 hectares (5 acres) in 1968 and 1969 and the results are illustrated in Table 8. Although the total density is considerably higher than the reed swamp this figure may be misleading owing to the enormous edge effect in such a small census plot.

TABLE 8. Average results for the 1968 and 1969 *Phalaris* marsh census.

| Species | No. of "territories" | "Territories" per sq. km. |
|----------------|-------------------------|------------------------------|
| Reed bunting | 5.0 | 247.0 |
| Coot | 3.0 | 148.2 |
| Mallard | 2.5 | 123.5 |
| Moorhen | 2.0 | 98.8 |
| Little grebe | 1.0 | 49.4 |
| Tufted duck | 1.0 | 49.4 |
| Yellow wagtail | 1.0 | 49.4 |
| Song thrush | 0.5 | 24.7 |
| Reed warbler | 0.5 | 24.7 |
| Sedge warbler | 0.5 | 24.7 |
| Whitethroat | 0.5 | 24.7 |
| Wren | 0.25 | 12.4 |
| Total | 17.75 | 876.9 |

Although occupying a very insignificant proportion of the total land area, these last two habitats are very important because a number of species are not found elsewhere in the study area. All the moorhens, coots, little grebes, great crested grebes, tufted ducks and reed warblers breed or hold territory in these habitats. Also most of the sedge warblers and reed buntings are confined to these areas. An unexpected member of the marshland avifauna was a grasshopper warbler in 1970 which held territory in a bed of *Phalaris* with scattered hawthorn and willows.

Other Areas

The remaining habitat types have not been censused, but from observation the playing fields do not support any breeding species, the parkland areas are rather poor because they consist of merely a few standards growing in the middle of mown grass fields. The only species noticed are great tits and blue tits together with a few blackbirds and song thrushes. The disused rubbish dump was only recently turfed in the autumn of 1970 so that the effects of this new habitat are not yet known. Large flocks of skylarks were however seen feeding there during the winter presumably on seeds.

The one remaining rubbish dump is very small and disturbed a great deal at the time of writing in 1971 and is not suitable for any species to nest in except at one corner where a skylark's territory is sited.

The railway sidings have not been investigated as access is restricted.

Factors Influencing Nesting Success

Little quantitative information is available on the annual variation of nesting success in the area. It is known, however, that suburban blackbirds have a higher productivity rate of young birds than their rural counterparts (Batten, in press). Results of a study by J. H. Wood of nesting success of blackbirds in the area suggest that this higher productivity must be confined to garden birds as those nesting in the scrub and woodland areas have a very poor success rate mainly due to predation.

Potential nest predators are quite common in the area and observations reveal that grey squirrel, which is increasing in the district, is possibly one of the most important. Weasels, brown rats and foxes may also account for some of the predated nests. Cats are also widespread especially in the gardens but they are more of a hazard to young birds just after they have left the nest. A relatively small proportion of nesting attempts also fail to produce young due to the attentions of man. Either the parents desert or have their eggs stolen or their nests destroyed. This sometimes happens to house sparrows when their nests block up gutters on houses for example. Carrion crows are the main avian nest predators and have been seen taking young nestlings and birds not long out of the nest. So far blackbirds, song thrushes, starlings and house sparrows have been known to fall prey to this species.

Fires are frequent in summer in the grassland areas around the reservoir and sometimes several acres of rough grassland and reedbed have been devastated. A substantial number of nests, especially of ground nesting species, are lost each year in this way, e.g. mallard, reed bunting, skylark, yellow wagtail and whitethroat.

In some years flooding causes further losses but these are confined to the immediate area of the reservoir and affect mallard, little grebe, great crested grebe, coot, moorhen, whitethroat, reed bunting and occasionally wren when nesting in the reed beds. It was unfortunate that the only known nesting attempt of gadwall in the area came to grief in this way.

Causes of Mortality after leaving the Nest

An analysis was made of all the recoveries of birds ringed and found dead in the area. Only about 50 per cent. of the recoveries actually gave the cause of death but out of exactly one hundred blackbird recoveries, 57 were killed by cats, 31 were due to traffic accidents and the rest were the result of a variety of causes such as striking glass windows or wires, being shut in cold frames or garages, getting caught in garden netting, being shot, or killed by a hawk. A few appear to have died from one disease or another. Unfortunately ringing recoveries are almost certainly subject to biases because some causes of death are more likely than others to be noticed by the finders.

Cats have accounted for the majority of robin, blue tit and dun-nock recoveries. They have also taken starlings, wrens, bullfinches, house sparrows, song thrushes, chaffinches, and goldfinches. House sparrows have died from being trapped in a flooded nest in a house gutter, drowning in a water bath and hitting wires. Rings placed on blackbirds, song thrushes, robins, dunnocks and house sparrows have been found in tawny owl pellets. Deaths attributable to cold weather seem rare in the area except during the winter of 1962-63, when several coots, linnets and house sparrows were recovered dead in the bitterly cold weather of that period. Ringing studies in other winters have shown that the weights of birds caught in the area during cold spells with snow cover are usually higher than the weights of birds caught in more rural surroundings. This suggests that the winter is a less difficult time for suburban birds than rural ones, presumably because of the abundance of food stuffs put out for them. As an example, the average weight of sixty-four blackbirds caught in the first fourteen days of January 1969 was 125·0 indicating about 20 g of fat, and enough for nearly three days survival without more food. At Northward Hill, High Halstow, in Kent during the same period the average weight was only 92·5 g indicating about 7 g of fat, sufficient for less than one day's requirements (Batten and Flegg pers. obs.)

Roosts

After the breeding season a number of species form temporary roosts composed mainly of young birds. A large starling roost has for several years, although not in 1970, been formed in the late summer in the area of willow swamp at the eastern end of the Reservoir. This roost, numbering several thousand birds was mainly composed of juveniles, some of which come from a nearby rubbish dump. This roost was broken up at the slightest disturbance and in any case much reduced by September, most of the birds having either died or disappeared.

Of ninety-eight juvenile starlings ringed on 3 June 1962 on the nearby rubbish dump, eleven were later recovered. Three of them were found dead by the end of the month, one ninety-eight miles north-east at Fakenham (Norfolk), the other two were from Paddington and Kensal Rise. Later recoveries include birds at Romford in Essex, New Southgate, Elmers End and Catford in London; Northfleet in Kent. Birds ringed on other dates in June and July 1962 have resulted in a few further recoveries and it seems that dispersal takes place in most directions and presumably on a large scale. Only four out of fifteen recoveries were of local birds.

The most important of several large thrush roosts in the area is mainly composed of juvenile blackbirds and song thrushes in the autumn. Most of the adults are in the middle of their moult at that time of the year and stay away, in fact they do not start appearing

again in any numbers until mid-September. This roost which is located in twenty-four acres of undisturbed scrub and woodland about 300 yards north of the Reservoir edge, also houses a temporary roost of house sparrows in the autumn.

This thrush roost is a permanent one and in use throughout the year, the highest numbers occurring in late September to November. Many blackbirds enter the roost during the breeding season and at least some of these are known to be breeding. The roost also houses other thrush species but in considerably smaller numbers. Song thrushes are outnumbered eight to one by blackbirds. In winter, redwings and fieldfares which feed by day on the fields around Barn Hill also use the roost. A considerable amount of work on blackbirds has been carried out at this roost, especially in connection with roosting behaviour. To date over 6,000 blackbirds have been ringed here and these have produced 235 recoveries. In contrast to the starling recoveries mentioned earlier all but four of the 235 birds recovered were still in London and only one in eighteen had moved outside the catchment area of about one mile, suggesting a highly residential population. So far, only one bird has been recovered abroad, and that was a bird ringed on 10 February 1968 and found dead in Sweden in October 1969. When one considers that nationally about one in eleven blackbird recoveries refer to continental birds, it strongly suggests that continental blackbirds are very scarce in the area. This is surprising as Simms (1965) stated that in September to October the adjacent Dollis Hill population was augmented by immigrants, presumably of continental origin although he does not state this. It seems likely in view of these observations that most immigrants which do arrive, stay only a short while to feed and/or do not roost with the residents.

Other communal thrush roosts are known to occur on top of Barn Hill, in some hawthorn on the wall of the Reservoir dam, and in some hawthorn and blackthorn bushes near the eastern end of the Reservoir. Ringing has been carried out at all the roosts near the Reservoir but very few blackbirds were caught again away from the roost at which they were ringed.

There is a large woodpigeon roost which is located in tall elms near the main thrush roost. During most evenings in autumn and winter several hundred woodpigeons fly in from the direction of Barn Hill and spend the night in the tops of these trees. The same elms are sometimes used as staging posts for the massive flocks of starlings moving into central London. Numbers build up from a constant supply of recruits until the whole flock, thousands strong, takes off and heads towards the metropolis. The study area appears to be on two of the flight lines to the city and every evening and morning large flocks of these birds may be seen crossing the area.

Roosting movements of gulls are also common as one of the main flight lines seems to cut across the Reservoir in the direction of

Barn Elms. This flight line has been traced from Kingsbury, south across Dollis Hill, Willesden, Harlesden and over Wormwood Scrubs and Hammersmith, but it is not known how much further north than Kingsbury the gulls originate (Sage 1970). The most intensive movement so far recorded was just under 1700 per hour, mostly of black-headed gulls on 22 December 1968. The return flights occur just before dawn when flocks of gulls, again mainly black-headed, may be seen at little more than rooftop level, moving north towards the Brent Reservoir and nearby rubbish dumps where many of them feed.

Surprisingly gulls have never been recorded as roosting at the Reservoir except for the occasional bird and during the night of 24-25 August 1969 when several hundred very noisy black-headed gulls remained. Small flocks of mallards regularly arrive after dusk, presumably to roost out on the Reservoir. It is believed these birds come from the small ponds and lakes in the district such as those in Gladstone Park and Brent Park where they feed during the day.

Finally in autumn and winter roosting movements of carrion crows are common across the Reservoir heading in a westerly direction in evening, sometimes over 100 have been counted in small groups within half an hour. It is believed that these are the local populations of nearby rubbish dumps moving off to roost, probably on Barn Hill.

Migration

It is not necessary to repeat here in great detail the patterns of migration through the area as this reflects the situation in other sites in London and these have already been dealt with. See Gibbs and Wallace (1961), Gladwin (1963), Gooders (1965), Grant (1967), Homes et. al. (1957), Strangeman (1965), Wallace (1961).

From the air the locality with its varied habitat in a desert of buildings is no doubt a considerable attraction to migrants passing over a heavily built-up area. From mid-March until early November many thousands of migrants use it as a convenient resting and feeding stage in their journeys. The Reservoir is probably the main attraction and after having been attracted down the various species soon disperse to their preferential habitats: the warblers to the thick cover, yellow wagtails, whinchats and wheatears to the grasslands, and hirundines, waders, gulls, terns and ducks to the water.

Although falls of migrants can occur after clear nights in the spring, all the large falls recorded such as those on 2 May 1965 and 6 May 1967 occurred after a cloudy night with rain. Other wet nights however have failed to produce a fall so the situation is obviously complex. The big autumn falls of waders are almost always after a wet or at least cloudy night. Particularly large falls were recorded on 24 August 1964 and 6 September 1968, both after very heavy rain the night before. The highest daily totals of warblers were always mist netted during mornings preceded by cloudy or wet

nights. This is in contrast to some other observations. At Greenwich Park for example large falls were not always accompanied by overcast or rain, many of the sizeable falls occurring after clear skies overnight (Grant 1967). It would seem therefore that generalisations are difficult to make.

Local conditions do not vary sufficiently to affect the numbers of passerine migrants visiting the area. In the case of waders and waterfowl the level of the water in the Reservoir has a profound effect on the appearance of these species. The summer of 1959 was warm and dry and consequently the water level was low exposing a considerable area of silt and shingle. It was therefore in an attractive state for waders. A total of seventy visits were made to the Reservoir in July, August and September of that year. In 1960 after a fairly wet summer the water remained at a high level for most of the period between July and September. The Reservoir was visited on forty-three occasions during those three months. Table 9 lists the number of each wader seen in both those years together with the number of each species seen per ten visits. Nearly three times the volume of waders per ten visits were observed in 1959 than 1960. If one excludes records of birds flying over, then there was a 4.5 fold difference.

TABLE 9. State of the water level and the number of visiting waders.

| | July to Sept. 1959. | | July to Sept. 1960. | |
|----------------------|------------------------------------|----------------------------------|------------------------------------|----------------------------------|
| | No. of bird/days (70 visits) | No. of birds per 10 visits | No. of bird/days (43 visits) | No. of birds per 10 visits |
| Ringed plover | 6 | 0.85 | 2 | 0.47 |
| Little ringed plover | 0 | 0.00 | 1 | 0.23 |
| Lapwing | 218 | 31.14 | 37 | 8.60 |
| Dunlin | 12 | 1.71 | 5 | 1.16 |
| Curlew sandpiper | 8 | 1.14 | 36* | 8.37 |
| Knot | 0 | 0.00 | 2 | 0.47 |
| Sanderling | 4 | 0.57 | 0 | 0.00 |
| Ruff | 4 | 0.57 | 0 | 0.00 |
| Spotted redshank | 2 | 0.29 | 0 | 0.00 |
| Redshank | 22 | 3.17 | 1 | 0.23 |
| Greenshank | 17 | 2.43 | 1 | 0.23 |
| Green sandpiper | 12 | 1.71 | 0 | 0.00 |
| Wood sandpiper | 13 | 1.86 | 5 | 1.16 |
| Common sandpiper | 231 | 33.00 | 61 | 14.19 |
| Black-tailed godwit | 1 | 0.14 | 0 | 0.00 |
| Curlew | 23 | 3.29 | 10 | 2.33 |
| Snipe | 83 | 11.90 | 1 | 0.23 |
| Great snipe | 2 | 0.29 | 0 | 0.00 |
| Total | 658 | 94.0 | 162 | 37.7 |

*This was one flock which was seen at the Reservoir on 28 September.
Note: In 1959 23% of the records referred to birds flying over.

In 1960 nearly 52 per cent. belonged to this category.

Naturally other factors such as the varying breeding success of the waders each year will influence the numbers passing, so possibly will the meteorological conditions and the time of observations. More waders are apparent at the Brent Reservoir in early morning or late evening than during the day, for example. Nevertheless, the differences in the numbers of visiting waders are so considerable in the two years that it seems the conditions of the Reservoir must exert the greatest influence.

It is not only waders which seem to be attracted to the muddy conditions when the water level is low but also surface feeding ducks. During the autumn, up to eleven garganey, twelve teal, thirty-three shoveler, thirty-six gadwall and 200 mallard are frequently present from July to September, feeding on the mud or in the shallow water at the northern and eastern ends of the Reservoir. Details of other migrant species can be found in the systematic list.

The Winter Population and Cold Weather Movements

Details of the species which constitute the winter population can be found in the systematic list. For much of the winter especially during cold weather, many of the passerines are congregated on the rubbish dumps in the area or on the fields of the farm where flocks of finches including up to a dozen yellowhammers are frequently seen feeding on fodder put out for the cows.

There are a restricted number of regular species of wildfowl which visit the Reservoir and they are tufted duck, pochard, mallard and smew, but the combined total of these seldom exceeds 300. This is due almost entirely to the disturbance caused by yachting and boating activities which are now carried out on every part of the Reservoir where the water is deep enough. The Reservoir also freezes over very easily and most of the ducks move out of the area in these circumstances although the coots and moorhens often stay. During periods of disturbance small numbers of ducks, especially smew, take refuge in the willow swamp at the eastern end of the reservoir which is often flooded at this time of the year.

When the weather turns cold birds flock to the area in great numbers, increasing the resident winter population of certain species many times. In addition several species such as skylark, fieldfare, redwing, yellowhammer and reed bunting start to visit the gardens. There has however been a tendency for this last species to become a frequent visitor to gardens in recent years during winter.

In addition to the arrivals, many thousands more birds are sometimes seen passing over, the main species involved being lapwing, woodpigeon, skylark, starling, fieldfare, redwing, meadow pipit, greenfinch and linnet.

Although cold weather movements are seen almost every year a few have been quite spectacular involving some very scarce species in the London area. One of the largest movements so far recorded occurred during a spell of cold weather between 16 December 1961 and 7 January 1962, with strong north-east winds around Christmas followed by heavy falls of snow in the New Year. A variety of rare species for the study area arrived on 17 December including two eiders, one pintail, one scaup and a merlin. Five smew flew in from the north and there was also an increase in several other species of duck. Small parties of woodpigeons were flying south-west all day and obvious increases were noted in skylark, meadow pipit, tree sparrow and reed bunting. During the next few days the Reservoir was also visited by a glaucous gull, four shelduck, three shags, several teal, wigeon and shoveler, single goosander, merganser, lapland bunting and lesser spotted woodpecker. Lapwings were recorded passing south-west in small flocks on 27 December but over 600 were counted moving in the same direction during a three hour watch the next day. The Reservoir was frozen except for a few pools and most of the diving ducks had gone, but single dunlin and redshank were seen. Overhead movement of thrushes continued on a small scale and two oystercatchers arrived on 30 December. There was a blizzard the next day and a massive movement of skylarks was under way by 1 January 1962, when 1,250 flew south-west in five hours. There were also six bullfinches present but the unprecedented number of thirty were seen in the reeds around the Reservoir the following morning; this number had increased to forty by 3 January. No less than fifty-four pinkfooted geese flew south on 5th, while nineteen Bewick's swans were standing on the ice. A thaw set in soon after and by the 7th the Reservoir was free of ice. There was still considerable overhead movement on this day with hundreds of skylarks moving south together with small numbers of linnets and one snow bunting. By 9th January all movement had ceased.

The other period of spectacular cold weather movements involved the great frost of 1962-63 which will long be remembered for its disastrous effects on British bird life. The weather suddenly turned cold on 23 December 1962 when small flocks of redwings totalling about 100 birds moved south-west followed by goosander and several flocks of lapwing in the next few days. A vast overhead movement was well under way by December 28 when about 900 skylarks were counted passing west over the Reservoir in four hours. Woodpigeons were flying south-west and there had been a large influx of finches and other passerines in the area including twelve woodlarks and a snow bunting. A similar movement continued for the next four days but on 30 December there was a heavy snowfall and two flocks totalling sixty-five goosander flew west and a twite was also seen. Thousands more passerines were recorded passing over in the next week when the weather became even more severe. Thirty-six whitefronted geese, a few mergansers and eighteen more goosander

were recorded in the movements. The heaviest passage was recorded on 5 January 1963 when in five hours observation 1,600 fieldfares and 700 redwings flew west. Woodpigeons were also recorded in hundreds but these were passing over in all directions.

Further spectacular movements were recorded in the next few days but by 12 January no diving ducks remained and by the 19th the Reservoir was frozen completely with ice six inches thick. A gradual evacuation took place in the next week and by the end of the month there were very few birds in evidence except for gulls. During the first half of February bird-life in the area remained at a low level with very little movement except for nomadic flocks of skylarks which were in the habit of feeding on the ice, presumably on wind blown seed. Fieldfares, redwings, starlings, together with chaffinches, tree sparrows, blue and great tits, robins and dunnocks, were frequent visitors to gardens at Kingsbury and to the rubbish dumps in the vicinity. A mild spell in mid-February brought back substantial numbers of wildfowl although the fieldfares and redwings moved away. The area continued to support over 2,000 gulls until early March when the cold weather finally broke, and the birds quickly became obvious again although far less numerous than usual.

Systematic List of Species

RED-THROATED DIVER *Gavia stellata*

Harting (1866) states that this species was occasionally seen or shot at the Reservoir during winter. Despite extensive watching only three birds have been seen since 1950.

BLACK-THROATED DIVER *G. arctica*

Three records: a young male shot in the winter of 1843; one immature obtained about 15 January 1893; one 21 January 1962.

GREAT NORTHERN DIVER *G. immer*

No records before 1949 when an immature stayed from 26 November until 3 January 1950. One 5 February 1950 and one 22 November 1951.

LITTLE GREBE *Podiceps ruficollis*

A frequent visitor to the Reservoir particularly in autumn when large numbers may occur in September and October. Apart from an isolated record in 1921, forty-one being seen on 30 September, these autumn gatherings have been a comparatively recent phenomenon. The highest count so far was 121 on 11 October 1953. A small passage is apparent in the spring of some years.

BLACK-NECKED GREBE *P. nigricollis*

There are only two records for this species in the nineteenth century, both in the 1840's. It was not until the 1940's that the

species became a regular visitor and since 1950 one or two have been reported on twenty occasions, mainly in the autumn.

SLAVONIAN GREBE *P. auritus*

Six records from September—March. All were single birds except for two together in November 1970. The first record was not until 1947 when one in nearly full winter plumage was seen at close range on 11 September.

RED-NECKED GREBE *P. grisegena*

Five records between December and March, the earliest of which was two on 18 March 1939.

GREAT CRESTED GREBE *P. cristatus*

Very rare in the nineteenth century; Harting (1866) could not find any record of a bird in breeding plumage being obtained in the area. The species was first recorded nesting in the 1920s and continued doing so until 1962, but has not been proved breeding since, although present regularly in the breeding season. A passage during spring and autumn is often noticeable with up to sixteen birds present very occasionally.

LEACH'S PETREL *Oceanodroma leucorhoa*

One 3 November 1952.

STORM PETREL *Hydrobates pelagicus*

A small petrel believed to have been of this species was reported flying over the area on 23 October 1966.

CORMORANT *Phalacrocorax carbo*

Almost unknown up to the 1930s but has become a more regular visitor since then. There are now records for each month of the year, the largest party was of eight birds 10 December 1968. One or two sightings exist for most years.

SHAG *P. aristotelis*

The first occurrence of this species in the area was not until 1960 when one was seen 24 January. Since then there have been seven more records, involving a total of fourteen birds; the largest party was four on 16 May 1962.

BITTERN *Botaurus stellaris*

One obtained in 1843. One 5 August 1959.

LITTLE BITTERN *Ixobrychus minutus*

One ♂ shot in 1843.

NIGHT HERON *Nycticorax nycticorax*

A record is included in a list of 'water birds' occurring at the Brent Reservoir in the *Zoologist* for 1843. A heron believed to have been of this species was seen 25 April 1951.

SQUACCO HERON *Ardeola ralloides*

A specimen was shot in 1840. There is another undated occurrence.

GREY HERON *Ardea cinerea*

Now rather infrequent at the Reservoir. In the mid 1950s up to thirty together have been recorded during severe weather. One pair built a nest behind the dam in the early 1950s but the eggs were taken. No attempt at breeding has since been made. This bird held much the same status in the nineteenth century.

SPOONBILL *Platalea leucorodia*

Two were shot 23 October 1865.

CANADA GOOSE *Branta canadensis*

Very rare during the last century when five appeared on the Reservoir during one winter in the 1840s. Occurrences have been more frequent in recent years in keeping with the general increase in London. The largest party was seventeen on 8 June 1970.

BARNACLE GOOSE *B. leucopsis*

One which flew in from the north-east on 21 October 1959 remained until 5 March 1960. One 11-17 April 1960; one 20 May and one 10 June 1961; one 8 June 1970. These were all feral birds.

BRENT GOOSE *B. bernicla*

One recorded in the *Zoologist* for 1843. Two 10 January 1964.

GREY LAG GOOSE *Anser anser*

Occasionally observed during the winter in the last century. In the winter of 1860-61 two were shot out of a flock consisting of thirty birds. One 8, 9, 27 April 1967 is the only recent record.

WHITE-FRONTED GOOSE *A. albifrons*

Occasionally recorded flying over. Five records since 1960, the largest party being forty-five to fifty 31 January 1969. Single birds have settled on the Reservoir on two occasions. Status was much the same in the nineteenth century.

PINK-FOOTED GOOSE *A. brachyrhynchus*

Fifty-four flew south-east 5 January 1962.

MUTE SWAN *Cygnus olor*

Rare in the last century but now regular with pairs attempting to breed in most years. Occasionally flocks of up to fourteen birds visit the area. There has however been a noticeable decrease since the mid 1960s.

WHOOPEE SWAN *C. cygnus*

Three records for the nineteenth century only. The largest party was of five in the winter of 1841. No further records until 1955 when ten were seen during the early part of that year. Since then they have been reported on four occasions.

BEWICK'S SWAN *C. bewickii*

First recorded in the area in 1947 when two adults were seen on 20 December. Since then there have been seven records involving a total of thirty-five birds, the largest party being one of nineteen adults standing on the ice on 5 January 1962. In 1956 an immature bird which first arrived on 25 February stayed until 30 April.

RUDDY SHELDUCK *Tadorna ferruginea*

Two were seen flying over the Reservoir on 9 May 1950. These may refer to genuine wild birds or to full-winged birds which are known to have been present at the time in St. James' Park, and have been in the habit of flying across to Regent's Park. One 1 February 1969.

SHELDUCK *T. tadorna*

No records before 1875 when two were seen on 18 September. Next recorded in 1929, but since 1944 has become more regular. Since that year there are thirty-five records involving a total of 126 birds, the largest parties being twenty-nine flying north-east on 27 February 1965 and a flock of sixteen immatures and two adults 13 September 1969. They have occurred in every month except June.

MALLARD *Anas platyrhynchos*

Common resident. At present up to a dozen or so pairs breed regularly in the area. It has decreased as a breeding bird since the 1950s.

TEAL *A. crecca*

An irregular visitor except in autumn when up to ten are frequently seen in August and September.

GADWALL *A. strepera*

Apart from one obtained in the winter of 1842-43, there are no records until 1944. Birds were then seen in six of the next fifteen years. Since 1960 this species has become a regular autumn visitor

when birds are virtually continually present from August to October. This autumn flock has often reached double figures and reached thirty-six in September 1969. They are still scarce at other times of the year, but have occurred in all months apart from March. One pair attempted to breed in 1957, but the nest and eggs were flooded.

WIGEON *A. penelope*

A regular winter visitor until 1950 with up to thirty present from October to early April. They are now scarce at any time. Five birds were seen on the unusual date of 31 August 1969.

PINTAIL *A. acuta*

Always a scarce visitor. Since 1944 there have been eighteen records in all months except June, July and August.

GARGANEY *A. querquedula*

Unknown before 1947, since when it has become a regular visitor, especially in autumn. In 1959 up to eleven were present continuously from mid July to mid September. There are two late May sightings.

SHOVELER *A. clypeata*

Once a regular winter visitor, but now more commonly seen in autumn. Up to thirty-three were present in some years. A few birds are sometimes reported in the summer but these seldom stay. The autumn visitors usually start to arrive in mid July. A flock of sixty-four was present on 15 August 1959.

RED-CRESTED POCHARD *Netta rufina*

Two males and one female on 18 September 1966.

POCHARD *Aythya ferina*

A common winter visitor and occasional in summer. 505 were counted on 11 December 1949. The winter flock now seldom exceeds 100.

FERRUGINOUS DUCK *A. nyroca*

One shot 24 December 1863. One ♂ 8-11 September 1960. One ♀ 24 September 1960. One ♂ 5 November 1965.

TUFTED DUCK *A. fuligula*

Common winter visitor. Small numbers may also be seen at other times of the year. One pair were proved to breed in 1967. This species was somewhat scarce during the nineteenth century when ten or twelve constituted the usual winter population and a flock of thirty was considered exceptional.

SCAUP *A. marila*

Only four records are known for the nineteenth century. This duck has become a more regular visitor since 1946. There are now thirty records since that year in all months except June to July.

MANDARIN *Aix galericulata*

One 23 January 1964.

EIDER *Somateria mollissima*

Two immature males 17-27 December 1961.

COMMON SCOTER *Melanitta nigra*

Rather scarce up to 1945 but since then they have been seen on fourteen occasions, usually in twos and threes, mostly in April and November.

VELVET SCOTER *M. fusca*

Four 30 October 1948, one ♂ found dead 27 November 1948, one ♂ 28 February - 7 March 1956 when found dead. Four 14 March 1966.

LONG-TAILED DUCK *Clangula hyemalis*

One 18 November 1951 until 16 February 1952.

GOLDENEYE *Bucephala clangula*

Small parties of ten or twelve were not infrequent in winter in the nineteenth century. Now an occasional visitor with seldom more than three together during the period October to April.

SMEW *Mergus albellus*

Only three records appear to exist for the nineteenth century involving only five birds. There appear to be no records between 1861 and the 1920s, when until 1943 it was seen occasionally. A remarkable increase took place in 1943 when the wintering flock was estimated at between seventy and eighty on 28 February. Since then the maximum count is 144 on 28 February 1956. The first birds arrive in late November and the last may leave as late as early April. During the 1960s a decline in the wintering flock occurred and now it is unusual to see more than thirty together.

RED-BREADED MERGANSER *M. serrator*

Scarce. Only four or five records exist for the nineteenth century. Since 1945 there have been only nine records.

GOOSANDER *M. merganser*

Never a regular visitor and scarce in the last century. At present there are a few reports most years but numbers are small. Two flocks totalling sixty-five birds flew south on 30 December 1962, and

eighteen were reported also flying south on 5 January 1963. These numbers are exceptional.

OSPREY *Pandion haliaetus*

One fishing amongst yachts on 19 November 1961.

RED KITE *Milvus milvus*

One 3 April 1850.

SPARROWHAWK *Accipiter nisus*

A scarce breeder until the beginning of the present century. Very rare at any time, with five records since 1958.

BUZZARD *Buteo buteo*

Very rare; twice observed in the nineteenth century. There are six records for the area since 1949, all in August or September.

HEN HARRIER *Circus cyaneus*

One 12 January 1869.

MARSH HARRIER *C. aeruginosus*

One 26 April 1964.

HOBBY *Falco subbuteo*

A very rare visitor. Seven records since 1953 from April to September.

MERLIN *F. columbarius*

Three records for the 1860s and then none until 1932 when eighteen were seen on 23 February. One 4 April 1958; one 17 December 1961.

PEREGRINE FALCON *F. peregrinus*

Harting (1866): "This noble bird was formerly not uncommon in the winter and early spring, when gunners were not so numerous, and Ducks and Teal more plentiful than at present in our brooks and reservoirs". He was however unable to give any records for the area. The first occurrence for the twentieth century appears to be as recent as 1951 when one was seen on 20 January. Since then there have been ten records including one on 25 July 1961. It is interesting that at Dollis Hill on the border of the area a falcon was seen on 21 July and a tiercel was observed chasing feral pigeons on 9 August 1961. Another bird was seen near the Reservoir on 24 September 1961. These records suggest that a pair may have spent part of the summer near the area. The latest record is one 9 October 1965.

KESTREL *F. tinnunculus*

A common resident. Up to three pairs may breed in the area. No change in status seems apparent since the last century.

RED-LEGGED PARTRIDGE *Alectoris rufa*

Although breeding for a time in the late nineteenth century it is now very rare in the area. One 10 April 1960 is the last known occurrence.

PARTRIDGE *Perdix perdix*

Common until recently even after much of the land had become urbanised. The sudden decline in the population near the Reservoir seems to be associated with the destruction of rough grassland by a rubbish dump and the conversion of allotments to playing fields. No breeding has taken place in this part of the area since 1961, although birds were occasionally seen during the breeding season until 1963. Since then there are only two records of sightings. Partridges lingered on until 1968 at the farm near Barn Hill but the conversion from dairy to arable in that year must have been the final blow.

QUAIL *Coturnix coturnix*

One heard near Kingsbury in May 1882.

PHEASANT *Phasianus colchicus*

Always scarce. At present very occasionally seen. In 1970 a cock held territory near the Reservoir but attracted no mate.

WATER RAIL *Rallus aquaticus*

A pair bred one summer prior to 1866. Otherwise an autumn and winter visitor in small numbers.

SPOTTED CRAKE *Porzana porzana*

One obtained prior to 1843; one caught near the Reservoir in the early 1850s. One 4 September 1957, one 20 September 1958, one 23 August 1959.

CORNCRAKE *Crex crex*

A regular breeding bird until the early decades of the present century. Now unknown in the area.

MOORHEN *Gallinula chloropus*

Common resident.

COOT *Fulica atra*

This bird has increased considerably since Harting (1866). Then it was a scarce resident and flocks of more than thirty in the winter were considered exceptional. Kendell (1907) stated that it was only seen occasionally at the Reservoir. At present it is a common resident with over 100 commonly present during the winter. The population was badly reduced in the 1962-63 winter and since then no more than six pairs have bred in one year compared with up to twenty-five pairs before that winter.

OYSTERCATCHER *Haematopus ostralegus*

Two records only in the nineteenth century. Since 1945 there have been thirteen records of one to three birds, in all months except January, September and October.

RINGED PLOVER *Charadrius hiaticula*

Flocks of up to twenty were frequent on migration in Harting's time, but it is now much scarcer with only a few birds being recorded each year.

LITTLE RINGED PLOVER *C. dubius*

When this species was a rare vagrant to the country three examples were shot in the 1860s. The next record was one seen in 1944. It has remained a very scarce visitor with less than a dozen records.

DOTTEREL *Eudromias morinellus*

One September 1856.

GOLDEN PLOVER *Pluvialis apricaria*

A regular winter visitor until increasing urbanisation drove it out of London. At present a few are occasionally seen passing over.

GREY PLOVER *P. apricaria*

First recorded in 1946, since when only six records have been submitted.

LAPWING *Vanellus vanellus*

Bred until the beginning of the present century. Today they are frequently seen passing over the study area, and sometimes settling. During the severe weather of February 1956 over 1,000 were present for a few days.

TURNSTONE *Arenaria interpres*

Rare visitor with three records for the nineteenth century, and nine records since 1944, five of which were in May.

LITTLE STINT *Calidris minuta*

Once a regular visitor to the Reservoir on both spring and autumn passages, but in the present century there are only three records.

TEMMINCK'S STINT *Calidris temminckii*

This species has not been identified at the Reservoir since 29 August 1872 when one was shot. Before that date it had been observed or shot on nearly a dozen occasions in parties of up to four, both in spring and in autumn. The earliest note on the occurrence of this species is contained in the last volume of Yarrell's *British Birds*

where the author says: "Mr. Bond sent me word that he met with a pair of old birds in the spring of 1839 on the margin of the Brent Reservoir and several young ones in the autumn, obtaining one of the old birds and five young ones."

WHITE-RUMPED SANDPIPER *C. fuscicollis*

One shot in 1856.

PECTORAL SANDPIPER *C. melanotos*

One shot in 1846.

DUNLIN *C. alpina*

Double passage migrant and occasional winter visitor in small numbers.

CURLEW SANDPIPER *C. ferruginea*

Six records up to 1873, but no more until 1928. Four records since 1959 including an exceptional flock of thirty-six on 28 September 1960.

KNOT *C. canutus*

A rare visitor with only nine records, mostly in the last twenty years.

SANDERLING *C. alba*

A scarce visitor. Even in the 1960s regular observations produced only one record.

RUFF *Philomachus pugnax*

Occasional visitor during the autumn. One bird was seen on 14 February 1959.

SPOTTED REDSHANK *Tringa erythropus*

A rare passage migrant, the first record being of a bird shot in June 1841. Since 1960 there have been five records involving nine birds, all in August or September.

REDSHANK *T. totanus*

An occasional visitor. Since 1959 there have been over thirty-five records involving about sixty birds, mostly in the spring and autumn.

GREENSHANK *T. nebularia*

A regular but scarce passage migrant mainly in autumn. Recorded from April to October. Largest parties: twenty-six 8 August 1967, eleven in September 1928.

GREEN SANDPIPER *T. ochropus*

An occasional migrant in spring and autumn. About a dozen records during the period 1960-70.

WOOD SANDPIPER *T. glareola*

A rather infrequent visitor, except in 1959 when single birds or pairs occurred on nine occasions from July to September. Since that year there have only been eight records. There are seventeen records up to 1885.

COMMON SANDPIPER *T. hypoleucos*

A regular double passage migrant and the most common wader to frequent the Reservoir at these times. An exceptionally large and compact flock of thirty-seven was seen 2 August 1970.

BLACK-TAILED GODWIT *Limosa limosa*

Only six records, three of which have been in the present century. Largest party: eight, 12 August 1964.

BAR-TAILED GODWIT *L. lapponica*

Twelve records, ten of which were in late April or early May. Largest party: six, 29 April 1864.

CURLEW *Numenius arquata*

A regular passage migrant in small numbers, but rarely settling.

WHIMBREL *N. phaeopus*

Scarce visitor; only nine records.

WOODCOCK *Scolopax rusticola*

Fairly common in winter in the nineteenth century but now are rare at any season. One was flushed 25 July 1949—the only summer record.

SNIPE *Gallinago gallinago*

A common visitor in autumn and winter.

GREAT SNIPE *G. media*

One shot in 1842, another in November 1851, and a third in the autumn of 1956. In addition single birds were identified on 22 July and 18 August 1959.

JACK SNIPE *Lymnocyptes minimus*

Regular in autumn and winter although much scarcer than the common snipe.

BLACK-WINGED STILT *Himantopus himantopus*

Two in September 1918.

AVOCET *Recurvirostra avosetta*

One May 1854, two August 1897.

GREY PHALAROPE *Phalaropus fulicarius*

Five records between 1840-1892, but the only occurrence this century was of two birds which remained at the Reservoir from 8-14 September 1950.

STONE CURLEW *Burhinus oedicanus*

One on 15 April 1969.

GREAT SKUA *Stercorarius skua*

One seen flying over Kingsbury on 15 January 1942.

POMARINE SKUA *S. pomarinus*

Fredrick Bond includes it in his list published in the *Zoologist* for 1843.

ARCTIC SKUA *S. parasiticus*

Four shot in the autumn of 1842.

LITTLE GULL *Larus minutus*

Rare visitor. Six records only for the Reservoir, the first being in August 1871.

BLACK-HEADED GULL *L. ridibundus*

Very common, and already regular in spring and autumn when Harting wrote in 1866.

LESSER BLACK-BACKED GULL *L. fuscus*

Harting was only able to list three records up to 1866, but in common with the other species of gull they became more and more frequent to the area until in the 1950s and 1960s flocks of over 300 were regular in spring and autumn. They are now also regularly present in winter.

HERRING GULL *L. argentatus*

Common, especially in winter.

ICELAND GULL *L. glaucoides*

Three records, the first being an immature on 1 February 1961. One sub adult on 17 and 18 March 1962 and another individual on 16 and 18 April in the same year.

GLAUCOUS GULL *L. hyperboreus*

First identified at the Reservoir on 10 January 1950. Since then there have been thirteen individuals recorded. In addition there have been four records of glaucous/Iceland gulls in the area. All records are for the period November to April.

GREAT BLACK-BACKED GULL *L. marinus*

A vagrant in the nineteenth century. Now fairly common and although records exist for all months it is most frequent in numbers of up to fifty from September to April.

COMMON GULL *L. canus*

Common, especially in winter.

KITTIWAKE *Rissa tridactyla*

Harting was able to list three records up to 1866. Since 1940 it has been recorded on twenty occasions from August to May.

BLACK TERN *Chlidonias niger*

Regular spring and autumn passage migrant in small numbers, occurring in every month from April to October. The largest flock so far has been twenty-six on 11 May 1960.

WHITE-WINGED BLACK TERN *C. leucopterus*

One shot May 1883.

SANDWICH TERN *Sterna sandvicensis*

First recorded on 24 May 1947. Since then there have been eleven records involving thirty individuals. Records exist for every month from April to October.

COMMON TERN *S. hirundo*/ARCTIC TERN *S. paradisea*

Both species have been identified on occasions, and records are frequent from April to October. The largest party was of fifty-two on 13 August 1964.

ROSEATE TERN *S. dougallii*

Two were seen on 16 August 1866, one of which was shot.

LITTLE TERN *S. albifrons*

Three records are known prior to 1866 but no more were reported until 1947. Since then there have been ten sightings involving twenty individuals, the largest party being of six on 15 May 1950.

PALLAS'S SANDGROUSE *Syrrhaptes paradoxus*

One was shot near Neasden in August 1863.

WOODPIGEON *Columba palumbus*

Common resident and winter visitor.

STOCK DOVE *C. oenas*

Common in the 1950s when flocks of over a hundred birds were frequent in the winter. Now rarely seen at any time of the year.

FERAL PIGEON *C. livia*
Common resident.

COLLARED DOVE *Streptopelia decaocto*

First recorded on 6 May 1961. There have been only a few records as the species has not so far colonised the area.

TURTLE DOVE *S. turtur*

Occasionally seen in summer.

CUCKOO *Cuculus canorus*

A few are seen or heard each year but no fledgings have been seen for many years.

BARN OWL *Tyto alba*

Now very rare with only three records since 1959. One was seen hunting on 18 May 1970, and it is conceivable that a pair may breed somewhere in the vicinity.

LONG-EARED OWL *Asio otus*

Although not uncommon in the nineteenth century this species is unknown in the area at present.

SHORT-EARED OWL *A. flammeus*

Rare visitor with a few records in the nineteenth century and four in the present century, all of which have occurred since 1947.

LITTLE OWL *Athene noctua*

Resident from the 1920s to the early 1960s. Has not been recorded for several years.

TAWNY OWL *Strix aluco*

Rare in the last century. By 1930 it had become common and several pairs are still resident.

NIGHTJAR *Caprimulgus europaeus*

Although breeding for a few years in the 1890s and early twentieth century there is only one recent record and that is of a migrant in August 1956.

SWIFT *Apus apus*

Common summer resident.

ALPINE SWIFT *A. melba*

One seen in August 1841.

KINGFISHER *Alcedo atthis*

Up to the 1962-63 winter this species was occasionally seen in autumn and winter. There have been only three records since 1963.

HOOPOE *Upupa epops*

One shot at Neasden in April 1865 and one seen near the Reservoir on 23 April 1963.

WRYNECK *Jynx torquilla*

This species ceased breeding in the area in 1926 and the last occurrence was a migrant on 3 September 1956.

GREEN WOODPECKER *Picus viridis*

At present wandering birds are very occasionally seen. Common in the 1950s and earlier decades, but scarce in the nineteenth century.

GREAT SPOTTED WOODPECKER *Dendrocopus major*

Common at the beginning of the nineteenth century but almost extinct by 1865. A recovery followed, and by the early twentieth century nesting commenced. Another decline became apparent in the late 1950s and at present only an occasional visitor.

LESSER SPOTTED WOODPECKER *D. minor*

Although the most common woodpecker in the last century it is now only a scarce visitor.

WOODLARK *Lullula arborea*

Became extinct as a breeding species in the 1830s and 1840s. From 1960 to 1962 the species was not infrequently seen and there were three records of winter flocks: six on 17 January and five on 22 January 1960, twelve on 28 December 1962. Not recorded since 1962.

SKYLARK *Alauda arvensis*

Common resident.

SAND MARTIN *Riparia riparia*

Common passage migrant, the earliest arrival recorded being on 18 March 1945.

SWALLOW *Hirundo rustica*

Common from April to October although no definite evidence of breeding for many years. Still seen throughout the summer hawking over the fields of Big Bush Farm at Barn Hill.

HOUSE MARTIN *Delichon urbica*

Common summer resident breeding in many streets.

RICHARD'S PIPIT *Anthus novaeseelandiae*

One seen on 19 October 1963.

TREE PIPIT *A. trivialis*

Regular on spring and autumn passage. In 1969 and 1970 has held territory for much of the summer on Barn Hill.

MEADOW PIPIT *A. pratensis*

A common passage migrant and winter visitor, although seldom seen between May and early September.

ROCK PIPIT *A. spinoletta petrosus*

Occasional autumn and winter visitor. In October 1845 seven were killed at the Reservoir. Since 1960 there have been a dozen records for the Reservoir all in the period October to December and March to April. The Water Pipit *A. spinoletta spinoletta* has been observed three times: single birds on 14 April 1961, 22 April 1961 and 7 May 1962, the two latter in summer plumage.

YELLOW WAGTAIL *Motacilla flava*

A regular summer visitor, until the last year or two breeding regularly. Wagtails resembling the grey headed form have been recorded on two occasions. One was shot in May 1864 and another seen 7 April 1945. There are also numerous records of the blue headed form, especially during the spring passage. A late yellow wagtail was seen on 26 November 1960.

GREY WAGTAIL *M. cinerea*

Regular from September to April in small numbers and occasional at other times. In 1929 a pair bred near the Reservoir and in several recent summers birds have been seen feeding young by the River Brent.

PIED WAGTAIL *M. alba*

Local resident. Numbers increase in autumn around the Reservoir. The white wagtail is occasionally seen on passage, usually in the spring.

RED-BACKED SHRIKE *Lanius collurio*

No records since 1956, although breeding in the early 1950s. During the last century it was a common summer visitor, usually arriving about the first week of May and remaining until the end of August.

GREAT GREY SHRIKE *L. excubitor*

Two records for the nineteenth century and four in the present century, the last being a migrant on 15 April 1967.

WAXWING *Bombycilla garrulus*

Recorded in November 1866 and during the invasion in early 1947.

DIPPER *Cinclus cinclus*

One during the spring of 1862 was seen on the silk stream near Colin Deep Lane.

WREN *Troglodytes troglodytes*

Common resident.

DUNNOCK *Prunella modularis*

Common resident. An albino was seen on 28 December 1961.

GRASSHOPPER WARBLER *Locustella naevia*

Occasional passage migrant and spasmodic summer visitor. Birds have been recorded breeding or holding territory in three years since 1960.

AQUATIC WARBLER *Acrocephalus paludicola*

One on 28 August 1955.

SEDGE WARBLER *A. schoenobaenus*

Regular summer resident. Usually between three and ten pairs breed around the Reservoir.

REED WARBLER *A. scirpaceus*

Regular summer resident varying in numbers from one to six pairs.

GARDEN WARBLER *Sylvia borin*

Regular passage migrant and summer resident with pairs breeding in most years.

BLACKCAP *S. atricapilla*

Common passage migrant and breeding species. Two females were seen on 14 December and one was caught on 21 December 1968.

WHITETHROAT *S. communis*

Common summer resident and passage migrant. A very early migrant was seen on 23 March 1957.

LESSER WHITETHROAT *S. curruca*

Regular summer resident and passage migrant. A few pairs still breed or hold territory.

WILLOW WARBLER *Phylloscopus trochilus*

Common summer resident.

CHIFFCHAFF *P. collybita*

Common on passage but rarely breeds. Several pairs bred in 1970—for the first time since at least the mid 1950s. Harting considered it to be more common than the willow warbler in the nineteenth century.

WOOD WARBLER *P. sibilatrix*

A rare passage migrant having long ceased to breed. Three records exist for the 1960s.

GOLDCREST *Regulus regulus*

Small numbers are present during the autumn and winter. A bird remained throughout the summer in 1970.

FIRECREST *R. ignicapillus*

One 9 April 1958 and another 5 April 1969.

PIED FLYCATCHER *Ficedula hypoleuca*

Occasional autumn passage migrant. Only one record is known before 1866.

SPOTTED FLYCATCHER *Muscicapa striata*

Regular summer resident in small numbers.

WHINCHAT *Saxicola rubetra*

Regular double passage migrant. An exceptionally early bird was seen on 30 March 1960. The last breeding record was in 1960.

STONECHAT *S. torquata*

A scarce but regular autumn and winter visitor. Exceptional numbers were present in the winter of 1960-61 when up to ten were recorded. Two juveniles were seen on 25-26 July 1961, and up to six were again present in the autumn of that year.

WHEATEAR *Oenanthe oenanthe*

Common double passage migrant. An early record: 12 March 1961. Birds considered to be of the Greenland form have been seen regularly in late spring.

BLACK REDSTART *Phoenicurus ochruros*

There have been only four records since the first in June 1954.

REDSTART *P. phoenicurus*

Regular but scarce passage migrant.

ROBIN *Erithacus rubecula*

Common resident.

NIGHTINGALE *Luscinia megarhynchos*

At present an occasional autumn passage migrant.

FIELDFARE *Turdus pilaris*

Regular winter visitor, mostly passing over. In winter a flock of a few hundred together with redwings, often gathers on the fields of

Big Bush Farm and spends the night in the large thrush roost near the Reservoir. One bird was seen on 19 May 1970.

RING OUZEL *T. torquatus*

Harting (1866) gave the impression that this species was a regular passage migrant especially in spring. It has since decreased as only four records are known since 1950.

BLACKBIRD *T. merula*

Common resident, second only to house sparrow in abundance.

REDWING *T. iliacus*

Regular visitor in autumn and winter and more common than the fieldfare. Song is sometimes heard from lingering birds.

SONG THRUSH *T. philomelos*

Common resident, although generally outnumbered by the blackbird by almost six to one in suburban gardens.

MISTLE THRUSH *T. viscivorus*

The least common of the thrushes because of its large territorial requirements. Several pairs still breed mainly near the farm at Barn Hill.

BEARDED REEDLING *Panurus biarmicus*

A pair on 25-26 October 1965.

LONG-TAILED TIT *Aegithalos caudatus*

No longer breeds but small parties are occasionally seen in the autumn and winter.

MARSH TIT *Parus palustris*

Owing to the difficulty of separation from the willow tit the past status is not clear. It was supposed to breed in the area in Harting's time but at present it is a scarce visitor.

WILLOW TIT *P. atricapillus*

First recorded in the 1950s but may have been present earlier. At present it is a regular breeding species in small numbers.

CRESTED TIT *P. cristatus*

One shot in the spring of 1860 in a small spinney near Cool Oak Lane.

COAL TIT *P. ater*

Resident and autumn visitor in small numbers. In 1970 at least seven pairs bred, but this was exceptional.

BLUE TIT *P. caeruleus*

Common resident. More abundant than the great tit.

GREAT TIT *P. major*

Common resident.

NUTHATCH *Sitta europaea*

Now almost extinct; the last record was of a pair breeding on Barn Hill in 1963.

TREE CREEPER *Certhia familiaris*

A rare visitor, with only two records for the last decade.

CORN BUNTING *Emberiza calandra*

Occasional visitor with seven records for the last decade.

YELLOWHAMMER *E. citrinella*

Resident in small numbers, mostly confined to Barn Hill.

ORTOLAN BUNTING *E. hortulana*

Two in early May 1867. One October 1868 and one 2 September 1956.

CIRL BUNTING *E. cirrus*

A nest was found in May 1861 and another in 1871. A few other records exist for the nineteenth but none for the present century.

REED BUNTING *E. schoeniclus*

A common resident chiefly near the Reservoir. Occurs on spring passage mainly in March.

LAPLAND BUNTING *Calcarius lapponicus*

One was shot at the Reservoir about October 1892. One seen 13 December 1959 and one 19 December 1961.

SNOW BUNTING *Plectrophenax nivalis*

There are only two records for the area before 1933, when four were seen together on 5 November. Since 1950 there have been thirteen records from October to February.

CHAFFINCH *Fringilla coelebs*

A decreasing but not uncommon resident.

BRAMBLING *F. montifringilla*

An irregular autumn and winter visitor when small flocks may be occasionally seen near the rubbish dumps. An early record was of five on 2 October 1965.

GREENFINCH *Carduelis chloris*

Common resident and winter visitor.

SISKIN *C. spinus*

Small groups are sometimes seen in autumn and winter near the Reservoir.

GOLDFINCH *C. carduelis*

Small numbers breed regularly, mainly on the allotments. Flocks regularly occur in the autumn but become scarce in the winter.

TWITE *Acanthis flavirostris*

Several birds were seen in October 1864, and in October and November 1865. Single birds on 31 January 1954, 30 March 1960, 28 April 1961, 30 December 1962 and 23 March 1964.

LINNET *A. cannabina*

A regular breeding species mainly concentrated on the allotments. Flocks of over a hundred are not infrequent in the autumn and winter, especially near the rubbish dumps.

REDPOLL *A. flammea*

Has become much more frequent during the last decade and now a regular visitor in autumn and winter. In 1969 and 1970 there are summer records.

CROSSBILL *Loxia curvirostra*

One March 1955, and one 25 November 1966.

BULLFINCH *Pyrrhula pyrrhula*

Scarce in the 1950s but now breeds regularly. In early January 1962 up to forty birds were present in small flocks foraging for food, but these were immigrants and most had left by 4 January.

HAWFINCH *Coccothraustes coccothraustes*

Not uncommon in the nineteenth century but now extinct.

HOUSE SPARROW *Passer domesticus*

Common resident. The most abundant species.

TREE SPARROW *P. montanus*

Breeds regularly in small numbers. Numbers increase in autumn and winter when flocks of up to a hundred or more are frequently recorded.

STARLING *Sturnus vulgaris*

Common resident.

JAY *Garrulus glandarius*

Resident; thinly distributed.

MAGPIE *Pica pica*

Very scarce in the 1950s. Has since increased and now at least six pairs breed.

CHOUGH *Pyrrhocorax pyrrhocorax*

One shot in January 1900.

JACKDAW *Corvus monedula*

Now only an occasional visitor in autumn and winter.

ROOK *C. frugilegus*

Regularly recorded throughout the year. Flocks of up to a hundred have been recorded in autumn and winter. Extinct as a breeding species.

CARRION CROW *C. corone*

Resident; well distributed.

HOODED CROW *C. corone cornix*

Occasional winter visitor. Has occurred in eight winters since 1950. In January 1960 up to three were present.

RAVEN *C. corax*

One flew north-east on 19 August 1962.

Summary

A history of the study area since 1830 is given, together with an account of the increase in urbanisation.

The species breeding or present in the breeding season are reviewed at intervals since 1830 and their rate of decrease with increasing urbanisation is measured. The number of species breeding regularly when the area was less than 1 per cent urbanised varied from 67 to 72, but was 71 at 10 per cent, 64 at 30 per cent, 53 at 50 per cent and 43 at 61 per cent urbanisation.

A detailed account of the species present in the breeding season each year since 1957 around the Reservoir is also given, and it was found that there is considerable variation in the actual species involved. Out of the sixty-six species which have been observed in at least one breeding season only thirty-seven were seen in all the years.

The main habitats in the study area are described and the results of census work are given for each one. High densities of territory holding species are recorded in all of these, in fact the scrub and woodland plot has the highest density of birds ever recorded in any woodland area in the British Isles. Excluding starling, woodpigeon and house sparrow there are, on average, nearly 2,000 pairs per square kilometre. The most important habitats in terms of having the highest number of species confined to them are the willow swamp and *Phalaris* marsh. These hold all the moorhen, coot, tufted duck, great crested grebe, little grebe and reed warbler in the area. In addition almost all the sedge warblers and reed buntings are confined to these habitats.

Sections are also included on factors influencing nesting success, roosts, migration and on the winter population especially during cold weather.

A complete list of species recorded in the area is given together with details of their status.

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London Fishes to 1971

by DAVID MARLBOROUGH

(Recorder of fishes)

Further fish records have accumulated since the last list (Marlborough 1969), allowing this paper to be compiled. Most pleasing are records from a number of individual contributors. Also used are records from angling papers and magazines, occasional news stories in the national press, and two important original papers (q.v.). This time angling guide books were not needed.

Previous papers (Marlborough 1962, 1965, 1969) have given fish records essentially as supplements to *The Fishes of the London Area* (Wheeler 1958), which was regarded as definitive. The intervening thirteen years have seen some considerable changes in the fish fauna of the London Area, and it was felt that from now onwards all records received should be noted, in order to record the changes which are undoubtedly taking place; previously repetitive records from an area were not noted. In a time of change, continuing status merits mention as well as new records.

The changes referred to above have all either occurred or been fully published in the period now under review (1968 to 1971). As broad trends, they are as follows:

- a) A considerable mortality of roach and latterly perch in some of the Metropolitan Water Board reservoirs. These two species constitute the main fish biomass in probably all the reservoirs. The cause and extent of the mortality is not yet clear, but obviously profound ecological changes will follow.
- b) The considerable improvement in the condition of the River Thames, and the subsequent colonisation of the polluted central London stretches by several species of fish. This was foretold in the last list (Marlborough 1969). Much fuller documentation has now come to print. Mr Wheeler of the British Museum (Natural History) has been collecting fish taken off power station intake screens at Fulham, Brunswick Wharf, Blackwall Point, Barking and West Thurrock from 1964 to 1969. Lists of these fish are to be found in Wheeler (1969a, 1969b). They have been inserted into the usual arrangement of records in this paper where appropriate. Their significance is first that they add a number of marine or estuarine species to the London fish list, some re-occurring after many years' absence due to pollution, and secondly, they are indicators of the state of the River Thames. Physico-chemical information upon the state of the river is gained by examining the Greater London Council's Annual Reports of the Scientific Adviser (Brown 1967, 1968). There appears to be a region of low oxygen concentration (below 10% saturation in

July-September) about ten miles downstream of London Bridge, moving to and fro with the tide. Either side of this, and to some extent passing through it, fish are colonising.

Recognition of this notable improvement in quality spurred a number of influential anglers to revitalise the Thames Angling Preservation Society, first founded in 1838. T.A.P.S.' purpose is to preserve and improve the free fishery on the Thames below the London Stone at Staines. They have been active, with the blessing of the Greater London Council, in promoting the lower Thames as a potential recreational facility. Joint "angling experiments" by anglers fishing from moored barges between Wandsworth and Waterloo have been promoted and fish have been caught. T.A.P.S. have also "netted" several London park lakes not open for fishing, taken considerable interest in the various docks and their fish faunas as they fall out of commercial use and are closed, and surveyed urban streams with a view to re-establishing fish and fisheries in them. All this activity has produced new records.

- c) Similar improvements have been noted on the River Lea, which can now be said to hold fish of at least three species from Hertford to its confluence with the Thames – i.e. three-spined stickleback, roach and bleak.

The improvements in London's two major rivers could have been jeopardised by the municipal sewage workers' strike in 1970, as the amelioration is certainly due to improvements in sewage treatment. It does seem that one's worst fears have not been realised. The only fish mortality noted was on the Lea below Deephams Sewage Works, and this appears to have been temporary.

The preparation of grid maps of the fish species continues. I would ask all contributors to include Ordnance Survey or tetrad references to any records they send in to make the task easier. The length of the present paper has precluded inclusion of maps this time, but later maps of the commoner species will be presented, with if necessary, textual records reduced to tetrad references.

Contributors to this paper are listed below, against the abbreviated references used in the text. Periodicals are named in full except for *Angling Times* (AT followed by the date of issue) and *Anglers Mail* (AM followed by the date). Wheeler (1969a, 1969b) are referred to as ACW.

Individual contributors are as follows:— A. G. Duff and I. Dodd (AGD); Mrs Audrey Warren (AW); Bromley and District Angling Society (BDAS); Brian S. Meadows (BSM); C. Landells (CL); Colin Willock (CW); D. A. Boyd (DAB); G. Beven (GB); G. H. Gush (GHG); J. A. Burton (JAB); M. Towns (MT); personal observation (DM); P. A. Moxey (PAM); P. Green (PG); P. C. Tinning

and D. Regan (PCT); Thames Angling Preservation Society (TAPS); T. Beynon (TB); T. L. Bartlett (TLB); W. Bullen (WB); Uxbridge and District Aquatic Society (UAS).

I am grateful for the co-operation of all who have made this paper possible, but in particular I must thank for their help Messrs. A. C. Wheeler, Brian S. Meadows, and A. E. Hodges of T.A.P.S.

Species List

LAMPERN *Lampetra fluviatilis* (L.)

Wheeler (1958) refers to a former fishery for lamperns in the Thames up to 1882. Two specimens were taken at West Thurrock in 1964 and 1967 (ACW); they may return. Berwick Ponds, Rainham, Essex, July 1968 (ACW).

HERRING *Clupea harengus* L.

Four taken 1967-1968 at West Thurrock (ACW). Captures there also reported in AT 22 January 1970.

SPRAT *Sprattus sprattus* (L.)

195 taken at West Thurrock (ACW), 2 at Barking (ACW). Reported as "common" at West Thurrock (TAPS), and shoaling in the estuary up to Purfleet Deep (AT 15 January 1970). The return of these shoals can be compared to Wheeler (1958) where they are listed under 'whitebait'.

ANCHOVY *Engraulis encrasicolus* (L.)

One taken 1967 from West Thurrock (ACW). Wheeler (1958) reports this species as found in the estuary to 1903.

SHAD *Alosa* sp.

One taken 1968 from West Thurrock (ACW). It is not apparent in the source whether this specimen was the allis shad, *A. alosa*, or the twaite shad, *A. fallax* (*A. finta*). The latter species was the commoner in the estuary in the nineteenth century (Wheeler 1958); it is also the more estuarine of the two, the allis shad, like the lampern, running up river to reach a spawning ground.

SALMON (?) *Salmo salar* L.

One allegedly taken of 10 lb. weight from Hambledon Weir (TAPS). The informant was extremely sceptical, and so am I. No corroboration has so far been found. It could probably be one of the few large brown trout still found in the Thames weirpools.

SEA TROUT *Salmo trutta* L. (migratory form)

One reported, without corroboration, from Teddington Lock, weighing 2 lb. 10 oz. (AM 20 February 1971).

A confirmed record, a female fish in spawn weighing 3.75 lb., taken from Deptford Wharf, Charlton. The fish was identified by the British Museum, and the report said that this was the first record since 1910 (AT 18 February 1971). If this migratory fish is again trying to run up the Thames to spawn then amelioration must be considerable. This fish was also reported in the national press.

BROWN TROUT *Salmo trutta* L. (non-migratory form)

THAMES AND LEA. 1.5 lb. fish taken from river by Ham Car Park, Richmond (AM 4 December 1969); 3 lb. 2 oz. fish from Walton-on-Thames (AM 29 January 1970); one taken in 1968 at Brunswick Wharf (ACW). In the Lea, one at Ware Lock (AT 3 August 1967).

KENT. River Darent (BDAS).

RAINBOW TROUT *Salmo irideus* Gibbons (= *S. gairdneri*)

This species is widely used to stock sport and food fisheries, and frequently escapes, though rarely breeding in this country. Records of such escapes are always of interest.

THAMES AND LEA. Dobb's Weir 1969 (PG); Old River Lea, Waltham Abbey (AT 26 June 1967); six taken in Lea between Fishers Green and Waltham Abbey during February to March 1969—all these Lea records probably being escapes after flooding from a stocked gravel pit at Fishers Green (BSM).

KENT. Horton Kirby lakes (MT).

ESSEX. One taken in netting High Maynard Reservoir, Walthamstow in September 1969 (BSM; AM 9 October 1969).

SMELT *Osmerus eperlanus* (L.)

This estuarine fish once was the basis of a considerable commercial fishery in the Thames (Wheeler 1958). It appears to be returning, as the records show. Single fish were taken at Fulham and Blackwall Point in 1968 (ACW); five taken 1966 to 1969 from West Thurrock (ACW). The latter catches are also reported in AT 22 January 1970.

PIKE *Esox lucius* L.

The area still produces large specimens of this predator, which, fortunately for recording, are reported in the angling press.

THAMES AND LEA. Three taken at Brunswick Wharf 1967 and 1968 (ACW); in the Lea, a 25 lb. fish from Waltham Abbey (AM 6 November 1969) and a 19.5 lb. from Walthamstow (ibid.).

KENT. Horton Kirby and Dartford lakes (MT); R. Darent (BDAS); a 22 lb. pike from Brooklands Lake, Dartford (AM 13 November 1969).

SURREY. Two 22 lb. pike from One Island Pond, Mitcham Common, and a gravel pit at Chertsey (AM 23 October 1969); a 28.75 lb. from the Metropolitan Water Board reservoirs at "Hamp-ton"—the nearest being East Molesey. (AM 27 November 1969).

MIDDX. AND BUCKS. A 6 lb. fish found 20 May 1969 in the Serpentine, Hyde Park (DAB); a 20 lb. fish from a "gravel pit near London Airport" (AM 6 November 1969); Harefield Gravel Pit, 24 lb. (AM 5 December 1970); a lake at Denham (AM 20 February 1971).

HERTS. Cheshunt gravel pit, 28 lb. (AM 11 December 1969); Northmet Pit, Cheshunt, 24 lb.; Broxbourne Halls Angling Scheme pit, 23.5 lb.; a Rickmansworth gravel pit, 28 lb. (AM 5 December 1970).

ESSEX. Maynard No. 4 Reservoir, Walthamstow (BSM); Hollow Ponds, Leyton—two fish, 17.5 lb. (AM 20 November 1969) and 16 lb. (AM 5 February 1970); Walthamstow Reservoir, 25 lb. (AM 1 January 1970).

COMMON CARP *Cyprinus carpio* L.

THAMES AND LEA. A letter in AM 4 December 1969 from a veteran Thames angler said that this species was on the increase in the Thames, certainly between Richmond and Teddington. This may well be true: they are certainly extending their range into the central London reaches. A mirror carp of 20.5 lb. was taken from the river at Halliford Bend, Walton (GHG); others were taken as far upstream as Sonning (AM 11 December 1969). From the lower Thames, a 14 lb. mirror carp from Chelsea Reach near Fulham Power station (*Daily Telegraph* 17 June 1969); present in creeks by Fulham and Battersea Gas Stations (WB); one in 1969 from Barking; two in the same year from Blackwall Point; another from Fulham (ACW). It is suggested that the Barking fish came from stock introduced into the R. Roding at Ongar. AT 22 January 1970 reports carp from the West Thurrock grids. R. Lea—Dobb's Weir to Carthage Lock (BSM).

KENT. Pond at Letts Green, Horton Kirby and Dartford lakes (MT); Brooklands Lake, Dartford (AM 20 November 1969); lake near Gravesend, 20 lb. (AM 31 July 1969); Danson Park Lake, Bexley (WB).

SURREY. Isle of Wight Pond, Bookham Common; Church Pond, Weston Green (GB); taken and returned in netting of lake by Palm House, Kew Gardens (TAPS); Norwood Lake (AM 23 October 1969); Surrey Commercial Docks (AT 18 June 1970).

MIDDX. AND BUCKS. New River, Southbury Road, Enfield (AW); Clissold Park, Stoke Newington (TAPS); Alexandra Park, Hornsey (PAM); killed on drainage of Brentford Docks (AM 20 February 1971).

HERTS. Gravel pits at Stanstead Abbots (BSM); Wildwoods Lake, Whitewebbs Park, Cuffley (BSM).

CRUCIAN CARP *Carassius carassius* (L.)

HERTS. Lake in Hatfield Park, to 3 lb. + (DM).

GOLDFISH *Carassius auratus* (L.)

This common escape is probably under-recorded. Populations reverted to the dull 'wild' colouration should be carefully distinguished from the crucian carp.

THAMES AND LEA. R. Thames—Barking, Blackwall Point and Brunswick Wharf (ACW).

SURREY. Surrey Commercial Docks (AM 3 July 1969 and AT 18 June 1970).

MIDDX. AND BUCKS. Perivale Wood Pond (AGD); Pymmes Brook, Tottenham to Edmonton (BSM).

ESSEX. R. Roding, Woodford Bridge (CL).

BARBEL *Barbus barbus* (L.)

THAMES AND LEA. Fulham Gas Station (WB); Fulham Power Station, one in 1967 and one in 1968 (ACW); in anglers' catches at Hampton Court (4.5 lb.: AM 31 July 1969); Windsor (5 lb. 10 oz.: AM 18 September 1969); Laleham to Penton Hook (AM 22 January 1970); Halliford Bend (AM 3 July 1969); Molesey to Walton, Desborough Cut (AM 13 November 1969).

In the Lea, a 10 lb. fish from Wormley (AM 29 January 1970); many juveniles on the weir apron of Dobb's Weir (DM).

ESSEX. Two taken in netting from High Maynard Reservoir, Walthamstow (BSM). The possibility of barbel living in still waters, especially reservoirs, is discussed in Marlborough (1969).

GUDGEON *Gobio gobio* (L.)

Recording of this small species and of bleak has much improved in the angling press owing to greater coverage of fishing matches.

THAMES AND LEA. Desborough Cut, Sunbury (AM 13 November 1969); "The Bay", Walton; Romney Island, Windsor (AM 5 February 1970); Laleham to Penton Hook; Richmond (AM 22 and 29 January 1970); one from Barking in 1968 (ACW). In the Lea, Rye Meads effluent channel, downstream to Hackney; Small River Lea, May 1969, Rammey Marsh to Brimsdown (BSM); Dobb's Weir to Wormley (AM 18 September 1969).

KENT. Tributary of Darent at Castle Farm, Eynsford (PCT); stream by B2024 road (MT) and Horton Kirby lakes.

SURREY. Surrey Commercial Docks (AM 3 July 1969).

MIDDX. AND BUCKS. Perivale Wood pond (AGD); Grovelands Lake, Southgate (AW); Yeading Brook (UAS); Grand Union Canal, West Drayton (AM 21 August 1969); Turkey Brook, Enfield during 1968; Pymmes Brook—recolonising formerly polluted reaches at Edmonton and Tottenham (BSM).

TENCH *Tinca tinca* (L.)

Nominally a still-water species, it is found in quite fast water outside the area, e.g. in the Great Ouse in Bedfordshire; its presence in a Lea weirpool is not extremely atypical.

THAMES AND LEA. One in 1967 from Fulham (ACW). In the Lea, Dobb's Weir (DM and AM 18 September 1969); Cheshunt to Enfield (ibid.); Fishers Green (AM 29 January 1970).

KENT. Horton Kirby and Dartford Lakes (MT); I would be grateful for further references, as tench must be common in the many gravel pits of the Darent valley.

SURREY. Surrey Commercial Docks (AM 3 July 1969); reservoir at Walton-on-Thames, 5 lb. 10 oz. (AM 28 August 1969). Millwall Docks (ACW).

MIDDX. AND BUCKS. Poyle Park, Sunbury and Bedfont lakes (AM 3 July 1969); Grovelands Lake, Southgate (AW); South Lake, Halls Angling Scheme No. 1 Fishery, Wraysbury (AM 28 August 1969); Alexandra Park lake, Hornsey (PAM).

ESSEX. High Maynard Reservoir and Maynard No. 4 Reservoir, Walthamstow 'a few' in September and October 1969 (BSM); gravel pit at Fishers Green, Waltham Abbey 1968 (BSM).

MINNOW *Phoxinus phoxinus* (L.)

Another small and under-recorded fish, generally of fast clean streams. Records, with a view to the minnow's potential use as a pollution indicator, would be appreciated.

KENT. Tributary of Darent at Castle Farm, Eynsford (PCT); R. Darent at Horton Kirby (MT and PCT); tributary of Darent near Otford (JAB).

THAMES AND LEA. In the Lea, abundant at Hertford, Stanstead and Rye House, a few at Feildes Weir; Broxbourne Mill Stream (BSM); Dobb's Weir, abundant; increasing near Welwyn Garden City (DM).

MIDDX. AND BUCKS. Perivale Wood Pond (AGD).

CHUB *Squalius cephalus* (L.)

THAMES AND LEA. One in 1969 from Fulham (ACW); Desborough Cut, Molesey to Walton (AM 13 November 1969); Laleham to Penton Hook; Albert Bridge, Old Windsor, 5 lb. 13 oz. (AM 1 January 1970). In the Lea, found dead after pollution in Small R. Lea, Rammey Marsh to Brimsdown; Rye Meads effluent channel (BSM); Fishers Green (AM 29 January 1970).

KENT. Horton Kirby lakes (MT); R. Darent (BDAS).

SURREY. Wey Navigation Canal (AM 4 December 1969).

MIDDX. AND BUCKS. Serpentine, Hyde Park (DAB): one on 5 September 1969.

ESSEX. High Maynard Reservoir, Walthamstow; gravel pit at Fishers Green, Waltham Abbey (BSM).

DACE *Leuciscus leuciscus* (L.)

THAMES AND LEA. Four in 1968 from Fulham; one in the same year from Brunswick Wharf; and Blackwall Point (ACW); Fulham Gas Station (WB); a 1 lb. dace from Kingston (AM 8 January 1970);

recorded in various *Anglers Mail* from 3 July 1969 to 29 January 1970 from Molesey, Walton, Halliford Bend, Romney Island Windsor, Richmond, Laleham and Penton Hook. In the Lea, Rye Meads effluent channel (BSM); Dobb's Weir to Wormley (AM 18 September 1969).

KENT. Dartford lakes (MT); Castle Farm, Eynsford, in a tributary of the Darent (PCT).

SURREY. Surrey Commercial Docks (AT 18 June 1970).

ESSEX. R. Stort down to confluence with Lea at Feildes Weir (BSM).

ROACH *Rutilus rutilus* (L.)

A number of these fish which were netted from park lakes by T.A.P.S. have been tagged and introduced into the Thames and Lea. Readers are asked to look out for these marked fish. The markings are either small yellow plastic squares near the dorsal fins, or red or blue latex spots under the skin. T.A.P.S. and I would be pleased to hear of the capture of one of these fish.

THAMES AND LEA. Roach are the commonest of the larger fish species in the London Area, and have been among the earliest colonisers of the formerly polluted stretches of the two main rivers. At Fulham, fish were first taken in 1965, and between 1967 and 1969 178 roach were taken. In the same period, 73 were taken from Brunswick Wharf, 24 from Blackwall Point, 11 from Barking and 2 from West Thurrock (ACW)—a neat gradient downriver. Roach were also seen at Fulham and Battersea Gas Stations (WB); the reason for their appearance here was suggested as the change-over to natural gas, resulting in the discharge of a less injurious waste than that from coal gas. A roach was seen dying near Lambeth Pier (*Angling*) on 4 July 1969; six to seven inch long roach seen in the mouth of the Wandle (TAPS); and in the second "angling experiment" two roach to 0.75 lb. were taken on rod and line from barges moored by Wandsworth Park. This was in September 1969, just after the turn of the low tide; they were both externally in excellent condition (TAPS: DM).

In the rest of the Thames, *Anglers Mail* records roach from "The Bag" at Walton, Romney Island Windsor, Richmond, Laleham, Penton Hook, Shepperton, Sunbury and Kingston.

In the Lea, roach are found in small numbers all the way down to its confluence with the Thames; at Hackney; and in the effluent channel of Rye Meads Sewage Farm, where they display slower growth but greater numbers than in the main river (BSM). They are spreading despite such events as a mortality at Rammey Marsh in May 1967 (AW). Other places in the Lea, mentioned in *Anglers Mail* are Cheshunt, Enfield, St. Margarets, Dobb's Weir, Wormley and Crown Fisheries. They shoal in good size and numbers in the old Lea course at Wormley, though quite a few have damage to their backs, reason unknown (DM).

KENT. Horton Kirby and Dartford lakes (MT); R. Darent (BDAS).

SURREY. Palm House lake, Kew Gardens—hundreds netted by T.A.P.S. and put into Thames and Lea, but many remain. Surrey Commercial Docks (AM 3 July 1969); Wey Navigation Canal (AM 4 December 1969). Millwall Dock (ACW).

MIDDX. AND BUCKS. Brentford Docks, found during drainage and filling to 2 lb. (AM 20 February 1971); Clissold Park, Stoke Newington (TAPS); Grovelands Lake, Southgate (AW); Perivale Wood Pond (AGD); Bedfont Lake (AM 3 July 1969); Yeading Brook (UAS).

ESSEX. Walthamstow Reservoirs, September and October 1969; Highams Park May 1969; gravel pit at Fishers Green, Waltham Abbey (BSM); R. Stort near Harlow (AM 18 September 1969).

RUDD *Scardinius erythrophthalmus* (L.)

Probably under-recorded in the area because of its similarity to roach. It can colonise small standing waters and produce a population of many small individuals; such bodies of water could produce a lot more records if examined.

THAMES AND LEA. Rye Meads sewage outfall; Feildes Weir (BSM).

SURREY. Isle of Wight Pond, Bookham (GB); Surrey Commercial Docks (AM 3 July 1969; AT 18 June 1970).

MIDDX. AND BUCKS. Queen Mary Pond, Regent's Park (CW).

ESSEX. Parsloe's Park, Dagenham (TAPS); pools in a tannery, West Ham (CL).

BRONZE BREAM *Abramis brama* (L.)

THAMES AND LEA. This species is also colonising the lower Thames, though in smaller numbers than the roach. Sixteen fish were taken at Fulham between 1967 and 1969; 10 at Brunswick Wharf; and one each at Blackwall Point and Barking (ACW). Other Thames records in *Anglers Mail* are from Halliford Bend, Laleham, Penton Hook and Richmond. In the Lea, bream are recorded from King's Weir (AT 19 June 1969) and Fishers Green (AM 29 January 1970).

KENT. Dartford lakes (MT).

SURREY. Surrey Commercial Docks, especially the Royal Albert Dock (AM 3 July 1969).

MIDDX. AND BUCKS. Sunbury Lake (AM 31 July 1969).

ESSEX. Highams Park, May 1969; Walthamstow Reservoirs—High Maynard—September 1969; gravel pit at Fishers Green, Waltham Abbey 1968 (BSM).

ROACH X BREAM HYBRID

This is probably the commonest interspecific hybrid in freshwater in this area. It is probably also under-recorded, as small hybrids

are usually assigned to either of the parent species on superficial or ignorant examination. It is only when careful examination is mandatory or inevitable that they are discovered—such as when making angling “specimen fish” claims, or in scientific sampling followed by examination by an ichthyologist. I would be extremely grateful for records and specimens of putative hybrids and parent species of these or any other kinds. Please use preservative (formalin) if sending specimens.

THAMES AND LEA. Two taken in 1967 from Brunswick Wharf (ACW). Taken in fishing match on Lea at Widewater (AM 5 February 1970).

ESSEX. Eleven taken in netting during September 1969 of High Maynard Reservoir, Walthamstow (BSM).

BLEAK *Alburnus alburnus* (L.)

This small planktophagic species is extremely common in our major rivers and in connected waters. It is also easy to observe; it keeps in the upper layers of water and is a persistent “nuisance” fish to the sport fisherman. With the roach, it is a leading coloniser of the polluted lower reaches of the Thames and Lea, moving in shoals.

THAMES AND LEA. Fifteen from Fulham, 1967 to 1969; one from Brunswick Wharf 1969 (ACW); in the Wandle creek (TAPS). During the second “angling experiment” in September 1969, a party of fishermen took 159 bleak from barges moored near Wandsworth Park, and another party took some more near Chelsea Bridge. The fish were generally in excellent condition and well coloured (TAPS: DM). In the Lea, bleak are colonising downstream and are present from Stanstead Abbots right down to the Thames confluence (BSM); AM 5 February 1970 mentions them at Widewater. If more “all-in” fishing matches, where these little fish count toward the final weight, are to be held in the area then more records may be available on the rivers.

SURREY. Wey Navigation Canal (AM 4 December 1969); Surrey Commercial Docks (AT 18 June 1970).

ESSEX. Present in High Maynard Reservoir, Walthamstow during netting in September and October 1969 in numbers (BSM).

STONE LOACH *Nemacheilus barbatula* (L.)

A small-stream rather secretive species, hiding in amongst coarse gravels by day, and therefore probably under-recorded.

THAMES AND LEA. Abundant in upper Lea at Hertford (DM); very abundant from Stanstead Abbots down to Dobb’s Weir; colonised the Hackney to Tottenham stretch for the first time in 1969; mortality in Small River Lea following pollution in the same year (BSM).

KENT. Tributary of R. Darent at Castle Farm, Eynsford; R. Darent at Shoreham (PCT) and Otford (JAB).

SURREY. R. Mole, Cobham (CW).

MIDDX. AND BUCKS. Turkey Brook from Whitewebbs Park, Enfield to Brimsdown, August 1969 (BSM).

EEL *Anguilla anguilla* (L.)

THAMES AND LEA. Though taken or seen in some numbers in the lower Thames, the eel cannot be said to be recolonising the polluted reaches—for it never left them. As Wheeler (1969b) says, “with the exception of eels, no fish seem to have been present in the lower Thames from around Richmond or anyway Fulham to some 25 miles downstream of London Bridge from about 1920 through to about 1960”. They have never ceased to be present in the Thames above Richmond, which implies recruitment through the polluted stretches from the sea.

Thirteen eels were taken from Fulham from 1967 to 1969; 4 from Brunswick Wharf, 3 from Blackwall Point, 12 from Barking and 2 from West Thurrock during this period (ACW). Another was found dead at Battersea Gas Station (WB).

In the Lea, eels are noted at Hackney (BSM) and Dobb's Weir (DM) and Stratford (ACW).

MIDDX. AND BUCKS. A 6 lb. 15 oz. specimen taken from one of the Hampstead Heath ponds (AT 13 July 1969).

ESSEX. High Maynard Reservoir, Walthamstow, October 1969 (BSM).

CONGER EEL *Conger conger* (L.)

Three specimens of this marine eel were taken at West Thurrock in 1967 and 1968. In AT 11 December 1969, Mr W. T. Dixon wrote a letter saying that he saw an eel two feet long on the bank by Lambeth Bridge, being eaten by a gull. He said it “looked like a conger”, but it is more likely to be *Anguilla anguilla*, which becomes markedly silvery before and during its final spawning run back to sea and would resemble a conger when seen at a distance.

PIPE-FISH *Syngnathus acus* L.

This elongated relative of the sea horse *Hippocampus hippocampus* L. lives in inshore marine areas down to the Channel coast. One was taken on 1 April 1966, and two more in 1967 and 1968 from West Thurrock (ACW).

HADDOCK *Gadus aeglefinus* L.

This species has apparently been spreading its range recently southwards from the northern North Sea. Its spread has taken it into the Thames estuary; haddock to 7 lb. 10 oz. have been taken at Southend and at Gillingham on the Medway, outside the L.N.H.S. area (AM 29 January 1970). Within the Area, they have moved upriver, reportedly following and preying upon shoals of sprats (q.v.).

Captures are reported at Greenwich (TAPS); off the Esso Wharf at Purfleet Deep by dockers fishing in their lunch-breaks (AT 15 January 1970); and at West Thurrock (ACW).

BIB or POUTING *Gadus luscus* L.

This is common along the Channel coast, shoaling near piers, groynes and rocks, in such numbers as to be a "nuisance" fish to sea anglers. It is obviously extending its range up the Thames estuary, for two were taken at Barking in 1968, and twelve at West Thurrock in 1967 and 1968 (ACW).

COD *Gadus morhua* L.

Catches of this commercially valuable food fish are frequent by inshore anglers on the east coast in winter, and offshore for much of the year. A single specimen was taken at West Thurrock in January 1968 (ACW).

LESSER FORKBEARD or TADPOLE FISH *Raniceps raninus* (L.)

This small fish is rather uncommon off British coasts, though Wells (1958) notes it off Kent and Essex. Its penetration of the Thames estuary and the capture of a specimen at West Thurrock in 1964 prompted Wheeler to start collecting fish from the power station grids (Wheeler 1969a). Another was taken in December 1964, and two in 1967 (ACW).

BASS *Dicentrarchus labrax* (L.)

A slow-growing predatory species of coastal waters, running into brackish water. Two were taken from Blackwall Point in 1968, and sixteen in 1967 and 1968 at West Thurrock (ACW).

PERCH *Perca fluviatilis* L.

THAMES AND LEA. Certainly colonising downstream in the Thames, and probably doing so in the Lea. In the Thames, 8 taken in 1967 and 1968 from Fulham; 5 from Brunswick Wharf in 1968; 1 in 1967 from Barking (ACW); Battersea Gas Station (WB). In the Lea, at Hackney; but still scarce upstream near Stanstead Abbots following pesticide pollution (BSM); a 3 lb. 12 oz. specimen from Cheshunt (AM 5 December 1970).

KENT. R. Cray (MT) and R. Darent (BDAS); a 4 lb. fish from Stone Lake (AM 31 July 1969).

SURREY. Surrey Commercial Docks (AT 18 June 1970).

MIDDX. AND BUCKS. Serpentine, Hyde Park (DAB); Clissold Park, Stoke Newington (TAPS); Grovelands Lake, Southgate (AW); Sunbury Lake (AM 3 July 1969); Yeading Brook (UAS).

ESSEX. Head tanks on Stratford sidings (CL); gravel pit at Fishers Green, Waltham Abbey; mass mortality due to unknown disease in King George V and William Girling reservoirs; only a few taken in netting Walthamstow reservoirs in autumn 1969 (BSM).

RUFFE *Acerina cernua* (L.)

THAMES AND LEA. Four taken during 1967 and 1968 from Fulham; one in 1967 from Brunswick Wharf (ACW); in the Lea, from Feildes Weir to Dobb's Weir (BSM) —though they must be more widely spread than this comparatively short stretch.

ESSEX. High Maynard and Maynard No. 4 Reservoirs, Walthamstow; R. Stort, Roydon (BSM).

SCAD OR HORSE MACKEREL *Trachurus trachurus* (L.)

One specimen taken at West Thurrock in 1968 (ACW): though common in the Channel, scad are not particularly noted as being estuarine fish.

GREATER SAND-EEL *Hyperoplus lanceolatus* (Lesauvage)

Two specimens taken from West Thurrock between 1964 and 1968 (ACW). This and the following species live near sandy shores or in sandy estuaries and form an important prey species for many predators.

SAND-EEL *Ammodytes tobianus* L.

One taken in 1968 from Brunswick Wharf; and Barking; two in 1967 from West Thurrock (ACW).

SAND GOBY *Pomatoschistus minutus* (Pallas)

This little goby has penetrated as far upstream as Fulham, where one was taken in 1969: it must have swum through the zone of worst pollution. Five were taken at Brunswick Wharf in 1968; nine from West Thurrock in 1967 and 1968 (ACW): previously one was taken from here in 1965.

DRAGONET *Callionymus lyra* L.

Two taken 1967 and 1968 from West Thurrock (ACW). Dragonets are a shallow water species and have been noted from the Thames estuary before (Wells 1958).

MULLET *Mugil* sp.

Reported in AT 22 January 1970 from Dartford and West Thurrock. Mulletts are well known for moving up estuaries to feed, right into fresh waters.

RED GURNARD *Aspitrigla cuculus* (L.)

Two specimens taken at West Thurrock in 1967 and 1968 (ACW). This species is described by Wells (1958) as being found in the Thames estuary.

GREY GURNARD *Eutrigla gurnardus* (L.)

One taken from West Thurrock in 1968 (ACW).

BULLHEAD *Cottus gobio* L.

THAMES AND LEA. R. Lea—from Stanstead Abbots to Dobb's and Feildes Weirs (BSM); abundant in upper Lea at Hertford (DM).

KENT. R. Darent tributary at Castle Farm, Eynsford; headwaters of Darent at Westerham, (PCT); and at Horton Kirby (MT) and at Otford (JAB).

ESSEX. High Maynard Reservoir, 1969 (BSM).

HOOKNOSE *Agonus cataphractus* (L.)

Two taken in 1967 and 1968 from West Thurrock (ACW).

SEA SNAIL *Liparis liparis* (L.)

Four taken 1967 and 1968 from West Thurrock (ACW).

THREE-SPINED STICKLEBACK *Gasterosteus aculeatus* L.

THAMES AND LEA. Well able to live in quite severely-polluted water, this species is a major coloniser. Thirty taken from Fulham 1967 to 1969; thirty-one from Brunswick Wharf; six from Blackwall Point; six from Barking in the same period; one from West Thurrock in 1965 and another in 1968 (ACW). Tolerance of salinity also helps this species in its downward spread. In the Lea, downstream from Hackney to the Thames confluence (BSM), perhaps in the entire length.

KENT. Tributary of R. Darent at Castle Farm, Eynsford (PCT); another at Otford (JAB). MT reports "sticklebacks" (presumably three-spined) in the Darent at Horton Kirby, and a pond at Letts Green.

SURREY. Pond at Weston Green, Esher (GB).

MIDDX. AND BUCKS. Perivale Wood Pond (AGD); Turkey Brook; Pymmes Brook down to Tottenham Lock; Moselle Brook, Tottenham (BSM).

HERTS. Cuffley Brook; Mimms Brook to Waterend, South Mimms; upper part of Pymmes Brook near Barnet (BSM).

TEN-SPINED STICKLEBACK *Pungitius pungitius* (L.)

KENT. One in tributary of R. Darent at Otford, 18 March 1962 (JAB).

MIDDX. AND BUCKS. Perivale Wood pond (AGD).

HERTS. Quite numerous in denser weedbeds of the upper Lea tributaries, e.g. the Mimram (DM); rush-beds of Colne at Oxhey (TB).

GUPPY *Poecilia reticulata* (Peters)

The colony in warmed water at Hackney reported by BSM (Marlborough 1969; Meadows 1968) still persists.

PLAICE *Pleuronectes platessa* L.

Three taken from West Thurrock in 1967 and 1968 (ACW).

FLOUNDER *Platichthys flesus* (L.)

Three taken in 1967 and 1968 from West Thurrock (ACW).

BRILL *Scophthalmus rhombus* (L.)

One taken in 1967 from West Thurrock (ACW). This fish is a more unusual capture than the plaice or the flounder, both inshore or estuarine flatfish. The flounder indeed will run right into wholly fresh water. Brill are a sand-loving species, preying extensively on sand-eels.

DAB *Limanda limanda* (L.)

Three taken 1967-1968 at West Thurrock (ACW). This species will normally enter estuaries.

SOLE *Solea solea* (L.)

No less than 25 soles were taken at West Thurrock in 1967 and 1968 (ACW). It is a common Channel species, feeding mainly on marine worms in rather deeper water than these other flatfish.

Notes

B.S. Meadows has kindly pointed out three errors in Marlborough (1969):

- a) Trent Park, Cockfosters, is actually in Middlesex—though it was placed with Herts. records as its postal address is Barnet.
- b) Cobbins Brook and Honey Brook are in Essex, not Herts.
- c) Salmons Brook is in Middlesex.

Any errata of a similar nature I apologise for in advance, and I am always pleased to receive corrections.

Several people have asked me whether the brief of Recorder of Fishes included recording some of the larger invertebrates, especially crayfish (*Astacus pallipes* L.). Up to now I have not recorded them officially but I will gladly accept records of this crustacean.

Records so far are as follows:

THAMES AND LEA. Upper Lea, Hertford (DM).

KENT. R. Cray (MT).

HERTS. Up to 1964, in R. Rib at Wadesmill, near Ware; R. Gade near Watford (DM).

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The Dragonflies of Richmond Park

by A. K. S. BUSH

Introduction

Seven miles from London's Hyde Park Corner is an area well known for its natural history interest—Richmond Park, two and a half thousand acres of grassland, plantations and mixed woodland, predominantly oak (*Quercus robur*.) Geologically, the Park is on London Clay with an intermittent covering of gravel, in places of considerable depth. In the past the gravels have been dug out, and the resulting flooded hollows today form an outstanding feature. Other ponds, more shallow, were excavated during the last century as watering places for the deer. These animals are one of the most attractive features of the Park, but other elements of the fauna go unnoticed. Amongst these are varied and interesting dragonfly populations. The object of this study is to determine these populations and consider their distribution.

Results

This study was undertaken in 1969 and a part of 1970 and it was decided to concentrate on a detailed investigation of ten ponds, the location of which is shown on Map 1. In all, ten species were found to inhabit these ponds and they are shown in Table 1.

In attempting to explain the dragonfly distribution the characteristics of each pond were noted (Table 2). The Appendix gives the classification of the Odonata and a description of each species found in the Park.

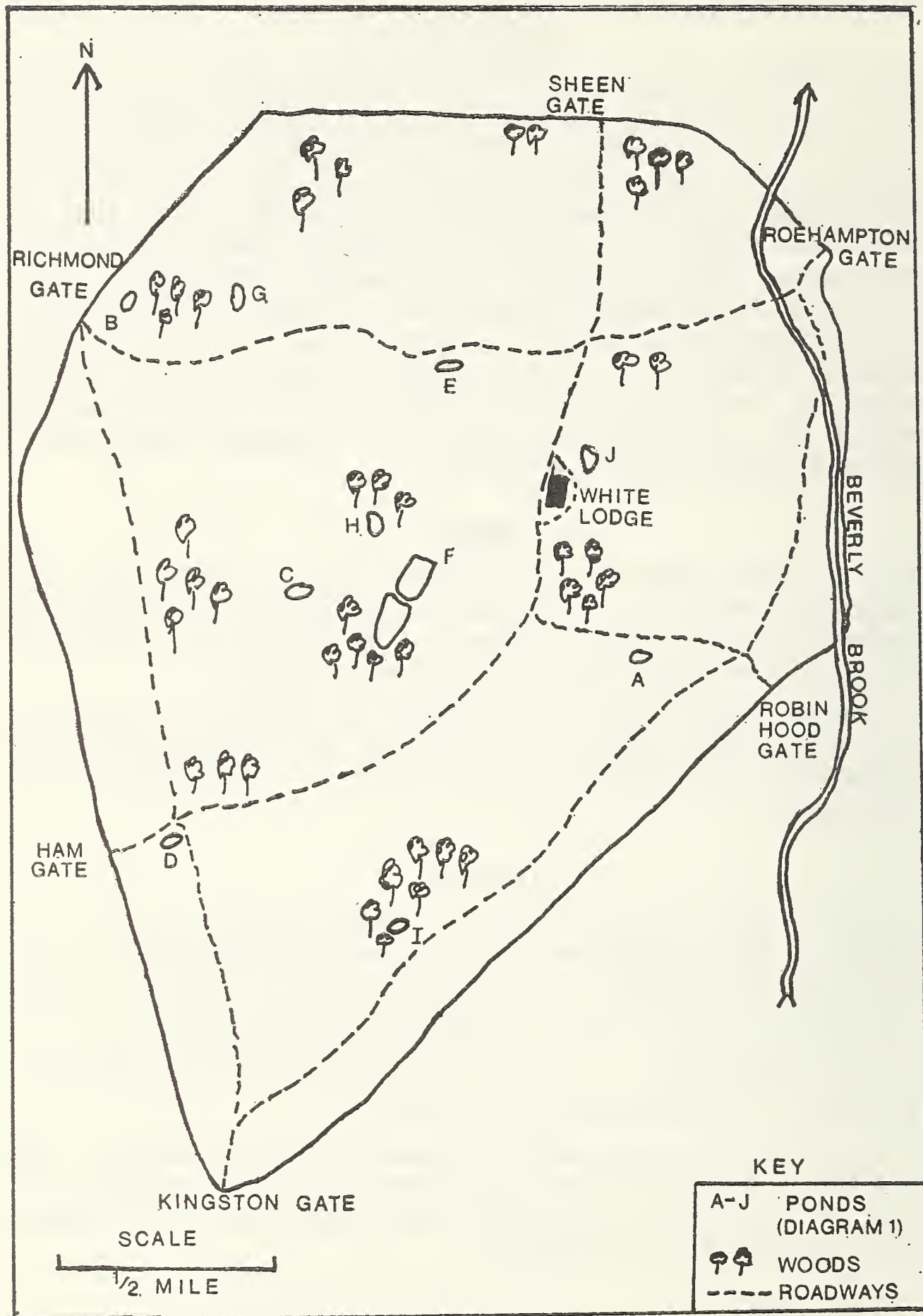
Discussion

Very little work has been done on the subject of distribution of the Odonata. Moore (1964) has worked on the Arne Peninsula in Dorset producing tables similar to those in this paper, but he confined his discussion to the problems of competition amongst the Odonata and not their distribution. Macan (1964) working on Hodson's Tarn in the Lake District has put forward various suggestions regarding the distribution of certain species in the Tarn.

Various writers have tried to correlate one factor or another with distribution, but probably no single factor can explain the phenomenon. It is intended to discuss the various factors here with reference to the situation in Richmond Park.

1. Damselflies

It has been said that the acid conditions present in some pools restrict the breeding of Odonata. Walker (1953), in Canada, states that *Enallagma cyathigerum* (Charp.) appears generally to avoid pools



MAP 1. The location of the ponds studied in Richmond Park.

TABLE 2. Characteristics of the ponds in Richmond Park.

| Pond | Martin's | Bishop's | Leg of Mutton | Ham Dip | Barn Wood | Lower Pen | Conduit Wood | Queen's Ride | Dann's | White Lodge |
|--|----------|----------|---------------|---------|-----------|-----------|--------------|--------------|--------|-------------|
| Map Key | A | B | C | D | E | F | G | H | I | J |
| APPROXIMATE DEPTH (feet) | 3 | 3 | 5 | 3 | 3 | 10+ | 3 | 3 | 4 | 1 |
| SIZE (sq. yds.) | 400 | 1650 | 2860 | 1020 | 850 | 32620 | 650 | 600 | 800 | 136 |
| SHAPE | Round | Oval | Oval | Oval | Oval | Square | Elongated | Elongated | Round | Round |
| TREES NEAR POND | | + | | | | + | + | ++ | ++ | + |
| pH of WATER | 6.58 | 7.11 | 4.4 | 6.11 | 6.63 | 6.97 | 3.84 | 6.34 | 6.86 | 6.21 |
| % SHORE EDGED WITH <i>Juncus effusus</i> | 20% | 40% | 75% | 60% | 20% | 50% | 70% | 20% | 80% | 2% |
| SUBMERGED AND FLOATING PLANTS | | | | | | | | | | |
| <i>Callitriche</i> spp. | | + | | + | | | + | | + | + |
| <i>Elodea canadensis</i> | + | | | | + | + | | + | + | + |
| <i>Glyceria maxima</i> | + | | | | + | | + | | + | + |
| <i>Potamogeton natans</i> | | + | | + | | | | | + | + |
| <i>Juncus bulbosus</i> | | | + | | | | + | | | + |

in acid soils, such as typical muskeg pools. However, he has found it in a *Sphagnum* bordered lake in southern Manitoba.

In Richmond Park the ponds have a range of pH from 3.84 to 7.11. It would seem that the three most common Zygopterans can stand a wide range of pH. However, if pH has no direct effect on distribution it might have an indirect effect.

Parr (1969) working in the Outer Hebrides where *Enallagma cyathigerum* breeds, found the species in the west of Benbecula and North Uist (characterised by a very light soil and rough grazing), but not in the east (characterised by uncultivated bog and moorland). He concluded that the total absence of cultivation in the east is an indication of infertility and acidity, and because of this there is a total absence of Zygopteran populations. However, Parr (pers. comm. 1970) does suggest that the pH may not be having a direct effect. He observed that the pools in the west were eutrophic with large numbers of other animal species, whilst those in the east were oligotrophic with fewer animal taxa. Thus the explanation of this and other distributions could well be found in the interaction of food availability, pH and the state of the pool (eutrophic or oligotrophic).

Lestes sponsa (Hans.) a damselfly common in Richmond Park is said by Corbet (1956) to be associated with acid moorland pools. However, in Richmond Park the view of Longfield (1949) is more applicable, that is, the species frequents marshes, pools, ditches and streams where emergent vegetation grows by the edge of the water.

Emergent vegetation is probably one of the most important factors governing distribution. To illustrate this point the distribution of the three damselflies, *Lestes sponsa*, *Ischnura elegans* (L.) and *Coenagrion puella* (L.) can be examined. The first two are common in the Park, as Table 1 shows. However, at no pond is there a large population of either species, and this is a reflection of the amount of emergent vegetation. There is one exception—Dann's Pond. Here there is a large amount of emergent vegetation and trees bordering the pond. Here also can be found the third damselfly—*C. puella*. It is likely that this dragonfly requires more emergent vegetation than either *Lestes sponsa* or *Ischnura elegans* to survive and is thus restricted to Dann's Pond.

The fourth damselfly to be found in the Park, *Enallagma cyathigerum*, is common. Two ponds, the Leg of Mutton and Lower Pen, have large populations. At Queen's Ride Pond there was only one sighting of the insect. From Table 2 it can be seen Queen's Ride Pond is surrounded by trees, has little emergent vegetation and is relatively small. In contrast the other two ponds are larger, have more emergent vegetation and have few if any trees at their edges. The explanation for this population size difference is as follows. *E. cyathigerum* must have open water over which to fly. At the same time it must have somewhere to perch, in other words sufficient emer-

gent vegetation. Both these requirements are fulfilled in the Leg of Mutton and Lower Pen Ponds but not in Queen's Ride Pond, where there is insufficient flying room.

In summary, it seems that food availability, state of the pond and vegetation are all important factors in distribution.

2. Dragonflies

The distribution of dragonflies in the Park can be explained similarly to that of the damselflies. However, in addition inter and intra specific competition may be an important factor, especially at the larval stage.

From Table 2, the Aeshnids seem to prefer weedy ponds where the female lays her eggs in the stems of water plants. The two Libellulids are known to prefer brackish or peaty water and this is reflected in their distribution in the Park, whereas the two Sympetrum favour weedy, muddy and shallow ponds and are therefore confined to these localities.

APPENDIX

Classification of the Odonata

In the British Isles there are forty-three species of the Odonata. Seventeen belong to the sub-order Zygoptera or damselflies. They are distinguished by their slender bodies, their fluttering flight and two pairs of similar wings which are held vertically over the abdomen when at rest.

Twenty-six species belong to the sub-order Anisoptera. These are the true dragonflies with two pairs of dissimilar wings, which are held at right angles to the body when at rest. They are strong fliers and have stout bodies. The Anisoptera is made up of fourteen hawk dragonflies, which have long bodies, and twelve darter dragonflies which are smaller and have short fat bodies.

Descriptions of Species found in Richmond Park

Hawker dragonflies (Anisoptera)

BROWN AESHNA *Aeshna grandis* L.

This brown insect can be distinguished by the two yellow oblique stripes on the thorax and distinctive yellow-brown wings. It is one of our largest dragonflies and can be seen hawking over the reeds bordering the ponds in mid-July, August and September. It is common in the midland and southern counties of England but rare elsewhere.

SOUTHERN AESHNA *A. cyanea* (Müll.)

Another very large dragonfly, the body is composed of many colours—yellow, green, blue and dark brown. It is altogether a

brilliant species. The female has an interesting method of oviposition. She slits open the stem of a water weed with her ovipositor and inserts an egg—an ideal protective device. It is seen flying in July, August and September, often away from water. It has a similar distribution to that of the brown aeshna

Darter dragonflies (Anisoptera)

FOUR-SPOTTED LIBELLULA *Libellula quadrimaculata* L.

This species has a brown body, brown patches on its wings and a dark spot in the centre of all four wings, which is characteristic. The way the adult catches its food can be likened to the spotted flycatcher for it lays in wait, darts out to capture its prey and then returns to its perch. It can be seen from the end of May to early September. It is a well known wanderer, and is well distributed throughout the British Isles.

BROAD-BODIED LIBELLULA *L. depressa* L.

Both sexes can be identified by their broad bodies whilst, in addition, that of the adult male is powdered bright blue. It is on the wing from the end of May to mid-August. This is another southern and midland species.

BLACK SYMPETRUM *Sympetrum danae* (Sulz.)

This is a small black or black and yellow dragonfly. It is a rapid flyer but does not fly far, often returning to the same spot unless thoroughly disturbed. As is the case with all *Sympetrum* species, the female is held by the male by the neck, whilst she is egg-laying. She deposits her eggs by striking the water's surface with her abdomen and in doing so the eggs are washed off. The species is on the wing from the end of July to October. It has a scattered distribution but is often locally common.

COMMON SYMPETRUM *Sympetrum striolatum* (Charp.)

This species is variable in colour but it is most often red and yellow-brown or all yellow-brown. It is very fond of resting on bare ground but is restless and easily startled. As the name suggests it is common and can be seen from the end of July to the end of October.

Damselflies (Zygoptera)

GREEN LESTES *Lestes sponsa* (Hans.)

A small metallic green damselfly. The male holds the female by the neck while egg-laying is accomplished under water where the female slits open a plant stem with her ovipositor and inserts an egg. It is on the wing from July to mid-September and is widely scattered throughout the British Isles.

COMMON ISCHNURA *Ischnura elegans* (L.)

This is a slender dark greenish-black damselfly with bright green or blue sides to the thorax. It is characterised by the blue eighth segment of the abdomen. The females are polymorphic. The species can be seen almost anywhere, from the beginning of May to the end of August.

COMMON BLUE DAMSELFLY *Enallagma cyathigerum* (Charp)

This damselfly is a brilliant cerulean-blue and can be distinguished from other blue damselflies by the blue eighth and ninth segments of the abdomen and the second segment having an oval spot joined to the black joint between the second and third segments by a stem. This species often swarms over open water, the habit being likened to the swarming of mosquitos on a summer's evening. It is on the wing from June to September and is probably the most common damselfly in the British Isles.

COMMON COENAGRION *Coenagrion puella* (L.)

This species can be distinguished from the common blue damselfly by the greater extent of black on the thorax and the black "U" on the second abdominal segment of the male. Like the rest of the damselflies its flight is weak and short. It is on the wing from mid-May to mid-August and can be found throughout the British Isles except in Scotland, where it is rare.

It is hoped that this account will encourage people to investigate the dragonfly populations in their areas, for records are sadly lacking. Any information regarding the dragonflies in the Park would be gratefully received. My address is: 3 Parkgate Gardens, East Sheen, London S.W.14.

I should like to thank Dr R. R. Askew, Mr G. Blower, Dr M. J. Parr and Dr D. Yalden for their encouragement during this study.

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Hemiptera-Heteroptera of the London Area

PART VII

by ERIC W. GROVES, F.R.E.S.

(Previous parts of this paper have appeared in the *London Naturalist* as follows: Pt. I (43, 34-66, 1964); Pt. II (44, 82-110, 1965); Pt. III (45, 60-88, 1966); Pt. IV (46, 82-104, 1967); Pt. V (47, 50-80, 1968); and Pt. VI (48, 86-120, 1969). A continuing list of abbreviations for the sources of records and recorders' names has appeared at the beginning of each of the above parts.)

MIRIDAE (Capsid Bugs) (*Contd.*)Subfamily: ORTHOTYLINAE (*Contd.*)

Orthotylus tenellus (Fall.) Sp. 330 p. 259
 D&S p. 343 (*Litosoma angustus*)
 S p. 289 (*O. tenellus* with *O. angustus* in synonymy)
 B p. 485 (Sp. 359)

Very local in the London area. Found mostly on ash but occasionally occurs on oak and hazel. Adults first appear at the end of July and have been taken up to the end of the following month. The species overwinters in the egg stage. Essex records wanting.

MIDDX. Edgware (Scratch Wood), 22.vii.60, a single ♂ (parasitized) on *Salix* near oaks, DL (EMM 97, 67) (54); Ruislip LNR, 18.vii.64, a single adult taken on ash, RAPM (49).

HERTS. Whetstone, 1.viii.60, ♂ taken in light trap, PHW (pers. comm.) and (47); Barnet, viii.1885, EAB (BM); and just over the boundary at Harpenden, 6.vii.33, to light, DCT (12); 23.vii.60, DL (HD) (54).

KENT. Sevenoaks (Knole Park) 4.vii.65, KCS (14) (1/1965, 59); 4.vii.65, AMM (BM).

SURREY. Merton Park 15.vii.31 (on elm) and 8.vii.32, FJC (SL); Croydon, ES (36); Boxhill, 23.vii.22, FJC (SL) Reigate, ES (36); Oxshott, 21.vii.51, HDS (SL); and beyond the boundary at Chobham, vii.1888, ES (HD) (36); and Woking, 1871, ES (BM).

BUCKS. On the boundary at Slough (PILG), various dates, GEW (40).

Orthotylus viridinervis (Kb.) Sp. 331 p. 259
 S p. 287 B p. 486 (Sp. 361)

Local. Found chiefly on wych elm. Adults occur from the beginning of July until the end of August. Essex records wanting.

MIDDX. Hampstead Heath, 18.vii.43, on *Ulmus*, CHA (17); Hillingdon, 8.viii.36, on *Alnus glutinosa*, DCT (33a).

HERTS. Whetstone, 30.vi.60 ♀, 11.vii.60 ♂ and 1.viii.60 ♀, taken in light trap, PHW (pers. comm.) and (47); Barnet, viii.1885, EAB

(BM); Elstree, 5. vii.58, *DL* (SL); Radlett, 20.vi.60, larvae and adults in about equal ratio on wych elm, *DL* (HD) (54).

KENT. Blackheath, *WW* (4) (22) (39); regular visitor to m.v. light at 63, Blackheath Park but not common, has not otherwise been taken, *AAA* (51); Kidbrook Lane, 25.vii.1896, on elm hedges, *WW* (60) (39).

SURREY. Wimbledon Common, *FJC* (62); Merton Park, *FJC* (62); Cheam (Nonsuch Park), 8.vii.55, on wych elm, *EWG* (24); Shirley, 11.vii.1896, on elm, *WW* (60); Boxhill, 31.viii.1898, on hazel, *WW* (60) (62); Bookham Common, 29.vi.13, on elm, *FJC* (SL); 3.viii.58, *DL* (SL); Esher, *JAP* (BM); and beyond the boundary at Chobham, vii.1892, *ES* (BM) (HD) (3) (37); and Woking, vii.1890, on elm, *ES* (BM) (3) (37) (62).

BUCKS. Just over the boundary at Slough, 26.vii.55, on apple *GEW* (EMM 92, 35); Amersham, 2.viii.54, on lime, *WJLeQ* (21); Coleshill, 14.vii.51, on ash, *WJLeQ* (21); and beyond at Burnham Beeches, 22.vi.12, *EAB* (BM).

Orthotylus marginalis Reut.

Sp. 332 p. 261

D&S p. 337 (*Litosoma nassutus*)

S p. 290

B p. 484 (Sp. 358)

Common and widespread throughout the London area. Has been taken on willows and sallows, apple, elm, and occasionally on other trees, shrubs and plants during the period mid-June until the end of August.

MIDDX. Buckingham Palace grounds, 1961, at light (July), *TRES* (52); Brompton Road, S.W.7, 9.vii.67, *J. Marshall* (BM); St. John's Wood (Finchley Road) N.W.8, 13.&16.vii.52, *DL* (HD) (54); 3.vii.58, adults on elm, *DL* (EMM 95, 98) (54); Finchley 16-31.vii.43, on *Salix*, *CHA* (17); Edgware (Scratch Wood), 22.&26.vii.60, on *Salix* *DL* (HD); Ruislip LNR, 1952-58, a common species on both the narrow-leaved willows and on the sallows in months June, July and early Sept. (earliest in the year taken 15.vi.52 adult ♀; latest taken 9.ix.58 adult ♀; ♂ & ♀ taken in cop, 29.vii.55) *EWG* (24) (49); Harefield, 21.vi.52, on nettle, *WJLeQ* (21); Uxbridge 1.viii.35 and 8.viii.36, on *Salix* and *Ulmus*, *DCT* (33a); Hounslow Heath, 23.vi.53, a few adults taken on *Salix* on the heath, *GEW* (33c) (54); and Sunbury-on-Thames, 10.vi.11, *ECB* (NM).

HERTS. Whetstone, several examples (all ♂♂) taken on dates between vi-viii.60 in light trap, *PHW* (pers. comm.) and (47); Barnet, viii.1885, *EAB* (BM); Elstree, 3.vii.58, larvae on sallow, *DL* (EMM 95, 98); Aldenham Reservoir, 19.vi.60, adults & V instar larvae (the latter all parasitized) beaten off willow, *DL* (54) (EMM 97, 67); Batford, 16.viii.37, on *Salix* sp., *DCT* (12); Rickmansworth, 3.viii.33, *DCT* (12); Radlett, 21.vi.60 and 23.vii.60, *DL* (54); Bricket Wood, 14.vi.54, *GGES* (HD); Bricket Wood Common, 3.vii.56, adult & V instar larvae, *EWG* (24); and Cheshunt, 19.vii.06, *AJC* (HD).

ESSEX. Epping Forest, on willow and sallow, common, *CN* (35a); 15.vi.57, on sallow, *WJLeQ* (21); (Chingford), vii.1892 (adult), 22.vi.11 (IV instar larva) and 15.vi.12 (III instar larva), *EAB* (BM); (Theydon Bois) viii.22, *EAB* (BM).

KENT. Blackheath, *JAP* (BM); common especially on willow less so on apple, fairly common at m.v. light, *AAA* (51) (22); Lee, *WW* (4) (22) (39); Southend, 17.vii.1897, banks of the Ravensbourne on sallow, *WW* (SL); Lewisham, *D&S* (4) (22) (39); (Chapman's Garden), 27.vii.1897 and 28.vii.1896, *WW* (60); Bexley (Joyden's Wood), 11.vii.64, *KCS* (14); Darenth Wood, 6.vii.55, V instar larvae, *EWG* (24); Horton Kirby, 2.vii.61, *KCS* (14) (22); Bromley, viii.1887 and vii.1887, *ES* (HD); West Wickham Wood, 27.vi.1896, on sallow, *WW* (60); Shoreham, *KCS* (22); Shorne, *KCS* (22); Magpie Bottom, 25.vi.61, *KCS* (14); and on the boundary at Sevenoaks, *KCS* (22); and near Gravesend, 21.vii.48 on broom *TRES* (13).

SURREY. Putney, 1.vii.1889, on osiers and willows on banks of the Thames, *EAN* (C); 18.vii.1883, banks of Thames E. of Hammer-smith Bridge, on willows, *EAN* (C); Wimbledon, *JAP* (BM); Wimbledon Common, 1.vii.48, *FJC* (SL); 3.viii.32, *FJC* (SL) (MM); 25.vi.55, *EWG* (24); Merton Park, S.W.20, *FJC* (62); Cheam (Non-such Park), 13.vii.54 and 8.vii.55, *EWG* (24); Norwood, *JAP* (BM); Banstead Downs, 23.viii.55, *EWG* (24); Banstead Heath, 3.ix.62, *PSB* (16); Boxhill, 14.viii.39, *ECB* (NM); Ashted, 11.vii.47, *FJC* (SL) (62); Bookham Common, 16.viii.48 *FJC* (SL) (62); *WW* (62); viii, *DL* (34); 8.vii.56 and 10.vii.55 (adults), 19.vii.53 ♀, 14.vii.58 & 21.vi.55 (V instar larvae), 21.vi.55 (IV instar larvae), *EWG* (24); 31.vii and 5.vii.69, *PSB* (16); Effingham, *FJC* (62); Oxshott Heath, 26.vii.48, *FJC* (SL) (62); 28.vii.57, *GGES* (HD); (Prince's Coverts), 25.vi.48, *FJC* (SL) (62); Esher, *JAP* (BM); and beyond the boundary at Byfleet, 2.vii.22, *FJC* (SL) (62); Chobham, vii.1892, *ES* (HD); Woking, vii.1890, *ES* (HD); and Chiddingfold, 22.viii.37, *ECB* (NM).

BUCKS. On the boundary at Chalfont St. Peter, 18.vii.25, on willow, *EAB* (BM); just over the boundary at Amersham, 2.viii.54, on lime, *WJLeQ* (21); Coleshill, 14.vii.51, on ash, *WJLeQ* (21); Slough, 26.vii.55, on apple, *GEW* (EMM 92, 35); and beyond at Burnham Beeches, 22.vi.12, *EAB* (BM).

Orthotylus flavinervis (Kb.)

Sp. 333 p. 261

D&S p. 338 (*Litosoma flavinervis*)

S p. 289

B p. 484 (Sp. 357)

Local. Overwinters in the egg state, the eggs hatching out at the end of June. Occurs mainly on alder, willow and sycamore. Essex records wanting.

MIDDX. Uxbridge, 22.vi.33, on *Salix* and *Alnus*, *DCT* (33a).

HERTS. Bushey Heath, 23.vii.44, *CHA* (17) (EMM 81, 163-4); and just over the boundary at Harpenden, 15.viii.37 (on *Ulmus campestris*) and 11.viii.37 (on *Tilia*), *DCT* (12).

KENT. Forest Hill, GCC (4) (22); Catford, 10.vii.1897, on alder, WW (4) (22) (39) (60); Lewisham, D&S (4) (22); Southend, 17.viii.1897, banks of the Ravensbourne on willow, WW (60) (SL); Bromley, vii.1887, ES (MD) (4) (22) (39); and Blackheath, regular at m.v. light (rather more frequently than *O. viridinervis*) though not found otherwise, AAA (51).

SURREY. Cheam (Nonsuch Park), 13.viii.54, EWG (24); Oxshott Heath, 1922-25, on alder in deciduous woodland, OWR (61); Esher, viii.1875, ES (HD) (3) (37) (62); and beyond the boundary at Virginia Water, 25.vii.56, on alder, GEW (40); Byfleet, 8.vii.50, DL (SL); 12.vii.22, FJC (SL); Woking, ES (3) (37) (62); Basingstoke Canal banks between Byfleet and Woking, 8.vii.50, SL (1/1950-51, 73); Gomshall, 8.vii.51, HDS (SL); Guildford, 30.vi.41, ECB (NM); and Shalford, EAB (3) (62).

BUCKS. On the boundary at Little Chalfont, 22.vii.54, on sycamore, WJLeQ (21); and at Datchet (Ditton Park), 30.vi.57, GEW (40); and just over the boundary at Latimer, 21.viii.54, on poplar, WJLeQ (21); Chenies, 19.viii.16, EAB (BM); Chesham, 4.vii.53, on alder, WJLeQ (21); and Amersham, 6.vii.52, 11.vii.53 (on hornbeam) and 2.viii.54, WJLeQ (21).

Orthotylus nassutus (Fab.)

D&S p. 336 (*Litosoma stricornis*)

B p. 486 (Sp. 360)

Sp. 335 p. 262

S p. 287

Local, sometimes locally frequent. Associated mostly with lime, oak, willow but occasionally found on ash, poplar, hazel and other trees. The adults occur during the months of July and August.

MIDDX. St. John's Wood (Finchley Road) N.W.8, 3.viii.51, on *Tilia*, DL (SL) (54); 15.vii.57, teneral ♂ on *Tilia*, DL (54); 3.viii.58, DL (SL); 4.viii.61, ♂ ♂ & ♀ ♀, DL (54); 16.vii.61, on *Tilia* and *Ulmus*, DL (HD); 3.viii.51, on *Tilia*, DL in WJLeQ coll. (21); Hampstead, 4.viii.43, on *Salix*, CHA (17); Hampstead Heath, 19.vii.52, on oak, DL (HD) (54); Crouch End, 2.ix.09, EAB (BM); Finchley, 13.vii.43, on *Populus*, CHA (17); Mill Hill, 5.viii.58, DL (SL); Highgate, ix.1892, EAB (BM); Ruislip LNR, 2.viii.64, a single adult on ash, RAPM (49); and Harefield, 26.viii.51, on willow, WJLeQ (21).

HERTS. Whetstone, 24.vii.60 ♂, 31.vii.60 ♂, and 29.viii.60 three ♀ ♀, taken in light trap, FHW (pers. comm.) and (47); Barnet, viii.1885, EAB (BM); Radlett, 23.vii.60, a few adult ♂ ♂ "more or less teneral", DL (HD) (54); and just over the boundary at Harpenden, 8.viii.37, on *Quercus*, DCT (12); 11.viii.37, laying eggs on trunk of *Tilia*, DCT (12); (grounds of Rothamsted Expt. Station), 22.viii.55, in light trap, GGES (HD); Harpenden Common, 23.vii.60, a few adult ♂ ♂ "more or less teneral", DL (54); and Haresfoot, near Berkhamsted, 19.vii.59, on lime, WJLeQ (21).

ESSEX. Epping Forest (Monk Wood), viii.1894, CN (35a); (Loughton) viii.04, EAB (BM); and Purfleet, RML (5).

KENT. Blackheath, *WW* (4) (39) (22); fairly common on lime trees (in some numbers on 29.vii.61), rarer on ash and bramble, *AAA* (51); viii.65 on *Populus italica* not common to m.v. light (mostly in viii), *AAA* (51); *JAP* (BM); Lewisham, 9.viii.1896, on lime, *WW* (SL) (60); 6.ix.1896, on limes, *WW* (SL); (Darmouth Row) 9.viii.1896, *WW* (60); 27.vii.1896, *WW* (SL); Eltham, *D&S* (36) (37) (4) (22); and Bromley, viii.1887, *ES* (HD) (37) (4) (22).

SURREY. Wandsworth, ix.1877, *ES* (HD) (37) (3) (62); Beddington Sewage Farm, 11.viii.55, *EWG* (24); Reigate, *ES* (36); *GBR* (62); Boxhill, 29.vii. & 26.viii.49, *FJC* (SL) (62); Ashted, *FJC* (62); Oxshott, *TRB* (37) (3) (62); and beyond the boundary at Shalford, viii.1886, *EAB* (BM) (3) (37) (62); Chobham, *ES* (36) (37) (3) (62); and Horsell, 26.viii.29, *FJC* (SL) (62).

BUCKS. Just over the boundary at Chesham, 6.viii.59, on hazel, *WJLeQ* (21); Amersham, 1.ix.51, specimens on willow, ash, and elder, *WJLeQ* (21); and Slough (ICBFS), 16.vi.33, on *Salix sp.*, *WHG* (41); (PILG), 26.vii.55, on apple, *GEW* (40).

Orthotylus ochrotrichus Fieb.

Sp. 336 p. 262

D&S p. 342 (*Litosoma ochrotrichus*)

S p. 288

B p. 488 (Sp. 364)

Local. The adults, occurring from end of June until the end of August, are to be found principally on elm and nettle particularly in hedges and along green lanes, though it has been recorded on a variety of other plant hosts. This species is predaceous on the Fruit tree Red spider-mite.

MIDDX. Buckingham Palace grounds, 1961, on elm, *TRES* (52); Cripplegate bombed sites, City of London, 23.vii.55, V instar larvae, *EWG* (24); Finchley, 15.vii.44, on *Ulmus campestris* and *Urtica*, *CHA* (17); Hendon, 11.vii.1896, *EAN* (C); Edgware (Scratch Wood), 22.vii.60, on *Salix*, *DL* (HD) (EMM 97, 33) (54); Ruislip, 4.viii.36, on *Ulmus*, *DCT* (33a); Ruislip LNR, 24.vii.56 ♂ & ♀, and 29.vii.58 ♂ & ♀ in cop., swept from nettle, *EWG* (24) (49); Hillingdon, 8.viii.36 on *Populus tremula* and *Salix sp.*, *DCT* (33a).

HERTS. Barnet, 27.vi.43, *CHA* (17); Boreham Wood, 27.vi.60, *DL* (54); Chorley Wood, 11.viii.16, III instar larvae, *EAB* (BM); Radlett, 20.vi. & 26.vi.60, as adults ("unusually early") *DL* (HD) (54); and just over the boundary at Harpenden, viii.11 and viii.37, on *Urtica* and *Tilia* *DCT* (12); (Rothamsted Expt. Station grounds), 26.vii.55 and 30.viii.54, *GGES* (HD).

ESSEX. Epping Forest (Chingford) 20.vi.1895, *EAN* (C); (Theydon Bois), viii.22, adults and III instar larvae, *EAB* (BM); adult, *ECB* (NM); *CN* (35a); near Grays, ix.38, common on elm, *DCT* (*in litt.* to W. E. China); and on the boundary near Harlow, 1.viii.50, sweeping in green lanes, *WAS* (35b).

KENT. Blackheath, common on fruit trees, nettles etc., less so at m.v. light, *AAA* (51) (22) (EMM 96, 271); Fawkham, 22.vii.56,

GGES (HD); Higham, *AMM* (22); Westerham, *AMM* (22); and on the boundary near Gravesend, 21.vii.48, on broom, *TRES* (13).

SURREY. Putney, 18.vii.1883, banks of the R. Thames east of Hammersmith Bridge, on willows, *EAN* (C); Wimbledon Common, 3.viii.32, *FJC* (SL) (62); Wimbledon (Southfields), 7.vii.1897, *EAN* (C); Surbiton, vii.1892, *ES* (HD) (BM) (37) (3) (62); Merton Park, 16.vi.32, on elm, *FJC* (SL); Hackbridge, 6.vii.52, *LC* (60); Banstead Downs, 23.viii.55 ♀, *EWG* (24); Reigate, *GBR* (62); Boxhill, vii.17, on nettle, *n.c.* in *FJC* coll. (SL); 8.vii & 20.viii.49, *FJC* (SL); Ashted, 15.viii.46, *FJC* (SL) (62); Effingham, 22.vii.49, *FJC* (SL) (62); Oxshott, 26.vii.48, *FJC* (SL); 9.vii.51, *HDS* (SL); 28.vii.57, *GGES* (HD); Esher *JAP* (BM); West End Common, 13.vii.51, *FJC* (SL); on the boundary at Egham, 21.vii.54, *GEW* (40); and beyond at Chobham, vii.1892, *ES* (HD) (BM) (37) (3) (62); Woking, vii.1890 and vii.1892, *ES* (HD) (37) (3) (62); Guildford, 14.viii.41, *ECB* (NM); and Chilworth, 3.viii.43, *ECB* (NM).

BUCKS. On the boundary at Datchet, 16.vii.55, *GEW* (40); and just beyond at Latimer, 21.viii.54, on poplar, *WJLeQ*; Slough (ICBFS) 16.vi.33, on hazel, *WHG* (41); (PILG) vii.60, on large willows (an unusual host tree), *GEW* (40) (EMM 96, 128).

Orthotylus prasinus (Fall.)

Sp. 337 p. 262

D&S p. 335 (*Litosoma viridinervis*)

S p. 288 (*O. prasinus* & *O. scotti*)

B p. 487 (Sp. 362, *O. prasinus* and Sp. 363, *O. scotti*)

Local. Found on oak, elm, willow, hazel and occasionally on other deciduous trees from July to September. Formerly confusion occurred between this species, *O. scotti* (now recognised as identical with *O. prasinus*) and *O. ochrotrichus*. The records given below have been checked and are considered to be authentic *O. prasinus*.

MIDDX. Ruislip, 4.viii.36, on *Ulmus*, *DCT* (33a); South Harefield, 28.vii.35, on *Ulmus*, *DCT* (33a); St. John's Wood, *JAP* (BM).

HERTS. Aldenham, 23.vii.61, on hazel, *DL* (HD) (54); Bushey Heath, 23.vii.44, *CHA* (17); and just over the boundary at Harpenden (Rothamsted Expt. Station grounds), 29.vii.49, a single ♂ taken in light trap, *TRES* (EMM 90, 35).

ESSEX. Epping Forest (Loughton) *HJT* (SL).

KENT. Kidbrook Lane, 18.vii.1896, on elm, *WW* (60); 25.vii.1896, on elm hedges, *WW* (60) (BM) (4) (39) (22); Abbey Wood, 30.vii.1898, on elm, *WW* (SL) (39); Blackheath, *JAP* (BM); (A. A. Allen (*in litt.*) states that he has never taken this species so the Blackheath record attributed to him by Masee (source 22) is incorrect—*EWG*); Darenth Wood, 15.vii.50, *AMM* (BM) (22); Bromley, viii.1885, *ES* (HD) (4); and beyond the boundary at Birling, 18. & 29.vii.54, sweeping nettles under trees in damp situation, *AMM* (BM).

SURREY. Wimbledon Common, 2.vii.48, *FJC* (SL); Banstead, 28.viii.55, *GEW* (40); Reigate, *GBR* (62); Headley Lane, *WW* (62);

Boxhill, 23.vii.32, *FJC* (SL); 7.viii. and 29.viii.37, *ECB* (NM); Bookham Common, 30.vii.51, *DL* (SL); *DL* in *WJLeQ* coll. (21) (34); Effingham, 22.vii.49, *FJC* (SL); Epsom, 18.vii.61, *GEW* (40); Ashted, 10.vii.48 and 20.vii.46, *FJC* (SL); Esher, *JAP* (BM); and beyond the boundary at Guildford, 9.viii.43, ♂ & ♀ on elm, *ECB* (NM).

BUCKS. On the boundary at Chalfont St. Peter, 17.vii.25, III instar larvae, *EAB* (BM); Datchet, 31.vii.55, *GEW* (40); and beyond at Slough (PILG), 22.vi.57, on guelder rose, *GEW* (40).

Orthotylus ericetorum (Fall.)

Sp. 338 p. 263

D&S p. 343 (*Litosoma ericetorum*)

S p. 292

B p. 491 (Sp. 371)

Locally frequent to common on various heaths and commons, particularly in Surrey. Associated with the common ling or heather (*Calluna vulgaris*) and the cross-leaved heath (*Erica tetralix*). Occasionally found in gardens in beds of ornamental species of *Erica*. The adults occur from June to October. Herts. and Essex records required.

MIDDX. Hounslow Heath, 19.vii.52, common on and under *Calluna* on the heath, *GEW* (33b) (54).

KENT. Blackheath, 4.viii.60, a single adult off *Chamaenerion augustifolium* in garden at 63, Blackheath Park doubtless a stray from heather in another garden some distance away, *AAA* (51) (22); Plumstead, 1894, *WW* (4) (39); St. Paul's Cray Common, 16.ix.05, *HM* (1/1905-6, 52); West Wickham Wood, *WW* (4) (39).

SURREY. Shirley Common, 20.viii.1898, sweeping heath, *WW* (60) (SL) (62); *D&S* (62); Coulsdon, 16.viii.10, *ECB* (NM); Chipstead, 31.vii. and 1.viii.10, *ECB* (NM); Boxhill, 1.viii.62, one swept on the chalk far from any heather, *AAA* (51); Bookham Common, 12.viii.56, *EWG* (24); Oxshott Heath, 1922-25, amongst *Calluna* and *Erica*, *OWR* (61); 26.vii.48 and 28. & 31.viii.50, *FJC* (SL) (62); 2.ix.50, *SL* (1/1950-51, 79); 12.vii.52, at roots of ling, *FJC* (SL) (1/1952-53, 84); 4.viii.55, *EWG* (24); 28.vii.57, *GGES* (HD); 17.vii.60, two adults and six V instar larvae (three of which were parasitized), *DL* (HD) (EMM 97, 67); 17.ix.64, *PLJR* (MM); very common, *AAA* (51); Fairmile Common, 23.viii.11, on heath, *WW* (60); Esher Common, *JAP* (BM); 28.viii.50, *FJC* (LS) (62); 4.viii.55 and 21.viii.54, *EWG* (24); very common, *AAA* (51); Weybridge, *JAP* (BM); *D&S* (62); on the boundary at Byfleet, 12.vii.49, *FJC* (SL) (62); and beyond at Ewhurst, viii.1890, *EAB* (BM); Leith Hill, viii.1895, *EAB* (BM); Chobham, viii.1884, *ES* (HD); 1.ix.35, *ECB* (NM); Horsell, 19.viii.49 and 16.ix.39, *FJC* (SL) (62); Woking, viii.1888 and ix.1888, *ES* (HD); Basingstoke Canal between Byfleet and Woking, 8.vii.50, *SL* (1/1950-51, 77); Ash Vale 4.ix.49, *DL* (SL); 8.ix.51, *WJLeQ* (21); Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954-55, *HDS* (50); Guildford, 13.ix.41, *ECB* (NM); and Chilworth (Blackheath), 30.viii.36, *FJC* (SL) (62).

BUCKS. On the boundary at Stoke Common, 17.viii.52 and 12.vii.64, *WJLeQ* (21); and just beyond at Amersham, 27.vii.52, *WJLeQ* (21).

Orthotylus adenocarpi (Perr.)

Sp. 339 p. 263

S p. 290

B p. 490 (Sp. 369)

Local but widespread. Found on broom overwintering in the egg stage on the host plant. The adults are found from the end of June until mid-September. Essex records required.

MIDDX. Finchley, 8.vii.44 on *Cytisus*, *CHA* (17); Edgware (Scratch Wood), 30.vii.44, *CHA* (17); 26.vii.60, adults only on broom, *DL* (HD) (54); Uxbridge, 17.vi.33, abundant on *Cytisus*, *DCT* (33a).

HERTS. Whetstone, 1.viii.60, a single ♂ and two ♀♀ taken in light trap, *PHW* (pers. comm.) and (47); and just over the boundary at Harpenden Common, 10.viii.37, on *Cytisus scoparius*, *DCT* (12).

KENT. Blackheath, 24.vi.60 and 3.vii.60, not common, *AAA* (51) (22); Plumstead, *TRB* (37) (4) (22); (Wickham Lane), 15.viii.1896, on broom, *WW* (60); Bexley (Joyden's Wood), 3.vii.65, *KCS* (14); Ruxley Gravel Pit, 8.vii.67, *KCS* (14); Darenth Wood, 2.viii.50, on broom, *AMM* (BM) (22); Farningham Wood, 2.vii.61 and 5.vii.65, *KCS* (14) (22); Westerham, 24.vii.60, a few on broom in company with *O. virescens* and *O. concolor*, *AAA* (51) (22); and on the boundary at Gravesend, *TRES* (22).

SURREY. Oxshott Heath, 23.viii.03, on broom, *WW* (60) (62); Esher Common, 9.vii. & 30.vii.51, 13.viii.51 and 10.ix.51, *FJC* (SL); Weybridge *JAP* (BM); 21.vi.13, *EAB* (BM); *GCC* (37) (3) (62); on the boundary at Egham, 17.vii.54, on broom, *GEW* (40); and beyond at Chobham, 1874, *ES* (HD) (37) (3) (62); Woking, vii.1871, vii.1875 and viii.1888, *ES* (HD) (37) (3) (62); Woking Heath, on *Spartium*, *ES* (36); Basingstoke Canal banks between Byfleet and Woking, 8.vii.50, *SL* (1/1950-51, 73); Shere, viii.1892, *EAB* (BM) (37) (3); Albury, 26.vii.43, *ECB* (NM); and Shalford, viii.1886, *EAB* (BM) (37) (3) (62).

BUCKS. On the boundary Little Chalfont, 4.vii.53, on broom, *WJLeQ* (21); Stoke Common, 18.vii.53, on broom, *WJLeQ* (21); Datchet (Ditton Park), vii.55, *GEW* (40); and beyond at Whitend Park near Chesham, 20.vii.61, on broom, *WJLeQ* (21); Hyde Heath, 15.x.50, *WJLeQ* (21); and Burnham Beeches, 24.vii.54 and 4.viii.57, *WJLeQ* (21).

(End of Part VII)

A Note on the Plant Mapping Scheme

by A. G. SIDE

Some years ago the scheme to map the vascular plants of the London Area began with high hopes. In order to show members the state of the proceedings at the present time the Committee of the Botany Section commissioned the drawing up of four distribution maps (Figs. 1-4), choosing three common plants and one which is rare in the London area. Being a map addict I took up the commission with pleasure and produced the maps depicted here from the records so far available to me. I look at them with mixed feelings.

It is obvious to any thoughtful observer that the maps plot the distribution of enthusiastic workers rather more than that of plants. The botanical flair of Mr D. H. Kent is manifest in the number of records in Middlesex. One has only to remember his work on the flora of London's walls to realise that he has an eye for any wild plants in the area. Surrey could not imaginably be so devoid of plants as the records show and Kent certainly is not. As keeper of the records for Essex and Kent I can say that records have come in very sparsely over the past two years, with exceptions from a few energetic workers. All county recorders appeal for more cards to be sent in.

In Kent 859 different plants have been recorded so far, so at least that number of maps will have to be made. With totals from other regions the number will probably reach beyond a thousand. The task of making the maps will be tremendous but they will be valueless unless the coverage is more complete. Please will all botanists cover as many tetrads as possible this year and next.

One note of comfort creeps into my thoughts as I look at the map of the lesser celandine (Fig. 4) and see the one dot in the inner rectangle. If Wordsworth stood on Westminster Bridge today he could still hope to see his favourite wild flower within a mile, even if it meant passing the guard at Buckingham Palace.

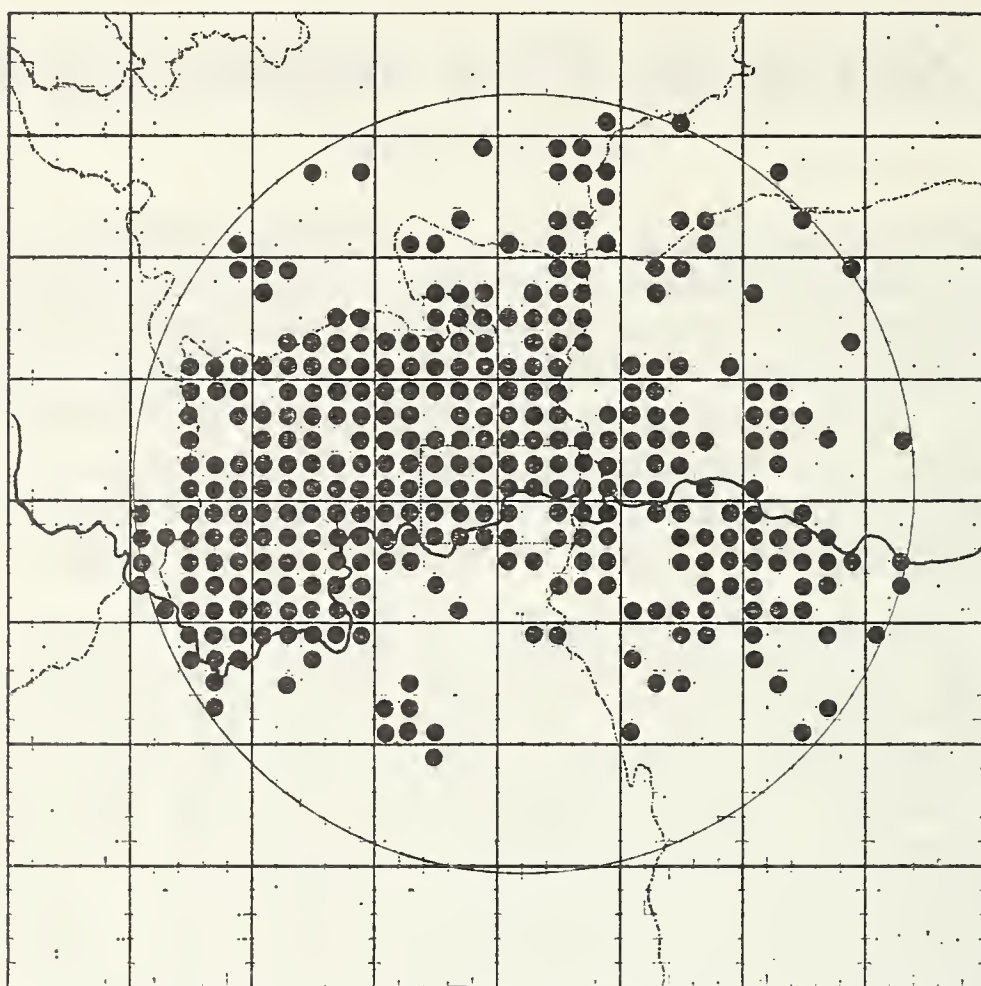


FIG. 1. Canadian Fleabane. *Conyza canadensis* (L.) Cronq.

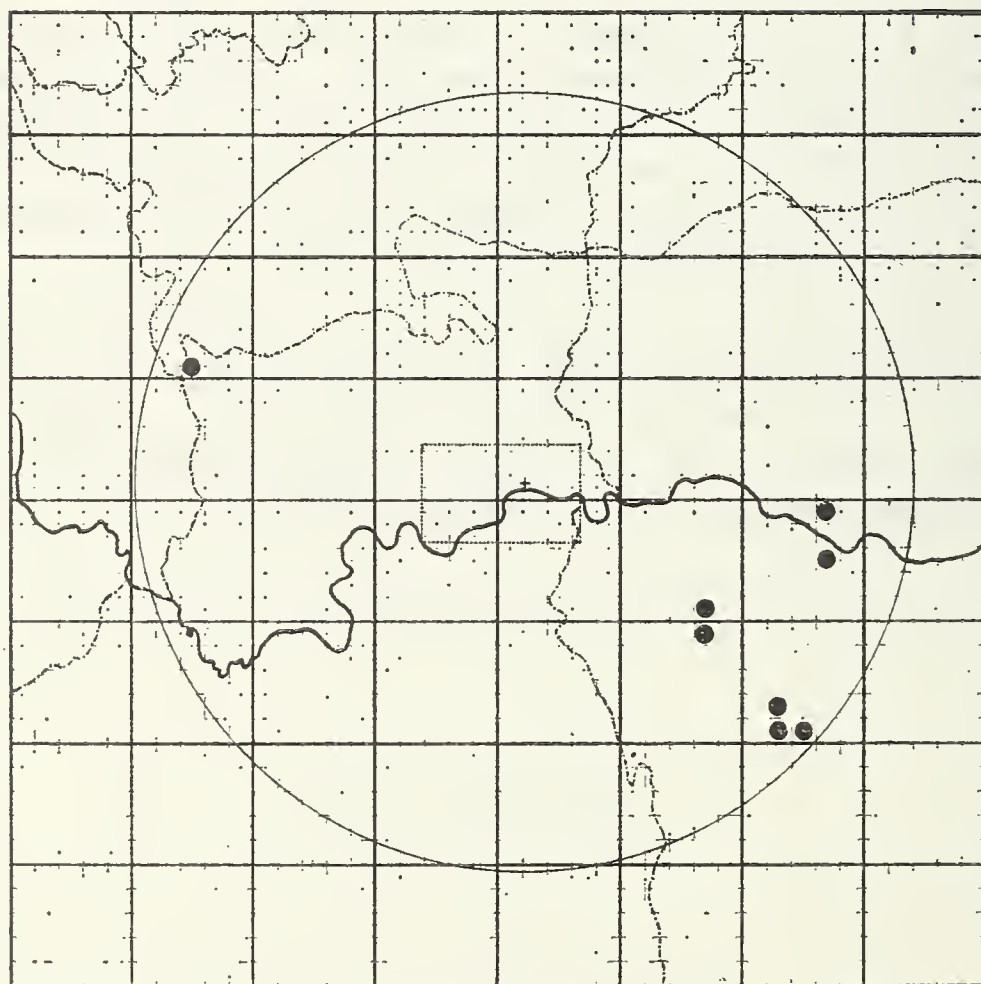


FIG. 2. Bee Orchid. *Ophrys apifera* Huds.

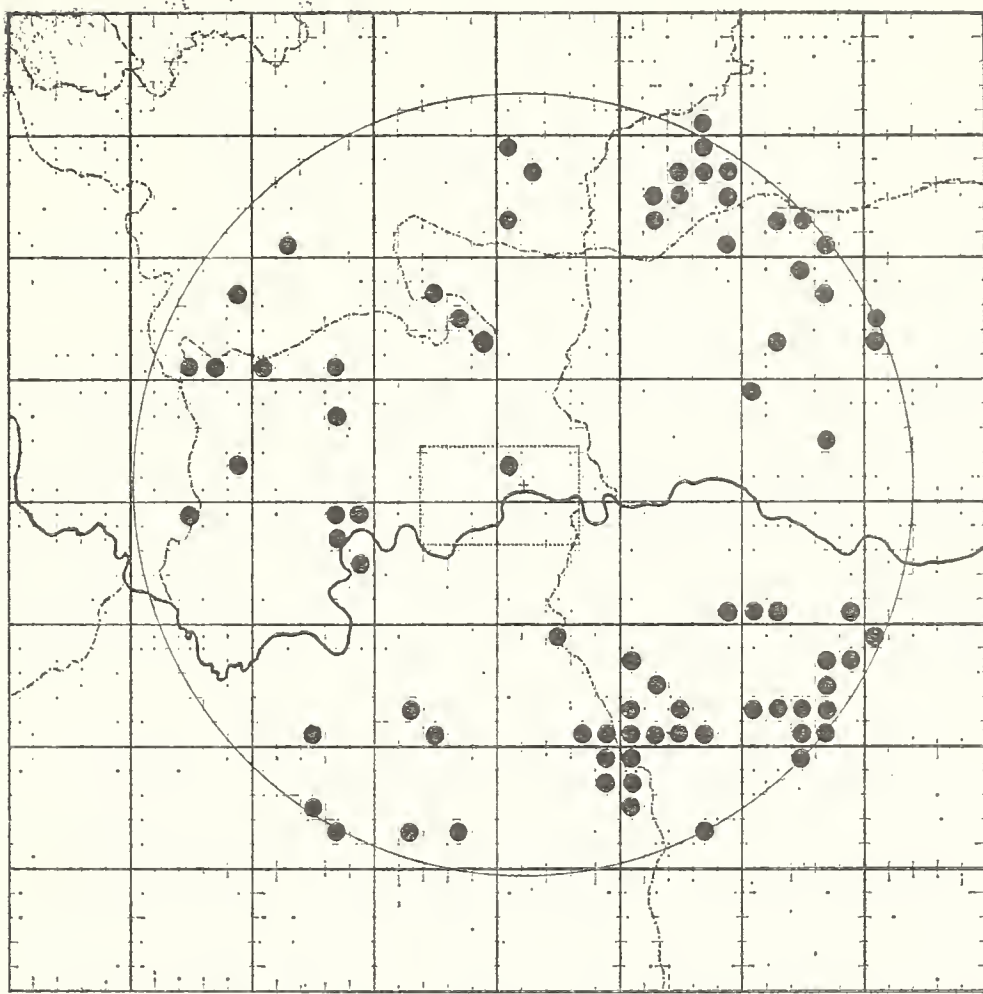



FIG. 3.  Primrose. *Primula vulgaris* Huds.

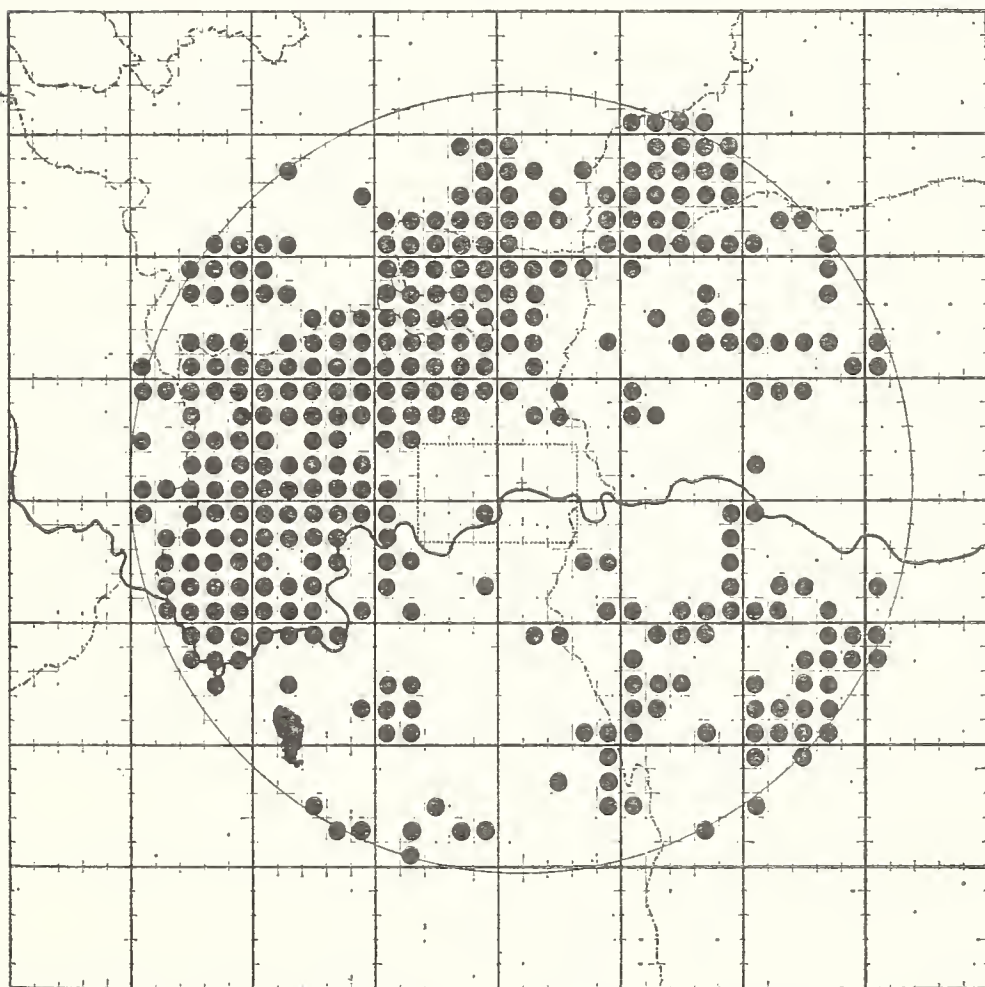


FIG. 4. Lesser Celandine. *Ranunculus ficaria* L.

Survey of Bookham Common

TWENTY-NINTH YEAR

Progress Report for 1970

Present and Future Surveys (G. Beven)

Owing to a number of difficulties, it was unfortunately necessary to forego the Carnegie grant as described in the Progress Report for 1969. However, the survey team intend to follow the original concept of the Carnegie Scheme in a modified form, so that work already completed will not be wasted. Thus in addition to the various surveys mentioned under separate headings below, the following are being made or are proposed:

- (1) A soil survey.
- (2) Revised base map of the Common (H. A. Sandford).
- (3) Ecological survey on bracken (P. A. Moxey).
It is hoped to study the effect of trampling and repeated cutting by recording the state of the bracken in six one-metre square permanent quadrats on Eastern Plain.
- (4) A survey of woodland areas using the national woodland recording card as a basis (Miss J. Stoddart and A. S. Thorley).
- (5) Freshwater survey (Michael Towns). An attempt will be made to link the vegetation and changes in population of small invertebrates with simple chemical factors in the water.
- (6) M. Towns has continued work on the rabbits and a paper giving preliminary results will appear shortly. David Warren is planning a survey of water voles.

General (G. Beven)

A successful Nature Trail was held on 18-19 July to mark European Conservation Year 1970. A full report appears below.

An additional steel cupboard has been placed in the hut to accommodate the increased equipment and expanding library. We are grateful to A. E. Le Gros for a further donation of books.

In order to keep a more accurate record of changes on the Common due either to the National Trust's management for conservation, or to natural causes, Michael Towns has drawn up some "Ecological Disturbance Record Sheets" which will be kept in the hut for completion by members.

Bookham Commons Nature Trail (Ecology Section, Bookham Common Sub-committee)

To mark the Ecology Section's contribution to European Conservation Year 1970, the organisation of the Bookham Commons

Nature Trail was their responsibility. L. Manns had prepared a plan in advance and, when he moved away from the London area, the Section was able to build on this plan. Permission to hold the Trail on their Commons was given by the National Trust in April 1969. The Section then started a full preparation which was to last uninterrupted until July 1970.

From the starting point by the Tunnel Car Park, where a tent was pitched to serve as information centre and to sell the printed guide, the Trail led down to the alluvial plain and along the station path to the Isle of Wight area, where the Hut formed the turning point for the return via the pond, Eastern Plain and along the woodland road back to the starting point. Including the Hut, seven positions were chosen and staked by numbered stages. At six stages plants in the surrounding area were labelled with keys to which the visitor could refer in the printed guide, which added a brief description of the ecology of the vegetation. The Hut, in addition to the usual wall displays explaining the work of the permanent survey, had on show specimens of grasses and other plants, pond life, mammal skins, skulls and droppings, casts of animal tracks, pellet analyses, and Lepidoptera. Immediately before the opening of the Trail a number of interesting items along the route were also labelled, adding much to the visitors' enjoyment.

July 18th and 19th were the two days of the Trail. Beforehand, a guide was compiled, duplicated from type-script and inserted in an attractive cover. Beforehand, too, local authorities and police had to be informed; publicity was achieved through the local press, handbills distributed, and some fine signposts were produced and erected outside the Common.

Mr. E. F. Youngman, Keeper of the Commons, has been of great assistance to the Section. In addition to a large amount of tolerance, he gave practical help for the Trail and sold a number of guides locally.

The number of visitors exceeded expectations. Nearly one thousand came, only about a dozen being recognised as L.N.H.S. members. The weather stayed fair, marred by only a little light rain, and the numbers were spread evenly over the two days. Comments heard and overheard were favourable, several people returned for "another look", and many were interested in the named specimens on the Trail and the exhibits in the Hut.

Approximately twenty-five members, mainly members of the Bookham Common Sub-committee, were actively concerned in the Trail, and we are especially indebted to Mrs M. Waller for the loan of her tent and equipment at the entrance, and to the Organiser for his work and the co-ordination of the various efforts. The hard work involved in the Trail was additional to that of the regular survey, which was carried on, surprisingly, without too many interruptions. All the workers felt that it had been well worth while.

Thanks are due to the following members who took part:—

Planning, and writing the guide: The Organiser* (who does not wish to be named), L. Manns, G. Beven*, Miss E. M. Hillman*.

Production of leaflet: Mrs A. Warren*, Mrs P. Allison, Mr and Mrs P. Moxey.

Signposts: A. S. Thorley.*

Labels and posts: E. F. Youngman, Miss A. Tsuji, Miss M. M. Taylor, Miss J. Stoddart*.

Map: Clare Harding*.

Newspaper article: I. Beames.

Hut exhibition:

| | | | |
|---------|------------------|-------------|--------------------------|
| Aquatic | A. E. Le Gros | Butterflies | A. S. Wheeler |
| Grasses | Miss J. Stoddart | Mammals | David and Michael Warren |

On duty on the Trail, selling programmes etc: All the members of the Bookham Common Sub-committee listed above* and Mrs M. Waller, David and Michael Warren (including twice camping overnight), Miss E. P. Brown, Mrs D. Kerr, Rosemary Beven and Robin Griffiths.

Vegetation (Ella M. Hillman)

Revision of the Flora

The revision began very slowly, with only two or three regular observers, and was then temporarily abandoned so that all resources could be used in furthering the Carnegie Scheme. This in turn was drastically pruned, and recording began again, slowed down a little when energies were diverted to the preparation of the Nature Trail, and is now accelerating considerably. The team of Miss J. Stoddart and Dr A. S. Thorley has been joined by Mr R. Stern, another able botanist, and their records have been entered on the punched card index. This has enabled us to see that the following trees and shrubs have been found in areas from which they were not recorded in 1953. The letters refer to the areas on the vegetation map of *Lond. Nat.* 33 : 24 (1954) or *Lond. Nat.* 49 : 107 (1970).

| | | | |
|---------------------------------|---------|---------------------------|-------------|
| <i>Acer campestre</i> | Q P | <i>Frangula alnus</i> | O |
| <i>Acer pseudoplatanus</i> | K Q T | <i>Fraxinus excelsior</i> | S |
| <i>Aesculus hippocastanum</i> | A D S | <i>Populus tremula</i> | B D O R |
| <i>Betula pendula</i> | O | <i>Quercus cerris</i> | O |
| <i>Betula pubescens</i> | O S | <i>Ribes rubrum</i> | B C D E F L |
| <i>Carpinus betulus</i> | F | <i>Rosa arvensis</i> | A B C D G H |
| <i>Castanea sativa</i> | B | <i>Rubus idaeus</i> | M N S R |
| <i>Crataegus oxyacanthoides</i> | F G | <i>Sorbus aucuparia</i> | D H K M |
| <i>Corylus avellana</i> | R | <i>Taxus baccata</i> | A E F |
| <i>Euonymus europaeus</i> | B D N S | <i>Tilia x europaeus</i> | E |
| <i>Fagus sylvatica</i> | K | <i>Viburnum opulus</i> | Q R |

We cannot yet conclude, however, that these plants have extended their distribution on the Common, as it is not known whether they occur in all their former areas, because the recording is not yet complete.

Effects of cutting Bracken and Grass

Eastern Plain. The results of four cuttings of the bracken in 1969 were described in last year's Progress Report. In 1970, the bracken was cut twice, in late March and early August, and *Molinia caerulea* has now spread over all the cut area. Other heathland species have not returned; permanent quadrats have been set up by Paul Moxey to study the changes. In tracks running through the *Molinia* Dr G. Beven noticed a line of deer droppings. The *Molinia* was then examined for signs of grazing, and some evidence was found though this was not extensive. It may be that cutting the bracken has provided a feeding ground for roe deer. The deer themselves were seen by some observers in this area.

Bayfield Plain. Here *Deschampsia caespitosa* tufts, persisting after the 1969 mowings, sent up flowering stems, but these were noticeably more sparse than in the surrounding uncut areas. The *Angelica sylvestris* was no longer conspicuous, being shorter than the *Deschampsia*, but was still abundant and could be seen through the thin veil of the grass. The area was reduced to stubble by the September cutting. In September, four stems of *Epipactis purpurata* were discovered close to the spot where it was last seen about fifteen years ago. The plant was photographed, an uncomfortable business as it was attracting many wasps at the time. They are known to cross-pollinate this plant. Three other species of orchids have been found on the Common in 1970, but they are very scarce, more so than twenty years ago. *Listera ovata*, one plant only, was bitten off or picked.

Central Plain. The vegetation on the stream belt along the Isle of Wight ditch would repay detailed and long term study. We have the impression, for example, that the amount of *Conium maculatum*, which was particularly fine this year, shows marked fluctuations. Now that *Impatiens glandulifera* has increased from one clump in square 85 in 1969 to a few more extending into square 81 in 1970, the stream flora should be carefully watched, as in a few years this plant can form pure stands. This could be prevented by picking the plant before the seeds ripen. There has been drastic clearing of the dense scrub along central ditch late in the year.

Ruscus aculeatus Survey

An attempt is being made to record all the stations of this plant in the woodlands, with various details of each clump. The plant is dioecious, but Hutchinson states in *British Wild Flowers* (1955) that

it bears bisexual as well as unisexual flowers. We hope to discover the proportions in which the three types of flower occur in the Bookham Common woods. Mrs A. Warren is in charge of the systematic recording of this plant, assisted by Miss J. Stoddart and others, and the interest aroused is involving them in further research into some of its features.

Algae (A. E. Le Gros)

The following records of fresh-water algae which were made when collecting samples of pond invertebrates are noted, as little attention has been given to these plants since A. H. Norkett's work on Eastern Plain (*Lond. Nat.* 28 : 56-59 (1949)).

On 9 August 1969 the water of L.E.Pond was green with vast numbers of the motile *Synura uvella* Ehr. It was seen later in small numbers in Bayfield Pond and in two of the gunpits, reaching abundance again in L.E.Pond on 19 May 1970. *Batrachospermum moniliforme* Roth, with cystocarps present, was found on a branch pulled out of the water close to the outlet to I.O.W. Pond in May 1970. Earlier the same month an extensive marshy pool in Station Copse was covered with a dense mat of a *Spirogyra* sp. in which were numbers of desmids with truncated apices close to *Closterium acerosum* (Schrank). Another dense mat of *Spirogyra* in the shrunken pool just below the I.O.W. Pond outlet in October 1970 was found to consist of three species differing widely in cell length and width but none were in a conjugating condition.

On 14 May 1970 *Chaetophora elegans* (Roth), previously recorded from gunpit E by Norkett, was found on twigs from the bottom of gunpit C. It appeared to be attractive to the ostracod *Cypridopsis vidua* which I found in large numbers on the mucilaginous mass surrounding the alga.

Two algae described as epibiotic on water fleas of the family Daphniidae have been recorded from Britain in the last twenty years, one new to science. I looked for them in 1970 and found both on *Daphnia pulex* from L.E.Pond in mid-October.

The first *Amoebidium parasiticum* Cienkowski was described as British in 1958 by D. S. Johnson who found it to be common in the London area on *Daphnia*, and thought it to be a winter species. I found it quite common on the carapace of the water flea, on the antennae and on the tail claws. The second was the almost colourless filaments of the blue-green alga *Lyngbya thornensis* Bunting & Lund, first discovered in 1954 in Yorkshire on *Daphnia pulex*, was on many specimens but seemed to be restricted to the antennae.

Freshwater Invertebrates (J. W. Coles)

The following species were collected by J. W. Coles:
Turbellaria. Freshwater Triclad.

Polycelis tenuis Ijima (det. S. Prudhoe) found in small temporary pond (ref. 821) 10 May 1970. (Previously recorded I.O.W. Pond in 1969, A. E. Le Gros in *Lond. Nat.* 49 : 97 (1970).

Oligochaeta. Family Tubificidae.

Aulodrilus plurisetus (Piguet) (det. E. G. Easton). In mud, I.O.W. Pond 8 February 1970.

Lumbriculus variegatus (Müller) (det. J. W. Coles). In mud, Bayfield Pond and in temporary pond (ref. 821) 10 May 1970.

Crustacea. Cladocera.

Ceriodaphnia megalops Sars. (det. Mrs R. L. Sayers). In I.O.W. Pond 14 June 1970. Previously reported I.O.W. Pond September 1957 (C. P. Castell in *Lond. Nat.* 37 : 58 (1957).

Lepidoptera (G. Beven)

A. S. Wheeler reports two species of butterfly new to the Bookham Common list:—

Clossiana selene Schiff. Small pearl-bordered fritillary. Male found Central Plain 14 June 1970.

Thymelicus lineola Ochs. Essex skipper. Found on 18 July 1970. The Essex skipper is very similar to the small skipper *Thymelicus sylvestris* Poda, and might have been previously overlooked. Mr Wheeler points out that the Essex skipper has become much more widespread in Surrey in the last ten years.

A. E. Le Gros reports that he saw an *Apatura iris* L., purple emperor, near High Point on 2 July 1969 and Dr I. Menzies also saw one on the Common during 1969. These bring the total up to 5 records for July-August 1969. (see *Lond. Nat.* 49 : 99 (1970)).

Collembola (A. E. Le Gros)

Three species of springtails have been found living on the surface of still water at Bookham. *Podura aquatica* L. and the cosmopolitan *Isotomurus palustris* (Müller) are widely distributed and may be found throughout the year. *Sminthurides aquaticus* (Bourlet) has been met with twice in summer on I.O.W. Pond. In 1969 the *Podura* were so abundant about the hollows, etc., that their shed exuviae formed a white scum approximately a square metre in extent about the outlet to L.E.Pond. In May 1970 the species was in vast populations on *Lemna* in Bayfield, South-east and Sheepbell-Ponds. The suggestion of Miall (1895) that in winter *Podura* crawls down plant stems to hibernate in the mud at the bottom of ponds may be discounted. The insects migrate to damp places around the margins of the ponds but a warm day will quickly bring them back to the water. On 25 February 1970 when the ponds were frozen I found *Podura* and *Isotomurus* in numbers on the ice.

Some popular accounts of these aquatic springtails are misleading and the following key may be found useful as a corrective. It is based on characters given in Palissa (1964) which I have used in identification.

1. Body globular. White to yellowish. Antenna longer than head. L. females 1 mm, males 0.5mm.

Sminthurides aquaticus

Body extended.

2

2. Furcula (the springing organ) pincer shaped. Body blue-black, with red-brown antennae and legs. Cuticle granular. Antenna shorter than head. Claw on Leg III with one small ventral tooth. L. 1-1.4mm.

Podura aquatica

Furcula V shaped. Colour variable, mostly yellow to greenish with dark dorsal stripe. Cuticle smooth. Antenna longer than head. Claw on Leg III without ventral tooth. L. 3mm.

Isotomurus palustris

MIALL, L. 1895. *The Natural History of Aquatic Insects.*

PALISSA, A. 1964. Apterygota. *Die Tierwelt Mitteleuropas* 4 (1a).

Cynipidae (A. E. Le Gros)

Niblett (1958) recorded forty species of gallwasps from Bookham. Unfortunately in error he omitted from the list his Bookham records (Niblett 1940) of the agamic generation of *Cynips longiventris* Hartig, nor did he include the inquiline species, intruders that feed on the tissue of the gall often to the detriment of the gall causer. Two genera of inquiline Cynipids are represented at Bookham; *Periclistus* in rose galls and *Synergus* in oak galls. Unlike most of the gall causing species the inquilines do not exhibit the phenomenon of alternating generations but when a species has two generations a year there are slight differences in structure and colour between the spring and summer generations.

The following list of twelve species is based on Niblett's published records, some notebooks on rearing records that he gave me as well as my own observations.

Periclistus brandtii Ratz; *P. canina* Hartig; *Synergus albipes* Hartig; *S. apicalis* Hartig; *S. clandestinus* Eady; *S. evanescens* Mayr; *S. gallae-pomiformis* Boyer de Fonscolombe; *S. incrasatus* Hartig; *S. nervosus* Hartig; *S. pallicornis* Hartig; *S. reinhardi* Mayr; *S. umbraculus* Oliv.

NIBLETT, M. 1940. Some notes of the Cynipid genus *Diplolepis*. *Ent.* 73 : 145-149.

NIBLETT, M. 1945. British gall causing Cynipidae IV. *Ent.* 78 : 72-73

NIBLETT, M. 1958. The gall wasps of the London Area. *Lond. Nat.* 37 : 126-135.

Chalcids and Spiders (A. E. Le Gros)

The predators of spider eggs are mainly ichneumons but there are some records (mainly foreign) of chalcids being reared from spider egg sacs and the majority of these are Eulophidae. In Britain Bristowe (1941) has recorded *Entedon* sp. and Smith (1954) *Pedobius* sp. in both instances from *Tetragnatha* egg sacs. From Bookham I have reared *Tetrastichus* sp. from *Agroeca brunnea* and large numbers of unidentified Eulophid from *Araneus cornutus* egg sacs, being in both cases hyperparasites attacking ichneumons of the genera *Tromatobia* and *Ischnurgops*.

The spider *Dictyna arundinacea* (L.) places its white disc shaped egg sacs, often as many as eight, within its retreat behind a screen of adhesive meshed silk surrounding the head of a plant, and it was once thought that enemies could not penetrate the obstacle of the clinging web of crebillate spiders to reach the eggs. In June 1952 I reared several females of a Pteromalid *Habrocytus platyphilus* (Walker) (= the *Pteromalus amplissimus* Morley of the *Lond. Nat.* 32 : 47 (1953)) and another in June 1970 from *Dictyna arundinacea* egg sacs collected in Central Plain. I was fortunate to observe two of the 1952 specimens emerge and noticed that they easily slipped past the web without getting trapped or disturbing the spider. Dr R. R. Askew, who identified the last specimen, tells me that the Bookham records are the only ones known to indicate the chalcid's host and that the male is unknown. One *D. arundinacea* egg sac, which always contains less than twenty eggs, provides food for the development of only one *Habrocytus platyphilus*. That ichneumons can also penetrate Dictynid webs was shown when in 1954 I reared a male *Gelis* sp. (identified J. F. Perkins) from a *Dictyna uncinata* Thorell egg sac collected in Shropshire.

BRISTOWE, W. S. 1941. *The Comity of Spiders* 2 : 351.

SMITH, K. G. V. 1954. *Ent. mon. Mag.* 93 : 102.

Arachnida: The Water Spider (A. E. Le Gros)

Argyroneta aquatica (Clerck) (Agelenidae) is the only truly aquatic British spider. Once locally abundant in our area, it is now under threat of extinction in some localities. It has rarely been recorded this century from the counties north of the Thames but it has been noted as abundant in such places as a pond on Wimbledon Common and the Black Pond at Esher in Surrey, and in the ditches of the marshes of the north Kent side of the River Thames between Woolwich and Dartford. Its distribution (though I have not fully worked this out) appears to be in naturally formed stretches of water, and it rarely appears in even quite old artificial large ponds of which the Long Water at Hampton Court, and Keston Ponds, may serve as examples.

Bristowe (*The World of Spiders*) says that when young the water spider will disperse by taking to the air on gossamer. I think this is likely to be a rare event. In the course of examining large numbers of "airborne" spiders I have never met with the young of the medium and large species of the Agelenidae. As an adult is most reluctant to leave the water although it may do so in the unnatural conditions of an aquarium. Natural dispersion and extension of range I would think to be very rare except in times of widespread flooding. Because of this once the spider has been lost to a locality in our area the odds are very high against natural recolonisation.

In recent years large areas of marshland have been drained for new urban development, one habitat has been polluted affecting both the spider and its food supply, and another very important habitat has been threatened by new road construction. At the suggestion of an authority on spiders that an attempt should be made on the conservation of *Argyroneta* it was decided, after consultation with the National Trust, that the spider should be introduced to Bookham Common.

This spider requires submerged vegetation as a support for its air cells. I have found that the submerged stems of plants like *Typha* and *Sparganium* are rarely used for the attachment of air cells and that the spider is mainly associated with the submerged leaves of pondweeds like *Elodea*, *Zannichellia* and *Myriophyllum*. Unfortunately none of the Bookham Ponds have recently had a growth of such plants, so that when numbers of young spiders were introduced to Lower Eastern Pond in 1970 some plants of *Zannichellia palustris* L. were also introduced. The numerous water fleas, dipterous larvae and small water bugs found in this pond should afford a good food supply, and the pond now has a consistent good depth of water.

Fish

Common carp *Cyprinus carpio* L. B. S. Meadows reports the presence of plenty of fry in I.O.W. Pond on 13 December 1970. This is the first definite record of this species although we had been informed of its introduction to the I.O.W. Pond in 1955 (*Lond. Nat.* 47 : 91 (1968)), and various anglers had reported that they were catching some.

Birds (G. Beven)

Oakwood (Eastern Wood)

The breeding season census was repeated in this forty acre sample of dense interior oakwood. The number of territories of singing males of selected species over the last eight years was as follows:

| | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|-----------|------|------|------|------|------|------|------|------|
| Great tit | 12 | 17 | 17 | 12 | 16 | 19 | 14 | 13 |
| Blue tit | 19 | 19 | 22 | 17 | 16 | 20 | 19 | 20 |

| | | | | | | | | |
|-----------------|------|-----|----|----|----|----|----|----|
| Coal tit | 2 | 5 | 4 | 3 | 8 | 6 | 7 | 5 |
| Marsh tit | 3 | 1 | 1 | 3 | 3 | 3 | 3 | 3 |
| Long-tailed tit | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 |
| Nuthatch | 2 | 5 | 5 | 5 | 7 | 5 | 3 | 5 |
| Tree creeper | 1 | 1 | 2 | 2 | 2 | 4 | 4 | 3 |
| Wren | 1 | 5.5 | 11 | 17 | 25 | 26 | 24 | 25 |
| Mistle thrush | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 |
| Song thrush | 4 | 7 | 7 | 8 | 10 | 7 | 7 | 7 |
| Blackbird | 8 | 10 | 12 | 11 | 12 | 11 | 13 | 9 |
| Robin | 21.5 | 32 | 37 | 37 | 42 | 43 | 44 | 36 |
| Blackcap | 5 | 3 | 4 | 7 | 6 | 3 | 6 | 1 |
| Garden warbler | 2 | 2 | 4 | 1 | 1 | 1 | 1 | 1 |
| Willow warbler | 2.5 | 1.5 | 4 | 4 | 2 | 6 | 2 | 2 |
| Chiffchaff | 2 | 5 | 7 | 6 | 6 | 3 | 3 | 4 |
| Dunnock | 4 | 5 | 5 | 4 | 8 | 6 | 6 | 3 |
| Starling | 5 | 5.5 | 10 | 6 | 8 | 12 | 7 | 8 |
| Chaffinch | 5.5 | 7 | 8 | 7 | 6 | 4 | 4 | 3 |

Scrub and Grassland

The spring census of the number of territories of singing males was again made on 96 acres of scrub and grassland in 1970. (G. Beven and W. D. Melliush). The number of territories of selected species over the last seven years was as follows:

| | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|------------------|------|------|------|------|------|------|------|
| Pheasant | 2 | 2 | 3 | 3 | 2 | 7 | 3 |
| Wood pigeon | 1 | 2 | 4 | 1 | 1 | 6 | 3 |
| Turtle dove | 5 | 4 | 3 | 5 | 3 | 7 | 4 |
| Green woodpecker | 0 | 1 | 4 | 4 | 4 | 1 | 1 |
| Wren | 2 | 3 | 9 | 10 | 15 | 14 | 18 |
| Song thrush | 8 | 8 | 7 | 10 | 9 | 9 | 14 |
| Blackbird | 15 | 8 | 13 | 17 | 15 | 15 | 20 |
| Robin | 23 | 23 | 15 | 21 | 23 | 23 | 22 |
| Whitethroat | 12 | 17 | 17 | 22 | 16 | 11 | 14 |
| Willow warbler | 20 | 14 | 19 | 27 | 21 | 26 | 14 |
| Dunnock | 11 | 15 | 13 | 18 | 12 | 12 | 13 |
| Linnet | 1 | 4 | 4 | 4 | 1 | 2 | 0 |
| Chaffinch | 18 | 13 | 13 | 14 | 9 | 12 | 17 |
| Yellowhammer | 9 | 7 | 9 | 7 | 8 | 7 | 5 |
| Reed bunting | 3 | 2 | 5 | 6 | 5 | 3 | 3 |

Thus the wren population remains high, appearing to have reached saturation point in the sample of oakwood but still rising in the scrubland where the whitethroats have only increased a little and have not reached the 1968 level. They remain much below the high 1967 population. Willow warblers showed a considerable decrease in the scrubland although they vary a good deal in numbers from year to year, as does the linnet which is becoming scarcer.

Hawfinches on Bookham Common 1969-70 (Clare Harding)

A flock of hawfinches wintered on the Western Plain area of Bookham Common from December 1969 to April 1970. Five birds were seen on 14 December, and by 28 December between twenty and thirty birds were present. During December and early January the birds were concentrated on the Western Plain area, feeding mainly on hawthorn berries and hogweed seeds.

With the onset of spring the hawfinch flock began to disperse over the whole scrubland, birds being seen even four miles from Western Plain. It is believed that many returned to a breeding area near East Horsley, where numbers were reported to be unusually low during the winter. By April only about five birds remained on the Common. Even though one male was in full song on Bank's Plain there was no evidence of breeding.

A certain amount of shooting on adjacent farmland tended to disturb the hawfinches; however, they seldom flew into the woodland to the east of the plains.

Other Notes on the Birds

As stated in last year's progress report a number of mandarin duck appeared on the Common during the spring of 1969. Breeding was proved by C. R. A. Clegg (*L. Bird Rep.* 34 : 15 (1970)), and Miss M. Portlock saw a female with two young on L. E. Pond during the spring of 1969. During 1970 a flock of twenty to thirty was observed on L.E. Pond on 3 January (Clare Harding) and several pairs were present in the woodland, at least until May. A sparrowhawk was seen on 24 August (C.H.) and one on 13 December (W. D. Melluish). A pair of coot again raised three young on I.O.W. Pond. At least one woodcock was roding during the spring.

There were probably five pairs of tawny owls but could well have been more as very few observations were made at night. A nest with one egg was found in a hollow tree on 8 April by E. and A. Stevens, but the nest was empty on 7 May. One barn owl was present in the spring. Little owl pellets were found in Kelsey's Barn on 13 September 1970 just outside the Common, near where this owl has nested in the past three years. The number of pairs of long-tailed tits in the spring in an area of about 120 acres of grassland and scrub during 1970 was five including two nests. In 1962 the number of pairs was 6, in 1963 nil, 1964 3, 1965 4, 1966 4, 1967 6, 1968 6 and 1969 6. A redstart was seen on 24 August (C.H.). There were five nightingales in song during the spring. Five grasshopper warblers were heard singing. A tree pipit sang in the I.O.W.-Eastern Plain area May-July. In ninety-six acres of scrub and grass there were six territories of displaying male redpolls during 1970. Previously up to 1962 there were none, 1963 1, 1964 2, 1965 3, 1966 5, 1967 4, 1968 4 and 1969 6.

Conservation Report 1970

by DAPHNE C. HERSEY
(*Secretary, London Nature Conservation Committee*)

European Conservation Year 1970 must really have exceeded the wildest hopes of its publicists, and has included a great many subjects not often within the province of the naturalist, from birth control to air pollution. Mrs Small will write elsewhere of the extensive programme she arranged for this Society.

Conservation in the London area tends to be a battle against road works and speculators. The planned South Orbital Road would appear to cut across most of the major Surrey commons, and road building in some other areas has given rise to concern. Kent County Council are seeking planning permission for a school on Crofton Heath and adjacent land including part of a registered common. The Orpington Field Club asked the Committee's support in their fight against this proposal. The Bromley Consumers' Group also protested claiming that the area forms part of the potential inner 'Green Belt', stretching from Norman Park through the West Kent Golf Course to Petts Wood. The Commons, Open Spaces and Footpaths Preservation Society informs us that if planning permission is given to build a school there, the consent of the Minister of Housing and Local Government would be required for the part of the proposal affecting common land. The Ministry would then consult the Commons Society and the case would come before the Executive Committee.

A threat to Osterley Park in the form of an exhibition centre is noted and its effect is under consideration.

Some planning applications have been rejected. Planning permission for a 1,000 bedroom hotel on the Kempton Park racecourse was opposed by the Surrey Trust and the Surrey Bird Club, and the Nature Conservancy advised against it. The scheme was turned down by Sunbury Council with the result that the course was sold back to the Horse Race Betting Levy Board.

In May, the Berkshire, Buckinghamshire and Oxfordshire Naturalists' Trust opposed the second application by the London Ski Club for water skiing facilities at Orlitts Lake, Colnbrook Bypass, Iver, Buckinghamshire. The application was refused by Eton Rural District Council but the Ski Club intend to appeal. As has been mentioned in other reports, some sports, particularly angling, can exist side-by-side with natural history interests. Water skiing is not one of these, especially as Orlitts Lake and other pits in the area are scheduled as Sites of Special Scientific Interest.

Naturalists viewed with some apprehension the necessary Metropolitan Water Board operations resulting in temporary draining of the Walthamstow Reservoirs, the site of the biggest heronry in the Lon-

don area, thus leaving the herons unprotected. Various discussions have taken place with the Board. In spite of wire fencing there was some shooting on the heronry island at breeding time, and if next year's breeding is to be successful there should be no human interference. The Royal Society for the Protection of Birds and the Nature Conservancy at Monks' Wood were consulted about control of the carrion crow population, but it was pointed out that the crows should not constitute a danger to the breeding herons. Now No. 1 Reservoir is completely dry and some of the herons have moved to the island on No. 5.

In January, one of the Society's members, Mr Geoffrey Geiger, drew our attention to developments at Brent Reservoir and since then various discussions have taken place with Brent Council. Letters from members with detailed knowledge of the birds and the botanical interest of the reservoir have been passed on to the Nature Conservancy. The increase in housing development near Cool Oak Bridge, with houses built within a few metres of the east shore is regrettable.

All members will be glad to know that interest in the promotion of nature reserves is increasing. In Surrey, the Fullers Earth Company at Nutfield is developing twenty acres on the Sandgate Beds as a sanctuary. At Hanwell, Ealing, the owner of 'The Hermitage' has kindly offered to make the large garden available for natural history investigation and the Selborne Society is to undertake this. Hillfield Park Reservoir, the property of the Colne Valley Water Company, has been declared a local nature reserve. Plans are being made to make Trent Park a country park, and a letter about its natural history interest was sent to the Greater London Council. At the request of a member of the Norwood Hall Horticultural College staff, our Chairman visited the former Lyons sports ground to see if it would be suitable for nature trails and educational work. Unfortunately, he had to report that the stream there was badly polluted and there was a great deal of rubbish. These matters are now being put right by Ealing Council. Norwood Hall hope to establish a nature trail on Petersham Common and Meadows. Hundreds of trees have been planted in the Lea Valley, Essex, as part of the planning scheme, and a nature trail is proposed at Turnford.

Some areas suffer from neglect whilst others suffer from their popularity. Hampstead Heath is of course in the latter category, and details of denudation there—the result of 'people pressure'—have been sent to the Greater London Council who are doing a certain amount of replanting in suitable places. Scratch Wood suffers from neglect, and a letter about the need for thinning scrub at Elstree Tunnel was sent to British Rail.

Sometimes authorities err by uninformed enthusiasm, and a scheme by the Conservators of Wimbledon Common to plant exotic trees has been opposed. The planting of exotics, however attractive,

is usually opposed by naturalists because native shrubs and trees support a greater number of interesting species, and every effort should be maintained to conserve the native flora when so many pressures operate against it.

As appropriate in Conservation Year, Trusts and other organisations report an increase in public interest and a corresponding rise in membership. Perivale Sanctuary had over 1,000 visitors when open in July and attracted new members to the Selborne Society. Godstone Reserve had a very good summer and won for the Surrey Trust one of the hundred Countryside Awards for site improvements. Under the enthusiastic leadership of Mr Harry Darby a great deal of time has been spent in reedmace clearance, the removal of which has been facilitated by a new raft construction. The Kent Trust, helped by library exhibits, report an increase of 300 members, and it is hoped that the Bexley library exhibition will have introduced many more to its work.

At Ruxley, the gravel pit, like other nature reserves in the London area, is being put to educational and research use. At the moment, research work is being carried out on swan mussels. University College conservation post-graduates under Dr Barry Goldsmith have finished the survey of Dartford Heath and are compiling reports on all London parks over six acres, including Hampstead Heath and the Royal Parks.

Natural history in London is never without its surprises. At the Southborough Open Space, Bromley, an area surrounded by houses, a rare plant, *Oenanthe pimpinelloides*, has been discovered, and Mr Holroyde has written to Bromley Council's Conservation Officer, stressing the need for its protection and requesting that the area should not be mowed or sprayed. Good relations with local and county councils are essential for conservation work. At Riddlesdown and Farthing Down, the City of London Corporation willingly and helpfully co-operate with the Surrey Trust. Agreement was reached with the Surrey County Council regarding the cutting of grass verges, which were only narrowly cut until July and others of greater botanical interest were not cut at all until the full flowering time was passed.

Geological conservation is important too, and this year the famous Abbey Wood site attained even greater international importance when it became the second site in Europe where certain types of primitive pigs' teeth had been found. Charlton Pit is not to be handed over to the Inner London Education Authority, and the proposed nature trail will not involve the geological part, so that further erosion can be avoided.

Various conferences have been attended by members of the Committee. These included the biological recording conference at Juniper Hall and the similar conference organised by the Hertfordshire and Middlesex Trust.

The Colne Valley Liason Committee has met several times during the year and visited various sites. This is really a pressure group to ensure the preservation of sites of natural history interest in the Colne Valley. The Surrey, Hertfordshire and Middlesex, and Berkshire, Buckinghamshire and Oxfordshire Trusts are represented on the Liason Committee together with the L.N.H.S., and the Ruislip and Hillingdon Natural History Societies. There are also two Nature Conservancy observers.

The scheme for the collection of bluebell seed organised by Mr Milne-Redhead, and mentioned in last year's report, had as its final stage the planting of the seed on Petersham Common during a civic ceremony. This was one of many ways in which Mr Milne-Redhead's knowledge of conservation has helped to add to the amenities of the London area, and we are very sorry to lose him as Chairman. All members of the Society will wish him a very happy retirement in Suffolk.

Botanical Records for 1970

Compiled by J. EDWARD LOUSLEY

The early part of 1970 was cold, with snow in March and April and a late spring. In early April flowers were a good month behind on average and did not catch up until towards the end of May when there followed a long pleasant summer extending well into the autumn before the first hard frosts. It is therefore all the more disappointing that the number of records contributed was less than in recent years.

By far the most exciting find was an aquatic, *Vallisneria spiralis*. This was found in great quantity in the Lea Navigation Canal near Cheshunt by Mr Stephen Harris, a zoology student, where it forms large beds offering cover to fish and is piled up on the banks by the dredges which keep the waterway open. It is a native of the warmer parts of the world and most of the previous occurrences in Britain have been in canals where the water is heated by discharges from factories or mills. It is grown by aquarists and no doubt was introduced by someone with an aquarium throwing some into the Lea Navigation. The female flowers after pollination are pulled down below the surface of the water by their stalks contracting into a spiral and when I visited the canal on 17 October, these corkscrews were extremely conspicuous and made the distribution easy to trace. It seems to start abruptly at the lock north of Cheshunt (373044) and to extend south for at least 3·5 miles past Waltham Abbey to near Enfield Lock (at 369993). It grows in four tetrads of our mapping scheme (30/T64, 62 & 60; 39/T68). The vice-county boundaries are extremely difficult to follow along the Lea on modern maps, but *Vallisneria* grows mainly in Hertfordshire, V.C. 20 but apparently also in South and North Essex, V.C. 18 & 19, and Middlesex, V.C. 21. This interesting plant must have been in the canal for some years to extend so far and increase to such a vast quantity, and it is surprising that it has not been reported earlier.

In this report "tetrad" references, as used in the Mapping Scheme, are cited where available, and failing this 10-kilometre squares of the national grid. In both cases these appear in brackets following the place names. The nomenclature is based on the *List of British Vascular Plants* (1958) prepared by J. E. Dandy, and for species in that list authors' names are omitted to save space.

V.C. 16, West Kent

In May, Mrs L. M. P. Small found *Oenanthe pimpinelloides* in Southborough Recreation Ground (46/T36). This is an uncultivated open space not far from the golf course where R. W. Hale found this umbellifer in 1943 and the only other records from the London Area are of single plants. J. R. Palmer has sent useful notes of some established aliens. Walnut, *Juglans regia*, he found at South Darent

(56/T88), Longfield (56/T88) and south of Darenth (57/T60) in hedges and an old railway cutting, and *Viburnum tinus* bird sown in a lane at Northfleet (67/T24). *Cotoneaster lindleyi* Steud. he reports as well established in quantity round the edges of chalk-pits at Northfleet (67/T24) and *Amaranthus retroflexus* as still abundant in arable fields at Hawley (57/T42) and in a raspberry field at Hockenden (46/T88) where it has persisted for at least eight years. Mr Palmer also found burnet rose, *Rosa pimpinellifolia*, well established but of doubtful status (it is native in parts of Kent) at Horn's Cross (57/T64) and, with E. Clement, *Hirschfeldia incana*, which we have not had previously from Kent, on a refuse tip also at Horn's Cross (57/T64).

In bushes by the old railway track at Brasted (45/T66) R. Clarke and party found perfoliate honeysuckle, *Lonicera caprifolium*, and in dense woods near French Street (45/T42) with J. R. Palmer, a clubmoss, *Lycopodium clavatum*. Mr H. M. Pratt has continued his series of annual lists from the Dartford area and R. M. Burton reports finding in 1967, four plants of *Physalis ixocarpa* Hornem. on a foot-path near St Paul's Cray (51/T46).

V.C. 17, Surrey

An interesting list of records from B. R. Radcliffe includes *Lathyrus aphaca* in quantity on Ashted Common (15/T88), *Polygonum amplexicaule* established near Epsom Hospital (25/T08) and *Geranium nodosum* well established in woodland on Walton Heath (25/T24). Mrs Small found *Ambrosia artemisifolia* at the junction of Druid Street with Tanner Street, Bermondsey (37/T28), and R. M. Burton reports *Hieracium diaphanum*, det. C. E. A. Andrews, from Nunhead Cemetery (51/T37). My own Surrey lists in 1970 include detailed records of Mitcham Common (52/T26) where there were two good colonies of *Oenanthe lachenalii*. Dr D. P. Young has again collected the fine hawkweed *Hieracium speluncarum* on an old wall near Ham House (51/T16), previously reported as *H. pulmonarioides*.

V.C. 18, South Essex

There were few records. *Potentilla palustris* is known only from Epping Forest in the London Area and it is encouraging to hear from B. T. Ward that it is increasing.

V.C. 19, North Essex

Many interesting records for 1969 and 1970 have been received for this much neglected part of our Area. Miss M. Kennedy, with the assistance of P. C. Holland, D. H. Kent, John Moore, and others, reports *Apera spica-venti* from a roadside at Magdalen Laver (50/06), *Epilobium lanceolatum* from Latton Park (40/T66) and *Iris foetidissima* from Epping Green (40/T24). Other species new to our records from V.C.19 include *Silaum silaus*, *Carex divulsa*, *Kickxia*

spuria, *K. elatine*, *Scirpus setaceus*, *Bidens cernua*, *Frangula alnus*, *Verbena officinalis*, and *Orobanche minor*. A fine colony of *Dactylorhiza praetermissa* and hybrids on private ground near Waltham Abbey (30/T60) is reported by B. T. Ward and others.

V.C. 20, Herts.

The occurrence of the interesting aquatic *Vallisneria spiralis* in the Lea Navigation has already been mentioned. Equally pleasing was the discovery by H. J. Killick of *Gentianella germanica* in abundance in a chalk-pit at Essenden (20/T--). This was included in the records collected during the year by E. B. Bangerter which filled in many additional tetrads for Hertfordshire plants in our Area. *Sorbus torminalis* was found by Mrs L. M. P. Small at Ridgehill (20/T02) and by Mr Bangerter in a woodland area near Oak Hill College, East Barnet (29/T84), and John Widgery reports *Stachys arvensis* from South Mimms (20/T02).

V.C. 21, Middlesex

Cyperus fuscus is one of the rarest British plants and appears only in the years when the water level of the ponds by which it grows drops early enough to give it time to germinate and mature. It has been found at intervals in the Staines district (07/T40) since 1957 and Miss E. Young and E. J. Clement reported a few plants in September. At the end of the month I found about a hundred away from the shore submerged and almost buried in black mud. These must have flowered in August when the water level was lower. In the same pond Mr Clement found *Elodea ernstae* and I noticed a few plants of *Rumex palustris*.

By a footpath near the Ridgway Mill (29/T22) L. K. Wilkinson reports *Cicerbita macrophylla*. Miss E. Young noticed *Lotus corniculatus* in a window-box in Lower Belgrave Street (27/T88) and a well grown plant of purple moor grass, *Molinia caerulea* between the paving stones in Walton Street, S.W.3.

V.C. 24, Bucks.

No records received.

We are grateful to the following for their contributions to our records during the year: C. E. A. Andrews, E. B. Bangerter, R. M. Burton, E. J. Clement, Mrs S. Dudley-Smith, Mrs P. O. Dunkly, Stephen Harris, P. C. Holland, Miss R. Hartas-Jackson, Miss M. Kennedy, H. J. Killick, H. M. Pratt, B. R. Radcliffe, Mrs L. M. P. Small, B. T. Ward, J. P. Widgery, L. K. Wilkinson, B. Wurzell, and Miss E. Young.

Mammals in the London Area, 1970

by M. TOWNS

In this year's report, the format of previous issues is abandoned. Instead of presenting a list of species and indicating their presence in vice-counties, an attempt will be made to deal with London as a whole. It is hoped that such an approach will stimulate an awareness of the type of habitats afforded by giant conurbations such as London.

Roughly speaking, London comprises three zones: (1) a central zone of high density dwellings and developments, typified by the "City" and surroundings; (2) an inner zone of less densely sited housing with an ample provision of open spaces and private gardens; (3) an outer zone, suburbia, where dwellings are relatively thinly spread, with large gardens and many open spaces.

At first one is tempted to regard the central zone as being poor in mammalian species, and then expect an increasing diversity through to the edges of the metropolis. It is, in fact, possible that the central zone contains "enclaves" where species are able to flourish as relict or as newly arrived populations. For instance, hedgehogs have been recorded from the central zone at the Deptford area (TQ 3676 and environs), Greenwich Park (TQ 3877/3977), Battersea Park (TQ 2777, 2877) and, surprisingly, from Southwark Park (TQ 3578/9 in 1957). This last record is particularly interesting as the Park is located in the heart of the Rotherhithe/Bermondsey area adjoining the Surrey Commercial Docks. No further records have been tendered for Southwark Park since 1957. If anyone has information of any species in this Park, it would be welcomed. Other recent interesting records for hedgehogs have been tendered from Hyde Park, St James' Park and Holland Park. The hedgehogs at these sites have been in residence for some years, and are apparently able to prosper despite the increasing urbanisation around them. Is it not possible, therefore, that some of our smaller mammals may also have continued to thrive throughout this period? The Society has no records for small mammals from any of the parks mentioned, and even negative records would be of value.

There is a possibility that there are several "animal highways" within London. Such highways may contain several resident species and provide routes for the invasion of new or previously excluded species. As an example consider the muntjac deer that was captured at Barnes Common (TQ 2275) in 1965. On the Ordnance Survey map it can be seen that Barnes Common is the end-point of a "green corridor" extending from the region of Esher or possibly Ewell, through Richmond Park and Wimbledon Common, along which the animal had apparently travelled before its capture. Fortunately this corridor is reasonably well documented, except for one irritating omission; although grey squirrels, foxes, badgers, moles, rabbits,

hedgehogs, weasels, field voles, wood mice, pygmy and common shrews have been recorded from Richmond Park and Wimbledon Common, only grey squirrels have been recorded from Barnes Common which is literally "just up the road". Is there an alteration in the species composition from Richmond Park to the West Middlesex Water Works Reservoirs, a distance of less than three miles? Our present knowledge is insufficient to enable any consideration of this or other related topics.

Three other badly recorded corridors lie close to one another in north-east London; one is the Lea Valley, from which the paucity of records is deplorable in view of the proposed development schemes. The other two, one passing from Epping Forest via Whipps Cross and the other along the banks of the River Roding, both terminate at the Wanstead Flats and the City of London Cemetery. This area alone provides a rich variety of habitats and would well reward a series of carefully planned trap nights.

A substantial number of deer and fox records are followed by "on railway embankment", and it would appear that man's highways often serve as convenient routes for these species, too. In the case of the foxes, the embankments and cuttings probably provide a very adequate food supply, although our own Society records reveal very little on this point. What is the species composition of the land associated with railways in the London area? We do not know. To what extent do species move along railways into regions otherwise inhospitable to them? We do not know.

In what way can the casual observer help to fill in these gaps? By reporting every sighting. If you have reported a species from a district in a previous year and it is still there, then report it again. On the other hand if you note that a species has declined or apparently disappeared from an area, report this too. It could be of great interest. The examination of owl pellets and discarded bottles for skeletal remains is also extremely useful. If you are unable to identify these remains yourself, please pass them on to someone who can, or post them on to me with a brief description of the habitat or situation from which they were recovered.

I wish to thank the ninety-two observers who have sent me their records.

Obituary

MISS I. DARLINGTON, M.A., F.L.A., F.S.A.

Miss Darlington died on March 25, 1970 after a long illness. She had been a member of the Society since 1940, and an honorary member since 1967. She had wide-ranging interests in natural history and the countryside, and it was her interest in birds that prompted her to join the Society, but from 1954 she was associated most closely with the Archaeological Section. She was on its Committee almost continuously until 1967, and was its Chairman from 1959 to 1963. Miss Darlington gave numerous lectures and informal talks on varied subjects, usually connected with London—especially early maps and views; she led the Section on many visits, most memorably one to Lambeth Palace, and she was a very keen “digger”. Most of all, she provided the Section with a convenient and comfortable base for its informal meetings and its practical work—the record room in County Hall. Her inspiration and leadership were to a great extent responsible for the vigour which the Section showed during the years she was connected with it. Finally, on her retirement she entertained many members in her delightful historic house in Blewbury.

There is no room here to do more than mention her work on the Survey of London, her many published articles, her services to archives, or her wartime work with the L.C.C. welfare service. There is room however to speak of her enthusiasm, her kindness, her leadership, and her willingness to devote much time and effort, amid all her other work, to the affairs of the L.N.H.S. Archaeological Section. It is for all this that we remember her.

Statement of Affairs

| | | | | |
|-----------|---|--------|----|--------------|
| 31.10.69 | The Hindson Bequest | | | |
| Nil | Balance at 1.11.69 | 14,224 | 8 | - |
| 14,000 | Add: Amount received in current year | Nil | | |
| 224 | Interest on Investments | 314 | 1 | 9 |
| | | | | |
| 14,224 | | | | 14,538 9 9 |
| | Accumulated Fund | | | |
| (75 2 9) | Balance at 1.11.69 | (75 | 2 | 9) |
| deficit | Transfer from General Account .. | 122 | 11 | 7 |
| | | | | |
| | | | | 47 8 10 |
| | Premises Fund | | | |
| 1,910 | Balance at 1.11.69 | 1,965 | 4 | 9 |
| 124 | Add: Interest for year | 157 | 4 | - |
| 68 | Less: Transfer to General Account | Nil | | |
| | | | | |
| 1,965 | | | | 2,122 8 9 |
| | Life Composition Account | | | |
| 400 | Balance at 1.11.69 | 300 | - | - |
| 100 | Less: Transfer to General Account | 30 | - | - |
| | | | | |
| 300 | | | | 270 - - |
| | Library Cataloguing Fund | | | |
| 200 | Balance at 1.11.69 | | | 200 - - |
| | | | | |
| | Castell Research Centre Fund (Carnegie Scheme) | | | |
| 125 | Balance at 1.11.69 | 200 | - | - |
| 75 | Add: Transfer from General Account | Nil | | |
| Nil | Less: Transfer to General Account | 200 | - | - |
| | | | | |
| 200 | | | | Nil |
| | Ornithological Research Fund | | | |
| 173 | Balance at 1.11.69 | 189 | 11 | 11 |
| 3 | Add: Royalties received in year .. | Nil | | |
| 12 | Add: Interest received in year .. | 11 | - | 8 |
| | | | | |
| | | 200 | 12 | 7 |
| Nil | Less: Grant to Atlas Scheme .. | 25 | - | - |
| | | | | |
| 189 | | | | 175 12 7 |
| | Other Reserves | | | |
| 550 | L.B.R. No. 34 Reserve | 650 | - | - |
| 75 | Plant Mapping Scheme Publication | 175 | - | - |
| 50 | L.N. No. 48 Reprints | Nil | | |
| 100 | Hire of Halls | Nil | | |
| 50 | European Conservation Year | Nil | | |
| Nil | L.N. No. 49 Reserve | 1,000 | - | - |
| | | | | |
| 825 | | | | 1,825 - - |
| | | | | |
| 17,829 | | | | 19,178 19 11 |

at 31st October 1970

| | | | | | | |
|--------|----|----|--|---------|--------|------|
| | | | The Hindson Bequest Investments | | | |
| 10,000 | - | - | Quoted Investments, at cost | .. | 10,000 | - - |
| 4,224 | 8 | 8 | Bank Deposit Account | | 431 | 16 5 |
| — | — | — | Central Investment Co. | | 4,106 | 13 4 |
| <hr/> | | | | | <hr/> | |
| 14,224 | 8 | 8 | | | 14,538 | 9 9 |
| | | | General Fund Investments | | | |
| 154 | 4 | 6 | Quoted Investments, at cost | .. | Nil | |
| | | | Current Assets | | | |
| | | | Balance at Bank | | | |
| 331 | 6 | 2 | Current Account | | 359 | - 4 |
| 564 | 11 | 11 | Deposit Account | | 1,525 | 12 7 |
| 2,554 | 11 | 4 | Deposit with Central Investment Co. | | 2,755 | 17 3 |
| <hr/> | | | | | <hr/> | |
| 3,450 | 9 | 5 | | | 4,640 | 10 2 |

17,829 2 7

19,178 19 11

| | | | General | | | |
|-------|----|----|---|-------|----|----|
| | | | Payments | | | |
| 148 | 1 | 11 | Hire of Halls | 263 | 15 | — |
| 150 | 2 | 4 | Sectional Expenses including L.N.C.C. | 196 | 1 | 6 |
| 32 | 16 | 6 | Subs. to other Societies | 52 | 16 | 6 |
| 84 | 14 | 10 | Printing and Stationery | 49 | 13 | 7 |
| 112 | 8 | 4 | Library | 22 | 7 | 8 |
| 31 | 2 | 9 | Castell Research Centre | 2 | 15 | 1 |
| 137 | 10 | — | Honoraria | 225 | — | — |
| 123 | 7 | 4 | Postage and Telephone | 64 | 8 | 10 |
| 47 | — | 4 | Sundries including Covenant Stamping | 28 | 7 | 6 |
| Nil | | | Carnegie Scheme | 110 | 18 | 10 |
| 1,820 | 13 | 1 | Grant to Publications Account | 1,928 | 12 | 10 |
| 50 | — | — | European Conservation Year Grant | 160 | 10 | — |
| 159 | 9 | — | Purchase, Removal Overhaul Duplicator | Nil | | |
| 46 | 5 | 7 | Loss from Sale of Securities | Nil | | |
| <hr/> | | | | <hr/> | | |
| 2,943 | 12 | — | | 3,105 | 7 | 4 |
| | | | Transfers to Reserves.. .. . | | | |
| 175 | — | — | Carnegie Scheme | Nil | | |
| 100 | — | — | Hire of Halls | Nil | | |
| Nil | | | Plant Mapping Scheme Research and Publication Fund | 100 | — | — |
| 50 | — | — | European Conservation Year | Nil | | |
| Nil | | | Ex. of Receipts over Payments, transferred to Accumulated Fund.. .. . | 122 | 11 | 7 |
| <hr/> | | | | <hr/> | | |
| 3,168 | 12 | — | | 3,327 | 18 | 11 |
| <hr/> | | | | <hr/> | | |

| | | | Publications | | | |
|-------|----|----|---|-------|----|----|
| 251 | 18 | 2 | Programme | 312 | 14 | 2 |
| 1,020 | 11 | 10 | London Naturalist No. 49 Reserve including Reprints | 1,000 | — | — |
| Nil | | | London Naturalist No. 48 excess expenditure including Reprints | 107 | 17 | 11 |
| Nil | | | London Bird Report—Excess Expenditure over Reserve (£630.23—£550) | 80 | 2 | 3 |
| 550 | — | — | London Bird Report Reserve for No. 34 | 650 | — | — |
| 45 | 14 | 6 | Addressing and Wrapping | Nil | | |
| 104 | 5 | 9 | Postages | Nil | | |
| 50 | — | — | London Naturalist—Reserve for Reprints | Nil | | |
| <hr/> | | | | <hr/> | | |
| 2,022 | 10 | 3 | | 2,144 | 14 | 4 |
| <hr/> | | | | <hr/> | | |

Account

| | | Receipts | | | | | |
|-------|-----|-----------------|---|---------|----|----|-------------|
| 2,561 | 12 | - | Subscriptions | Current | .. | .. | 2,472 5 8 |
| | Nil | | | Arrears | .. | .. | 32 2 6 |
| 62 | 5 | - | | Advance | .. | .. | 41 5 0 |
| 32 | 10 | - | Entrance Fees | .. | .. | .. | 40 15 - |
| | | | | | | | 2,586 8 2 |
| <hr/> | | | | | | | |
| 2,656 | 7 | - | | | | | |
| 60 | 7 | 11 | Donations | .. | .. | .. | 31 18 11 |
| 135 | 10 | 7 | Tax recovered from Deeds of Covenant | .. | .. | .. | 146 11 7 |
| 8 | - | 6 | Interest on Investments | .. | .. | .. | 5 8 - |
| Nil | | | Profit from Sale of Securities (£180—£154.4.6) | .. | .. | .. | 25 15 6 |
| 53 | 6 | 5 | Deposit Acc. Int. (Westminster Bank) | .. | .. | .. | 56 12 1 |
| 30 | 16 | 4 | Deposit Acc. (Central Inv. Co.) ex Premises Fund | .. | .. | .. | 44 1 11 |
| 5 | 5 | - | Sundries including Bird Film Receipts | .. | .. | .. | 1 11 4 |
| 50 | - | - | Transfer from Printing Rules Reserve | .. | .. | .. | Nil |
| 100 | - | - | Transfer from Life Composition Account | .. | .. | .. | 30 - - |
| 68 | 18 | 3 | Transfer from Premises Fund | .. | .. | .. | Nil |
| Nil | | | Transfer from Castell Research Centre (Carnegie Scheme) | .. | .. | .. | 200 - - |
| Nil | | | Transfer from Hire of Halls Reserve | .. | .. | .. | 100 - - |
| Nil | | | Transfer from European Conservation Year Reserve | .. | .. | .. | 50 - - |
| Nil | | | Sale of Mailing List in respect of E.C.Y. | .. | .. | .. | 10 10 - |
| Nil | | | Receipts from Film Show | .. | .. | .. | 39 1 5 |
| | | | | | | | 3,327 18 11 |
| <hr/> | | | | | | | |
| 3,168 | 12 | - | | | | | |

Account

| | | | | | | | |
|-------|----|----|--|----|----|----|-------------|
| 141 | 9 | 11 | Sale of Publications | .. | .. | .. | 156 1 6 |
| 27 | 10 | - | Sale of Mailing Lists | .. | .. | .. | Nil |
| 32 | 10 | - | Donation towards cost of London Naturalist | .. | .. | .. | 10 - - |
| 1,820 | 13 | 1 | Transfer from General Account | .. | .. | .. | 1,928 12 10 |
| - | 7 | 3 | L.B.R. No 32 Reserve (£550—£549.12.9) | .. | .. | .. | Nil |
| Nil | | | Transfer from Reserve London Naturalist Reprints | .. | .. | .. | 50 - - |
| | | | | | | | 2,144 14 4 |
| <hr/> | | | | | | | |
| 2,022 | 10 | 3 | | | | | |
| | | | | | | | 2,144 14 4 |
| <hr/> | | | | | | | |

Instructions to Contributors

Submission of papers

Papers relevant to the natural history and archaeology of the London area should be submitted to the editor, Mr J. R. Laundon, Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD, before the end of January if they are to be considered for publication in the same year. They should be typed, with double spacing and wide (three cm) margins, on one side of the paper. Authors must retain a duplicate copy. Papers should include an abstract, summary or synopsis.

Text

Spellings are to follow *Chambers's Twentieth Century Dictionary*; locality spellings should follow the latest editions of the maps published by the Ordnance Survey. Capitalisation should be kept to a minimum. Common names of animals and plants must begin with lower-case initials, and scientific names must be underlined. Genus names should appear in full where first used within each paragraph. In descriptive matter numbers under 100 should be in words. Dates should follow the logical sequence of day, month, year (i.e. 25 December 1971). Measurements should be in metric and follow the SI system (Système International d'Unités), with imperial equivalents in parenthesis where appropriate. There should be no full point following Dr, Mr, Mrs or St. Lists should be in natural, alphabetical or numerical order.

References

Reference citation should be based on the Madison rules (in *Bull. Torrey bot. Club* **22** : 130-132 (1895)) except that a colon should always precede a page number. Capitalisation in titles of papers in journals should be kept to a minimum. Journal titles should follow the abbreviations in the *World List of Scientific Periodicals* and be underlined. Examples are as follows:

In text:

Meadows (1970 : 80).

(Meadows 1970).

In references:

MEADOWS, B. S. 1970. Observations on the return of fishes to a polluted tributary of the River Thames 1964-9. *Lond. Nat.* **49** : 76-81.

MELLANBY, K. 1970. *Pesticides and Pollution*. Ed. 2. Collins, London.

WHITE, K. G. 1959. Dimsdale Hall moat, part II. *Trans. a. Rep. N. Staffs. Fld Club* **92** : 39-45.

Illustrations

Distribution maps should be submitted in the form of a Recording Map with symbols in Indian ink or Letraset. Solid dots are used to indicate contemporary or recent presence, circles for old records and crosses (not pluses) for other information, such as introduced species. Tetrad dots and circles should be 4.0 mm and tetrad crosses 5.0 mm, with a line thickness of 0.8 mm; all monad symbols should be 1.6 mm with a line thickness of 0.5 mm. The legend should be written outside the frame of the map and will be set up by the printer. The Mapping Schemes Secretary can provide Recording Maps and advice.

Line drawings should be in Indian ink on Bristol board, preferably twice the printed size. Place names, etc., must be produced with stencils or Letraset. Legends should be separate as they will be set up by the printer.

Photographs should be glossy black-and-white prints, of good contrast, preferably half-plate in size.

Proofs

Galley proofs will be sent to authors for scrutiny, but only essential corrections can be made at that stage.

Reprints

Up to twenty-five free reprints will be supplied on request. Additional copies may be purchased if ordered when the proofs are returned.

