THE LONDON NATURALIST

The Journal of the

LONDON NATURAL HISTORY SOCIETY

No. 43

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LONDON NATURAL HISTORY SOCIETY

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Information about the Society may be obtained from the General Secretary: Mrs. Small, 13 Woodfield Crescent, W.5.

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Report of the Society for 1963

THE membership of our Society at the end of October 1963 was 1,608, an increase of 93 over the figure for the previous year. It is with regret that we record the deaths of the following members: Miss P. Bird, K. V. Elphinstone, Mrs. M. Everitt, A. D. Mackenzie, Miss D. McCall, H. Reynolds and Oliver Pike.

The death of Oliver Pike was a grievous loss to the world of natural history. Mr. Pike had been an Honorary Vice-President of this Society for many years; an obituary notice by Mr. Eric Hosking will be found on p. 161 of this issue.

The Young Naturalists' Section has been disbanded this year. The decision to do this was deeply regretted by Council, but in view of the difficulties which have been experienced in finding officers for this Section there seemed to be no possible alternative. However, in order to maintain the interest of our younger members, Council has recommended to all other sections that they should whenever possible elect a junior member to serve on the sectional committee.

We have again received this year through the Royal Society a Parliamentary grant-in-aid of £150 towards the cost of our publications.

The restriction of our Society's activities following the loss of our premises at Eccleston Square has been keenly felt by us all. Since all efforts to find other suitable headquarters have so far failed, it was decided to start a special Premises Fund which will be added to from time to time as our finances permit. We would like to invite all members to help in this worthy aim by leaving legacies to the Society and by arranging to pay their subscriptions by Deed of Covenant.

The Lower Wood Committee reported to Council this year that subsequent to changes in the use of this land by the owner, it had become impossible to carry out serious scientific work there. Your Council has therefore terminated the agreement with the owner.

A Nature Trail was staged by the Society on Esher Common in May this year as a part of the National Nature Week activities. The trail, which was 2½ miles in length, was followed by some 700 people of whom only a small percentage were L.N.H.S. members. Judging by the large number of visitors and the many compliments received, this venture was a great success. In connection with the Trail an exhibition of maps, photographs and specimens was shown in Esher Central Library by arrangement with the Esher District Librarian. We are indebted to him, to the Esher U.D.C. and to the District Surveyor for allowing us to stage the Trail and the Exhibition and for their co-operation throughout.

We should like to record our appreciation of the work done by the Nature Trail Committee and particularly of Mr. L. Manns who first suggested the idea to Council and whose enthusiasm and effort was an important factor in the final success of this venture.

Your Society actively participated in National Nature Week this year. Apart from our Nature Trail mentioned earlier, and the supporting exhibition in Esher Central Library, another exhibition was expertly organized at Ealing by our Honorary Librarian, the Reference Librarian of Ealing, Dr. F. A. Toufar, which included our collection of photographs made by Oliver Pike. A selection of natural history colour photographs taken by our members was exhibited in the Kodak showrooms, Kingsway, by courtesy of the Directors of Kodak Limited.

Two of our members were recipients of important awards this year given in recognition of their outstanding contributions as amateurs to the science of Natural History over many years. Our present President, Mr. J. E. Lousley, received the Bloomer Award of the Linnean Society of London and the British Trust for Ornithology gave the Bernard Tucker award to Mr. S. Cramp, one of our Vice-Presidents. Apart from his scientific work, Mr. Lousley is well known as the Honorary Secretary of the Council for Nature and as the President of the Botanical Society of the British Isles. Of the many services to Ornithology rendered by Mr. Cramp, the best known and most vital to our members is his work as the Chairman of the joint committee of the B.T.O. and the R.S.P.B. on Toxic Chemicals.

In recognition of their great services to the Society over many years, Messrs. L. Parmenter and J. H. G. Peterken have been elected Honorary Vice-Presidents. Mr. Parmenter joined the Society in 1925 and was a founder member of the Ecological Section. He held the office of President from 1949 to 1951 and was Treasurer from 1952 to 1956. He was the driving force behind the Limpsfield Common Survey and was one of the first and most active members of the Bookham Common Survey. Beginning his career with the Society as an ornithologist, he early became interested in entomology, particularly flies, on which subject he has contributed numerous papers to the *London Naturalist* and other journals.

J. H. G. Peterken joined the Society in 1937 and after serving as Treasurer (1948-1951) held the office of President from 1952 to 1955. Bryophytes have for long been his main interest and he has recently compiled a Hand List of Bryophytes of the London Area. His "Bryophyte rambles" have been a regular feature of our programme for many years and many of our members have been encouraged and helped by him in the study of this difficult group.

The severe weather early in the year and the poor sunshine record in the months that followed seem to have done little to curtail the activities of our members in the field.

A second season of excavation at Merton Priory was organized jointly by the Archaeological Section and the Merton and Morden Historical Society under the direction of Mr. D. J. Turner. A further interim report will be published in a later issue. Members of the Section also assisted at two other excavations directed by Mr. Turner, at Charlwood and Carshalton.

Miss Joan Harding reports that members have again assisted in the third season of excavation on the Late Bronze Age homestead in Weston Wood, Albury. A radio-carbon analysis gave a date of 510 B.C. $\pm$ 110 years for the site. Interesting finds this year include a considerable amount of pottery and a storage pit for grain containing a mixture of barley and wheat. This excavation was reported in the national press and a paper on it was read to the Prehistoric Society.

The Section's monthly informal meetings are now being held in the Cuming Museum, Southwark. It is intended to devote several of these meetings to practical work on the considerable quantity of untreated and classified finds from recent excavations in Southwark. We are indebted to Mr. M. R. Maitland-Muller, the Curator of the Museum, for his help and active co-operation in this project.

A grand total of 34 field meetings were held this year by the Botanical Section which included the Easter week-end trip to Lyme Regis arranged

jointly with the Geologists and a large scale expedition to Aston Rowant, where we joined forces with the Middle Thames Natural History Society and the Bucks and Oxon Naturalists' Trust.

The Section's survey of *Calystegia* in the London Area is progressing favourably. The number of members taking the trouble to fill in the record cards has increased and a start has been made on the preliminary statistical work. A further progress report is included in this edition of the *London Naturalist*. Many more records are needed, so members who have not yet contributed to this scheme are not too late to do so.

During the past year the Ecology Section has continued its policy of planning meetings on topics not normally covered by the specialist sections. Lectures were arranged on amphibians, on snakes and a population study of small mammals. A symposium on "The Thames as an Habitat" was held in January and in September we were specially fortunate to hear Professor Munro Fox speaking on "Marine Biology".

The field meetings organized included a follow-up outing to Brighton to study life on the sea-shore, led by Professor Munro Fox, and a visit to Westerham to look for bats, whilst a party went to the London Zoo to see the small mammal collection and there was a joint meeting with the Geology Section to the North Downs to study the relationship between the geology of an area and its flora and fauna.

The publication by our member Dr. Geoffrey Beven of his paper "Population changes in a Surrey oakwood during fifteen years" in *British Birds* (**56**, 307-323, 1963), gave national (if not international) publicity to the Society's survey at Bookham Common. The survey was praised in the accompanying Editorial, where it was pointed out that the promising start of the early thirties had been followed by a period of "lean years for British studies of bird ecology and population". "During those years, perhaps the most comprehensive and sustained contribution for any single site has come from the Bookham Common survey carried out by the Ecology Section of the L.N.H.S. This has now to its credit 20 years of work on plants and animals, in which the ornithological element has been fully represented. It is to be hoped that other local bodies in different parts of the country may now be encouraged to follow the example which the L.N.H.S. has set so well for so long".

Mr. W. G. Teagle has now moved from the London Area and has resigned as Recorder for mammals, a responsibility which he has carried so well for many years. We are pleased to see, however, that two papers from him are appearing in this issue of the *London Naturalist*. The sectional Curator, Mr. J. Cooper, has now begun to build up a collection of bird skulls. He would like members to send to him any suitable corpses found in the field.

Indoor meetings of the Entomology Section included a showing of the prize-winning B.B.C. film on the life history of the Alder Wood-Wasp and its parasites, a talk by Mr. R. L. Coe about the Diptera captured on the British Museum expedition to Nepal, and a most entertaining evening when Dr. Massee spoke in his inimitable manner on the insects associated with cherry orchards in Kent.

The number of exhibits staged at indoor meetings was less than desirable, and the Section urges all its members to contribute to the interest and success of the meetings by bringing exhibits as frequently as possible.

Field meetings were held regularly during the season, the localities visited including Epping Forest, Brentwood, Higham Marshes, Chislehurst, Ranmore and Chobham Common.

Our Epping Forest Field Section held an average of two field meetings a month during the year, many of these being of a general nature, as would be expected in such a rich area for natural history as Epping Forest.

The Ramblers appear to have had an enjoyable time despite the inclement weather, walking through a variety of counties. Their Saturday visits to places of interest in the London Area continue to be as popular and well attended as ever, and included a visit to the new Museum of the Royal College of Surgeons arranged for us by Mr. Buckland.

For the fourth successive year the Geological Section showed an exhibit at the annual reunion of the Geologists' Association. This year the exhibit featured a display of specimens collected from the chalk pit at Coulsdon that had recently been studied. The Easter field meeting was centred on Lyme Regis and was led by Mr. R. F. Moorman and a well known local geologist, Mr. J. F. Jackson. A coach was hired for the whole meeting, being used for transporting members to Lyme Regis and back to London as well as for local excursions. Good Friday was spent under Stonebarrow Hill and Golden Cap and saw the collection of many ammonites and belemnites. A Nautilus specimen was also found. On the Saturday the party walked from Humble Point to Seaton and among the many further fossils collected was the tooth of a ray. A remarkable spring formed at the base of a large mass of slipped chalk was seen near Seaton. The morning of Easter Monday was spent on the Lias exposures west of the Cobb and one member was very fortunate in finding part of a jaw of an Ichthyosaurus.

Poor weather adversely affected many of the shorter field meetings planned during the year and a number of the coach meetings had to be cancelled because of lack of support. The coach meeting held in May to the Abingdon district, however, proved to be popular and was devoted entirely to the Corallian beds of the Jurassic. Visits were paid to Betchworth and Ford Place. The former yielded belemnites from the Plenus Marls whilst the latter produced a wide variety of ammonites from the Gault.

Among indoor meetings, the one given by Dr. J. F. Potter entitled "A Geological Excursion around the World" was very popular. Dr. Potter showed a remarkable variety of colour slides from many countries. Among the several demonstrations held was one to the works of the Diamond Polishing Company. Here members were able to watch diamonds being actually cut and prepared for use.

The Ornithological Section was again very active in the field this year, a field meeting being held every week-end. Two week-end meetings were arranged—to Pembrokeshire at Whitsun and to Walberswick in September. These were both highly successful and much enjoyed by the participants and look like being a regular feature of future programmes. The attendance at field meetings was very satisfactory, despite the severe weather conditions which prevailed in the early part of the year; in fact, a trip to the Wash in February's frost and snow was one of the most popular expeditions of the year.

A welcome feature of the year's series of indoor meetings was the strong contribution from the Section's own members, accounting for five out of

the eleven evenings. Average attendance is now well over the one hundred mark and the range of subjects as varied as ever.

In the absence of permanent quarters belonging to the Society, it is not so easy for members to meet informally. The Section, in an effort to encourage members in this respect, held two successful buffet-supper evenings and also a series of informal meetings at the Garrick Hotel. A Section dinner was to be held in April 1964.

Scientific enquiries at present in hand are a survey of rubbish tips and their birds and a general survey of the breeding birds of S.W. London. The principle aim of the latter is to determine changes in status since 1950. Further support for these is urgently called for from all interested members.

The *Bulletin*, under its new editor and business manager, has appeared in two issues this year, expanded its membership and established itself on a sure footing. Surely no member can reasonably consider himself on the "active list" of the Section without subscribing and contributing to the *Bulletin*.

There has been a serious decline in activity in the Section's ringing scheme at Beddington sewage farm. It is very important that our interest in this area be maintained and it is hoped that more members will try to visit the site regularly.

After being out of print for six years our Society's comprehensive book *The Birds of the London Area since 1900* is being reprinted by new publishers, Rupert Hart-Davies Limited. It will include a new set of photographs and an extra chapter of about 10,000 words on changes in the birds of the Area since 1954 and additions to our knowledge of bird migration and of the changing pattern of bird life in inner London. A limited number of copies will be available to members at a reduced price.

The first public showing of the Society's colour film "London's Birds" took place in March at St. Pancras Town Hall, twice nightly for four successive nights, with two special matinees for school children; about 4,000 tickets were sold. We are indeed grateful to the two photographers, R. P. Cordero and W. D. Park, who produced this valuable historical record of London bird life, to R. P. Cordero for his skilful editing of the mass of original material, to the members of the Film Presentation Committee who planned and organized the premier showing, and to many other members who helped to make a success of this venture.

Since then the film has been shown at Lewisham Town Hall, Fairfield Halls, Croydon, where our Honorary Vice-President, Mr. Eric Hosking, took the Chair and at the Great Hall, Queen Mary College where the Chair was taken by our Honorary President, Professor Munro Fox.

The film has now been made available for hire by other organizations and societies outside the London area and several bookings have been negotiated.

The most important work undertaken by members of the South-West Middlesex Group during the year has been in connection with the National Nature Week exhibition staged at Isleworth Polytechnic. The display was a joint effort by the Polytechnic, local schools and the South-West Middlesex Group. Members of the Group were responsible for the ornithology and botany exhibits, and assisted in the preparation during the previous week-end. One member organized a tree and shrub competition for school children, and another lectured on the "Birds of Osterley Park". This lecture was followed by a conducted tour of the

park to which members of the public were invited. Most of the evening stewarding was undertaken by members of the Group. At the end of the exhibition all who had participated felt that the effort had been very worth while.

The Society's Collections

When the Society lost its premises in Eccleston Square and it became obvious that high rentals in Central London made it unlikely that we should find new ones, it was necessary to decide what should become of our collections. We wanted to keep as many as possible for the use of members and the following still remain to us through the kindness of various bodies and individuals.

Botany

After extensive work in putting the herbarium into good order it was accepted by the South London Botanical Institute who will take care of both cupboards and specimens but let us have them if we should find new premises. We are very grateful to the Council of the S.L.B.I. for this facility. Access to the herbarium may be gained by writing to the botanical curator, Mrs. A. G. Side, 107 London Road, Stone, Dartford, Kent.

Our collection of mosses and liverworts is in the care of Mr. R. M. Payne, 8 Hill Top, Loughton, Essex. Specimens may be borrowed by post.

Entomology

The entomological collections have all passed into other hands but through the kindness of the Croydon Natural History Society our largest cabinet is in store and can be recovered if we should need it. Many of the specimens went into the Queen Mary College collections and through Dr. Carthy, Department of Zoology, Queen Mary College, Mile End Road, E.1, access may be granted to members.

Mr. B. L. Sage may also be able to help members interested in Coleoptera.

Ornithology

The best of our egg collection in several cabinets is in store in the care of the Council for Nature and although no access is at present possible we hope that we may eventually be able to arrange this. Skin collections are with Mr. Sage, the curator.

Ecology

A collection of land and freshwater shells and of mammal and bird skulls is in the care of the curator, Mr. J. Cooper, British Museum (Nat. Hist.). Additions, especially from the London area, would be most welcome. The collections may be consulted by arrangement with Mr. Cooper.

The photographs presented by Oliver Pike are stored at Ealing Central Library as are also the collection of lantern slides and archaeological records. It is hoped that all these will in due course be listed so that members may know what is available.

Botany in London

J. EDWARD LOUSLEY

(Summary of Presidential Address delivered December 4, 1963)

ALTHOUGH my title is botanical, I must make it clear that my remarks will not be directed especially to botanists. I propose to review some of the current work on the flowering plants and ferns of the London Area in relation to the work of the Society as a whole and to other organizations. At heart I am a general naturalist, but in recent years the demands of botany have left me with no time for other studies and I am very conscious of the disadvantages of specialization. The vast additions to the fund of knowledge have made it essential in the recent past for anyone bent on doing useful scientific work to concentrate on a narrow field, but fortunately times are changing. The steady growth of ecology and the rapid developments in conservation now offer far more scope for general naturalists who see nature as a whole. There will always be a need for specialists but it would be a tragedy if this Society ever developed into a number of sections working in water-tight compartments without full collaboration. I hope that this address will indicate some of the ways in which botany fits into the scheme as a whole.

The first step in almost any biological work is to establish a reliable list of the species present and their distribution, and botanists have endeavoured to provide this in *A Hand List of the Plants of the London Area.* This included records of 1835 species contributed by nearly four hundred helpers. Our Area must be one of the most thoroughly botanized for its size in the world and yet it is still not adequately known, and a large number of new records come in every year. One of the reasons for this is that we are gradually, as a matter of policy, obtaining permission to investigate places to which the public are denied free access. As examples I would remind you of the paper last year by Mrs. Smith and Mrs. Welch on Hurst Park Racecourse, of my papers in 1959 and 1960 on Dulwich Woods, of work done recently in the grounds of Woolwich Arsenal at the instigation of Flt./Lt. Halligey, and of recording in the grounds of Buckingham Palace. Again, disused railways are a fruitful source of new records—those by Dulwich Woods in the south and Highgate Woods in the north being examples. The botanists endeavoured to arrange for representatives of other Sections to join in the work at Woolwich Arsenal, but I feel sure that there is scope for greater collaboration of this kind. Surely Sections should join in suggesting opportunities for getting access to little-known places.

A further reason for the steady flow of new records is that the flora is constantly changing. The built-up centre of our Area where plants are few offers particularly favourable opportunities of studying the arrival of species in new—and usually temporary—habitats. Some of these plants are transported by birds, and their study would provide a useful subject for collaboration between botanists and ornithologists. Plants provide food for many insects, and work on the bombed sites is one example of the way in which botanical recording ties up with the work of other Sections, but surely more use can be made of these records than is the case at present. Has any serious attempt been made to relate the distribution of insects

restricted to particular species for food to the distribution of plants in our Area?

The botanists have faithfully restricted their official recording to the Society's Area—a circle of 20 miles radius from St. Paul's—but the time may have come when the boundaries should be reviewed with the interests of all Sections in mind. The present limits conform neither with the boundaries of counties used as a basis for the preparation and publication of Floras, nor with the National Grid system used for the units of much botanical recording. Our Area includes land in six counties and only one, Middlesex, is wholly included. Kent, Surrey, Hertfordshire and Essex have new Floras in active preparation, and of Buckinghamshire we have only such a tiny part that it is of no great significance. No doubt other Sections also find difficulties in applying the present arbitrary boundary, and while it would be most regrettable if the Society ceased to concentrate its main effort on London, there may be a case for adjusting the present boundary for practical reasons, and introducing a second outer boundary to provide more scope for field work in less artificial habitats.

This is not the time to go into details about the work of botanists but there are two features which I would like to bring to your notice. The first is that the plodding recording of aliens which takes up a good deal of our time, and may at first sight seem rather trivial when so many of the species recorded fail to reappear, has implications of general importance. When I started recording, Rosebay Willowherb was still uncommon, and Oxford Ragwort very rare indeed. More recently the rapid spread of a waterweed, *Lagarosiphon major*, has had serious implications—it completely choked a pond at Whipp's Cross which had to be emptied and thoroughly cleaned. These alien explosions have considerable effect on the ecology of the habitats concerned, and influence the insects, and maybe even fish and mollusca as in the last mentioned example. The second point I would like to make is the desirability of having a corporate research project. The Botany Section have one running on the large bindweeds (*Calystegia*) to which all members can make a useful contribution. Work of this kind depends on having a large number of helpers and is eminently suitable for a Society but, like all research projects, even the most careful planning cannot guarantee spectacular results. Other Sections might consider whether they can initiate further investigations of this kind, and it may be that suitable projects could be found for collaboration between Sections. The field for such projects is much wider than may appear at first sight. Collaboration of botanists with archaeologists and antiquarians may not seem very likely but I have been involved in such work on a number of occasions as, for example, when I was able to fix the precise eastern boundary of the Thrale Estate, of Dr. Johnson associations, by careful plotting of the Dutch, English and other elms of various ages. I am sure other Sections could make more use of the botanists.

We naturalists know that we are on to a good thing and it would be selfish to keep it to ourselves. In other words we have a duty to the public, and especially to the younger members of the public, to spread interest in the subjects we study. One of the most successful ways of doing this is by organizing Nature Trails, of which the one which Mr. Manns arranged for the Society in National Nature Week is an excellent example. The botany, which came first on the notice-boards, is fundamental for describing the homes and sources of the food of many of the mammals, insects and birds.

Naturalists, including botanists, also have a duty to help in the work of conserving our remaining habitats, or at least the best of them. This is the particular responsibility of the Nature Conservation Committee, a committee of Council, which also provides a link with the Nature Conservancy and the various County Naturalists' Trusts in our Area. In this work the botanists have an essential part to play. The first step in conservation is to record, and until we have full records we do not know what we are trying to protect or the relative importance of the sites. Here the Botany Section's existing records provide a basis on which to build but we need many more special visits to sites and the preparation of full surveys. The next step is to keep these records up to date and to note and study changes. Much of this is the proper province of the Ecological Section, but the botanists have a part to play and their pooled knowledge of the history of sites can be particularly valuable in indicating trends. The acquisition of habitats is likely to prove futile without provision for proper management, and I would draw your attention particularly to the growth of scrub following withdrawal of grazing, and the efforts being made by the Conservation Corps of the Council for Nature to organize the work of young people to save some of our chalk grassland. Conservation work is urgent and needs the energetic support of every Section of the Society.

I opened this address by saying that my remarks would not be directed especially to the botanists, and I must apologize to the Botany Section for using their activities for my purpose. I have endeavoured to give some indication of how intimately the work of one Section is bound up with the interests of others. No doubt a series of similar examples could be given for other Sections. I think it is time we gave more thought to the relationship between our own specialist studies and other branches of natural history, and to ways in which our own Sections can collaborate with others. If my remarks help more of you to take this broad view my object will be achieved.

(The address was illustrated by colour transparencies of Dulwich Woods, disused railways, Hurst Park Racecourse and other habitats to which we have only recently had access, of important new plant discoveries, nature reserves and the work of the Conservation Corps in our Area, and of the Society's Nature Trail arranged in May 1963.)

The following references may be of use to readers who wish to follow up the subject of this address:—

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Notes on the Flora of Churchyard Walls in Middlesex

By Douglas H. Kent

IN an earlier paper dealing with the flora of Middlesex walls (Kent, 1960) data on plants noted growing on churchyard walls was deliberately excluded on the grounds that the floristic cover of these walls was usually different to that found on walls enclosing parks and gardens.

Old churchyards invariably harbour a relict flora of native plants even when the surrounding area has become urbanized, e.g. the old parish churchyard at Willesden, in an area which has long been heavily built up, is gay with *Ranunculus ficaria* and *Anthriscus sylvestris* in the spring and both species are excessively rare elsewhere in the borough. The seeds of plants growing in churchyards are probably easily transported to the surrounding walls which are usually of lower height, often of much greater age, sometimes of a different composition, and frequently in more need of repair than many garden walls. These are probably the chief factors why churchyard walls support a more varied array of native plants than do garden walls.

The observations given below were made during a study of the flora of walls and old tombs of 20 parish churchyards in various parts of Middlesex (vice-county 21), during the six years 1957-63. All the walls had plants growing on them, and at least six visits were made to each site at varying times of the year during the course of the survey.

The following table indicates the ten species most frequently encountered on churchyard walls with a percentage of their frequency in all twenty sites. Details of the frequency of these species on twenty garden walls selected at random, but all within 200 yards of the various churchyards, is provided for comparison.

Table I

The Most Frequent Species on Middlesex Walls

	Churchyard walls	Garden walls
Poa annua L.	45%	55%
Taraxacum officinale Weber	40%	20%
Dryopteris filix-mas (L.) Schott	35%	30%
Sagina procumbens L.	35%	20%
Sonchus oleraceus L.	35%	30%
Lamium album L.	30%	20%
Poa angustifolia L.	30%	0%
Cymbalaria muralis Gaertn., Mey. & Scherb.	25%	35%
Phyllitis scolopendrium (L.) Newm.	25%	10%
Taxus baccata L.	25%	0%
Asplenium ruta-muraria L.	20%	5%
Pteridium aquilinum (L.) Kuhn	20%	15%
Glechoma hederacea L.	15%	0%
Parietaria diffusa Mert. & Koch	15%	5%
Senecio vulgaris L.	15%	10%
S. squalidus L.	15%	45%
Veronica chamaedrys L.	15%	0%

It is not surprising that *Poa annua* is by far the most frequent inhabitant of both types of wall. Tutin (1957) has pointed out that it is "supreme among weeds" as it flowers and fruits throughout the year, germinates rapidly and has seeds which are easily dispersed. Its self-fertility and rapid life cycle also ensures that a few isolated plants are enough to build up large populations in the course of a single year. *Taraxacum officinale*, *Lamium album*, *Poa angustifolia*, *Glechoma hederacea* and *Veronica chamaedrys* are much more frequent on churchyard walls than those of gardens, and originate from the churchyard flora. *Phyllitis scolopendrium*, *Asplenium ruta-muraria* and *Parietaria diffusa* are also more common on churchyard walls, but these are characteristic churchyard species throughout southern England. A curious feature on the other hand is the much greater frequency of *Senecio squalidus* on garden walls than those of churchyards; *Cymbalaria muralis* also is more common in the former habitat. *Taxus baccata* (as seedlings) is quite common on churchyard walls and originates from mature trees planted in the churchyards. This species is entirely absent from adjacent garden walls.

The flora of the various walls are influenced not only by their composition, aspect and exposure but very largely by the character of the surrounding vegetation. The species found on the walls of six different churchyards are listed below, with information on their frequency and availability.

(*a*) East Bedfont:

Arenaria serpyllifolia—r.
Asplenium ruta-muraria—a.
Bromus sterilis—o.
Conyza canadensis—o.
Epilobium adenocaulon—f.
E. roseum—r.
Geranium robertianum—o.
Glechoma hederacea—f.
Lamium album—o.
Plantago lanceolata—o.
Poa annua—f.
P. angustifolia—f.
Potentilla reptans—o.
Rumex acetosella—f.
Sagina procumbens—f.
Senecio vulgaris—o.
Sonchus oleraceus—r.
Veronica chamaedrys—o.

With the exception of *Asplenium ruta-muraria* which was confined to the walls all the species recorded were also present in the churchyard. *Thymus pulegioides* also grew in the churchyard but had not succeeded in colonising the walls.

(*b*) Greenford:

Achillea millefolium—f.
Antirrhinum majus—r.
Centaurea nigra—r.
Galium verum—r.
Lamium album—r.
Luzula campestris—r.
Poa angustifolia—r.
Taraxacum officinale—r.

Apart from *Antirrhinum majus* which had probably originated from a nearby garden all the plants seen were also noted within the confines of the churchyard.

(*c*) Hampstead:

Acer pseudo-platanus—o.
Agrostis stolonifera—o.
Betula pendula—o.
Crataegus monogyna—r.
Dryopteris filix-mas—f.
Epilobium montanum—o.
Phyllitis scolopendium—o.
Poa annua—o.
Pteridium aquilinum—f.
Senecio squalidus—o.
Solanum dulcamara—o.
Sonchus oleraceus—o.
Taraxacum officinale—o.
Taxus baccata—r.

Agrostis stolonifera, *Dryopteris filix-mas*, *Epilobium montanum*, *Poa annua*, *Taraxacum officinale* and *Taxus baccata* were present in the churchyard. The seedlings of *Betula pendula* probably originated from wind-borne seed from Hampstead Heath. The small plants of *Pteridium aquilinum* are also likely to have originated from air-borne spores from the heath. *Crataegus monogyna* and *Solanum dulcamara* are likely to have been bird-sown, while *Acer pseudo-platanus* is a common street tree which readily regenerates. Both *Senecio squalidus* and *Sonchus oleraceus* are common weeds in a variety of habitats in the district. *Phyllitis scolopendrium* was seen only on the walls and in this particular area is likely to have originated from spores from cultivated plants.

(*d*) Harefield:

Achillea millefolium—f.
Asplenium ruta-muraria—a.
A. trichomanes—r.
Chamaenerion angustifolium—f.
Dactylis glomerata—o.
Fragaria vesca—f.
Geranium pyrenaicum—o.
Glechoma hederacea—f.
Lamium album—f.
Plantago lanceolata—o.
Poa angustifolia—f.
Prunella vulgaris—o.
Rosa canina—r.
Rumex obtusifolius—r.
Sonchus oleraceus—o.
Taraxacum officinale—o.
Urtica dioica—f.
Veronica montana—r.

With the exception of *Asplenium ruta-muraria* and *A. trichomanes* which were confined to the walls, and *Rosa canina* which was undoubtedly bird-sown, all the species seen were also present in the churchyard.

(*e*) Heston:

Glechoma hederacea—o.
Poa angustifolia—o.
Symphoricarpos rivularis—r.
Urtica dioica—o.

Symphoricarpos rivularis was probably bird-sown from a garden but the other three species were noted growing in the churchyard.

(*f*) Pinner:

Asplenium ruta-muraria—o.
Capsella bursa-pastoris—r.
Chamaenerion angustifolium—r.
Cymbalaria muralis—o.
Dryopteris filix-mas—o.
Helxine soleirolii—o.
Linaria purpurea—o.
Parietaria diffusa—a.
Phyllitis scolopendrium—f.
Poa annua—o.
Pteridium aquilinum—o.
Sagina procumbens—f.
Sonchus oleraceus—o.

Asplenium ruta-muraria, *Cymbalaria muralis*, *Parietaria diffusa* and *Phyllitis scolopendrium* were confined to the walls, but with the exception of *Linaria purpurea* which probably originated from a nearby garden, all the species seen were also noted in the churchyard.

A comparison of the normal habitats of plants found on churchyard walls and garden walls shows a marked increase of meadowland and hedgebank species in the former habitat. Ferns also are more frequent on churchyard walls, the common species being *Dryopteris filix-mas*, *Phyllitis scolopendrium* and *Pteridium aquilinum*, though *Asplenium ruta-muraria* occurs in a few places, including Fulham where it was first recorded by John Blackstone as long ago as 1746. *Polypodium vulgare* is very rare but survives at Hayes where it has been known for over half a century, while *Ceterach officinarum* has long been known on old tombs at Perivale, and *Asplenium trichomanes* at Harefield.

A study of the dispersal methods of the 70 different species found on Middlesex churchyard walls reveals that no less than 30% of them are wind dispersed. The percentage for garden walls is just below 20%, the difference in percentage being probably due to the more open aspect of most churchyard walls.

The main conclusion drawn from this study is that short distance dispersal is the vital factor in the vegetation of churchyard walls, which is invariably more stable than the flora of all but a very few old garden walls.

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An Unusual Myxomycete in the London Area

By Bruce Ing

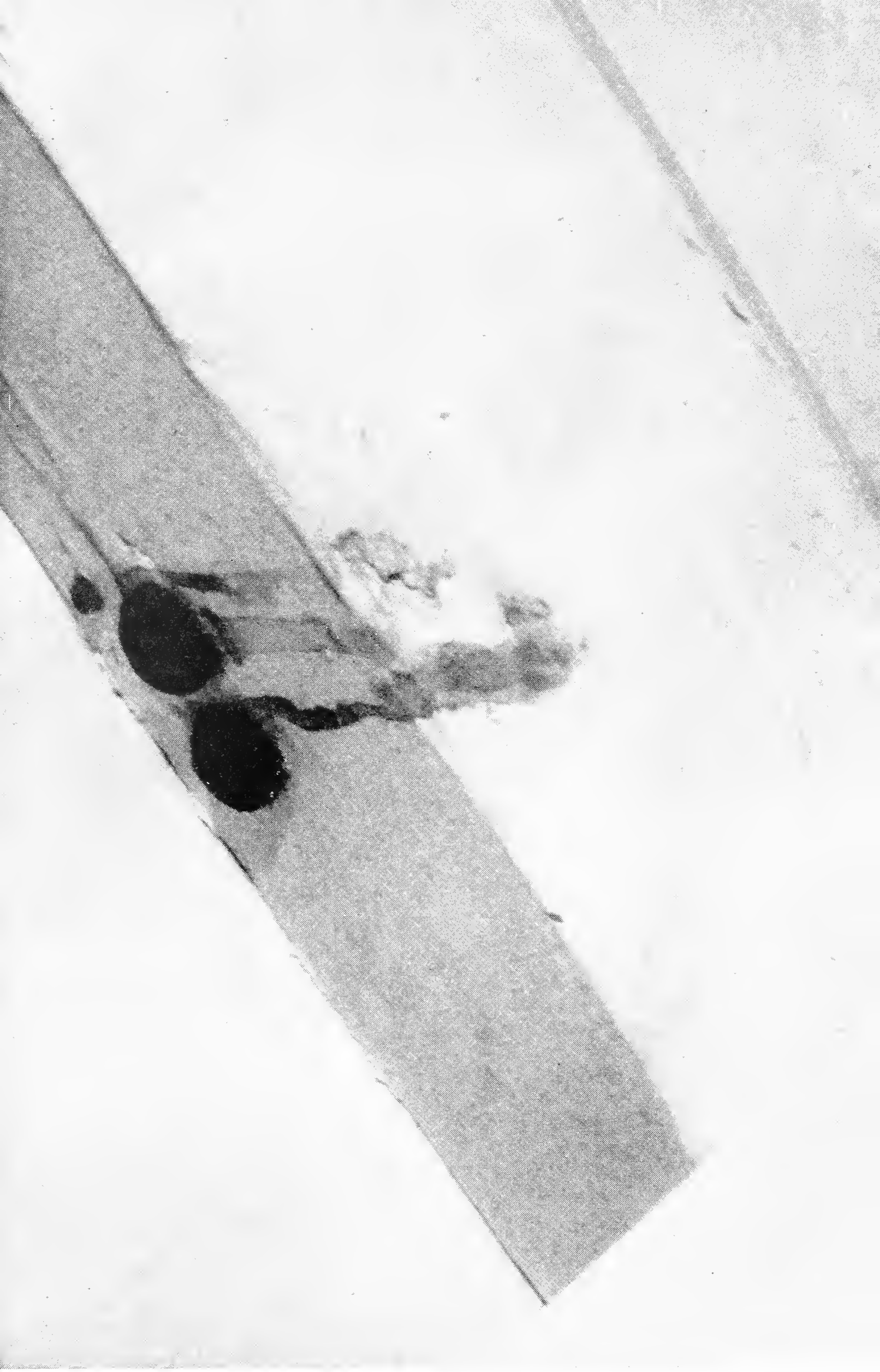
IT has frequently been remarked that the habitats and, indeed, habits of slime moulds are not constant. The species in question has been observed in five places in the London Area in the last three years, behaving differently each time.

Comatricha flaccida (Lister) Morgan was first found in this country by A. Lister growing on a stump of Scotch Fir at Lyme Regis, Dorset, in 1891 and recorded as *Stemonitis splendens* Rost. (Lister, 1891), a species which only reaches the extreme south-west of the British Isles. In 1894 Lister described this form as a variety of *S. splendens* and later in the same year Morgan gave it specific status in *Comatricha* as it lacks a surface net to the capillitium. The division between the genera is quite arbitrary and need not concern us here, but it is accepted that this species belongs in *Comatricha.* It occurs in large developments or pseudoaethalia, with prominent silvery hypothallus and bright chestnut spore mass. It is a readily recognizable species but although widespread appears to be nowhere common.

I first found it in the London area in April 1961, looking quite normal. A colony about 2·5 cm. diam. was growing on an oak log on Wimbledon Common, near Putney Vale Cemetery. The log was under a holly bush and very sheltered.

The second occurrence was on Stanmore Common in June, 1963. Here the species was common and colonies up to 7 cm. diam. grew on the bark and exposed wood of 5 ft. high birch stumps typically "topped" by *Piptoporus* [*Polyporus*] *betulinus.* The silvery hypothallus and radiating short black stipes of the component sporangia were particularly conspicuous. The colonies were inhabited by the beetle *Anisotoma humeralis* (F.) which is very common in large myxomycete fruit bodies; I later extracted and bred out the larvae of the Empid fly, *Tachydromia agilis* Mg. This is, I believe, the first record of an association between a myxomycete and a fly of this family.

A few days after the Stanmore trip I visited Banstead Heath and on dead standing pine trunks there were numerous colonies, 2-6 cm. diam., from 6 to 30 ft. up the trunks, mostly on bare wood, some perched on



Comatricha flaccida on beams of galley in Thames barge

remaining fragments of bark. On one trunk, also, a large aethalium emerged through the flight hole of a longicorn beetle 4 ft. from the ground. This was a specimen of the common myxomycete, *Reticularia lycoperdon* Bull.

On the Society's Foray to Oxshott in November 1963 the remains of a 3 cm. diam. colony were found on a low pine stump. Most of the specimen had been weathered, presumably by rain and beetles. This is typically an exposed species and rarely found away from open situations.

The most extraordinary occurrence was brought to my attention by Miss Susan Kenyon with whom I worked at the offices of the Council for Nature. She had noticed some white blobs on the white painted oak beams in the ceiling of the kitchen (galley) of her houseboat moored along the Chelsea embankment. When I investigated on August 12, 1963, I found two ripening colonies of *C. flaccida*, quite separate from each other. One was 2 cm diam., the other 9 mm. Both were typical, from a white plasmodium and with clear plasmodial slime tracks visible on the painted surface, and obviously coming from above the ceiling. On October 18 another three colonies were removed from a different beam. Examination of the upper surface of the beams was not possible but there were no fruit bodies underneath the decking planks over the galley. During February 1964 another six small colonies appeared on the first beam. Warmth and perhaps steam may have produced the right conditions for this slow-growing species. There are several American records of abnormal forms in this family being found in warm, damp houses or near leaking steam pipes. These, and all the other specimens quoted, were, however, normal and microscopically conspecific, with minutely warted spores from 7·5-9 in diameter.

The origin of the Chelsea gatherings is interesting as there is an old record for "Botanic Garden, London" and this may refer to the Chelsea Physic Garden.

Other, older, records for the Area are from Epping Forest, Wanstead Park, Abbey Wood and Weybridge; in all these places oak, birch or pine wood is present.

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Botanical Records for 1963

Compiled by J. EDWARD LOUSLEY

LONDON'S weather in 1963 was even less favourable than in the previous year. The season was remarkable for the persistence of cool, dull conditions and absence of prolonged settled spells, and although the rainfall in London (22·18 inches at St. James's) was a little below average, the absence of drying conditions made it seem much wetter than the statistics suggest. The extreme cold of January and February was followed by a slow thaw and changeable wet weather in March and April, so that there was an absence of very early spring flowers. During the summer there were two brief warm dry spells, the first at the end of May and early June, the second at the end of July, but, in general, overcast skies and rather low temperatures prevailed. The year was unfavourable to the growth of plants needing warmth and light, and depressing to the botanist.

Thanks to the enthusiasm of our members, climatic conditions were not reflected in any decrease in the number of records contributed. It is, however, remarkable how, in spite of all our efforts, the contrast between the well-worked parts of our Area in the counties of Kent, Surrey and Middlesex and the rest of our Area continues to grow. For the first mentioned the coverage is exceedingly good, but for Essex, Herts. and Bucks. the standard falls far short of our needs. No doubt this is in part a reflection of the distribution of our most enthusiastic members.

During the year further progress has been made in recording the flora of the grounds of Woolwich Arsenal and of Hurst Park Racecourse. In both cases the plants are likely to be destroyed by development before long and in fact the contractors moved in to Hurst Park during the summer. Several outstanding discoveries were made during the year. Mr. and Mrs. P. C. Hall found Marsh Sowthistle, *Sonchus palustris*, near Dartford, and Fl.-Lt. P. Halligey discovered a rare wintergreen, *Pyrola rotundifolia*, near Stone. Mr. Leslie W. Law discovered a very scarce helleborine, *Epipactis phyllanthes*, near Weybridge.

The nomenclature used in this report 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 in order to save space. The numbers following place names are those of the 10-kilometer squares of the National Grid (for a full explanation see *Lond. Nat.*, **37**, 182, 1958).

V.-c. 16, WEST KENT.

The 677 records contributed for this part of our Area in 1963 included many interesting observations. The discovery mentioned above of *Sonchus palustris* on the bank of a creek near Dartford (57) by Mr. and Mrs. P. C. Hall reinstates a handsome and rare species in our records. This was first recorded in 1666 from "By the Thames between Greenwich and Woolwich", and it persisted in a reed-bed on Plumstead Marshes until at least 1885. It was also found at North Woolwich, on the Essex bank of the Thames. Its reappearance at Dartford in a reed-bed therefor fits into the old pattern of distribution and from observations in Suffolk it is known to be a species which moves about, possibly spread by its windborne fruits, or perhaps from seeds which remain dormant. The Dartford

habitat may well be a natural one, but the finders point out that the creek is used by barges from the Medway, where *Sonchus palustris* also grows, and draw attention to the possibility that it may be introduced by barge traffic.

Mr. and Mrs. Hall have also contributed a valuable list of plants they have observed in recent years in the grounds of Woolwich Arsenal (47). These include Sand Sedge, *Carex arenaria*, on a railway track in 1961 where it was no doubt introduced, Angelica, *Angelica archangelica*, which lined a ditch from 1952 onwards, and a grass, *Calamagrostis epigeios*. Their list from the Arsenal is a most useful addition to those made by the visiting parties from the Society organized by Fl.-Lt. Halligey in 1962 and 1963. The Halls also report Dyer's Greenweed, *Genista tinctoria*, in quantity on a field edge and top of a roadside bank at Longfield (66), and Strawberry Clover, *Trifolium fragiferum*, from the side of a footpath between Hartley and Longfield (66).

The series of annual lists contributed by H. M. Pratt for so many years has been continued by a combined list covering his records with those of Mrs. M. C. Foster and Mrs. J. K. McLean. Amongst the many useful additions mention may be made of Russian Comfrey, *Symphytum x uplandicum* from a roadside near Farningham Wood (56), *Mimulus luteus* from Otford (55), *Sedum sexangulare* from Stone (57), Yellow Vetchling, *Lathyrus aphaca*, from a gravel pit at Green Street Green (57), and the hybrid between *Spergularia marina* and *S. media*, with the parents, at Swanscombe saltmarsh (67)—all found by Mrs. Foster. An interesting list also came from H. A. Sandford including the first record for the fertile *Spartina townsendii* which he noticed on Stone Saltings (57). Fl.-Lt. P. Halligey included a list of the plants he found on Woolwich Common (47) which were mostly aliens like *Vicia villosa*, and *Melilotus indica*, and reported *Scirpus sylvaticus* from by the Ravensbourne, Bromley (46) His discovery of a new locality for *Pyrola rotundifolia* near Stone (57) has already been mentioned. The new place is in a chalkpit only about a mile from the pit where Mrs. A. G. Side discovered it in 1962, and is of importance as evidence that this species is extending its range.

London Ragwort, *Senicio x londinensis*, which is a hybrid between *S. squalidus* and *S. viscosus*, is very much rarer now than it was just after the war when the parents grew together in such abundance on bombed sites, and a specimen collected by D. McClintock in 1962 at Longfield (66) is our first record for the London Area since 1958. J. R. Palmer contributed a useful list of aliens including *Artemisia biennis* from a garden in Queen Anne Avenue, Bromley (46), and *Hibiscus trionum* L. from Hayes Common (46). B. Wurzell had several rewarding visits to Kent. Between South Darenth and Green Street Green he found two medicks, *Medicago polymorpha* and *M. minima*, in an arable field. These are usually indications that wool shoddy has been used as a manure and they sometimes persist after the use has been discontinued. An eyebright he collected on Dartford Heath (57) in 1962 has been determined as "probably" *Euphrasia confusa* by Dr. P. F. Yeo, and this, if confirmed, is new to the London Area.

With Dr. A. G. Spooner and D. Stoyel I had interesting visits to Kent in June and August. We found *Hieracium brunneocroceum* well established on Gumping Common, Pett's Wood (46), Meadow Rue, *Thalictrum flavum* in Ruxley Pits (47), *Chenopodium botrys*, *Centaurea diluta* and *Guizotia abyssinica* on a refuse tip at Rushmore Hill, Halstead (46) and a rather strange collection of bird-seed aliens on heathland on Hayes

Common (46)—these included *Guizotia abyssinica*, *Carthamus tinctorius*, *Rapistrum rugosum*, and *Centaurea diluta* in plenty. *Rapistrum rugosum* is persistent near the old refuse tip at Downe (46) and *Carthamus tinctorius* was also seen at St. Paul's Cray (46). With a party from the South London Botanical Institute I noticed *Rosa tomentosa* at Downe Bank (46), and with Mr. and Mrs. A. G. Side, two large patches of the handsome grass *Calamagrostis epigeios* in a chalk pit at Horn's Cross (47).

V.-c. 17, SURREY.

Our largest contribution of records was again from R. Clarke and these included a number from Tooting Bec Common (27) which were especially welcome. For example, he found *Viola riviniana* there in plenty, a species recorded there annually by members of the Streatham Antiquarian and Natural History Society up to 1942 and not noted since. At Moorhouse Marsh (45) he collected *Glyceria x pedicellata*, determined by Dr. D. P. Young, and in Chalkpit Wood, Oxted (35) he noted Flowering Currant, *Ribes sanguineum* established. Mr. Clarke found *Ranunculus sardous* at Stocketts, Broadham Green (35) and one plant of *Anthemis arvensis*, which was determined by Dr. Young, in barley at Chelsham (35). For Herb Paris, *Paris quadrifolia*, and for *Carex strigosa* he added new localities from Old Lane, North Godstone (35), and Moth Mullein, *Verbascum blattaria*, confirmed by Dr. Young, he saw in a gravel pit at Nore Hill (35). An L.N.H.S. field meeting lead by him in June produced a surprising number of records from churchyards including *Euphorbia platyphyllos* from St. Agatha's Churchyard, Woldingham (35), and *Myosotis ramosissima* from Oxted Churchyard. This prompts the thought that a survey of churchyards throughout our Area would produce a quite astonishing list of species with less disparity between built-up and rural districts than is usual in our work !

Mrs. L. M. P. Small reports *Lonicera caprifolium* from a hedge by the track leading to Oaks Park, Carshalton (26), and Miss B. M. C. Morgan with Mrs. Beattie record *Dianthus deltoides* from a gorse clump on Reigate Heath (25). *Baldellia ranunculoides* has become very scarce in the London Area in recent years and it was pleasing to have confirmation from Mrs. E. A. Briggs and Mrs. Missen that it still grows in a ditch in Richmond Park (17). Miss P. Walker and P. Holland sent in useful lists from waste ground at Ham Pits (17) which included *Lepidium latifolium*, only known to us previously from Middlesex, Herts. and Bucks., and *Lathyrus aphaca*, which they found with Miss J. Stoddart. E. J. Clements reported *Typha angustifolia* and *Hypericum elodes* from Silvermere, Byfleet (06), and Walnut, *Juglans regia*, from a scrubby copse on Epsom Downs (25)—self-sown seedlings of the last mentioned are more frequent on our Surrey chalk than is generally realized. Bruce Ing sent records of *Rubus laciniatus* from Oxshott Heath (16), and of over fifty plants of *Monotropa hypophegea* from under beech on Park Downs, Chipstead (25). Dr. D. P. Young in 1962 found many large clumps of Sea Plantain, *Plantago maritima*, and Buck's Horn Plantain, *P. coronopus*, on the site of a turfing contractor's establishment near Norwood Junction Station (36) which were no doubt the relics of plants brought in with the turf, and in a market garden field at Ewell (26) he found *Solanum sarrachoides* in abundance. Another pleasing discovery was *Geranium rotundifolium*, of which Mrs. K. Le Sueur sent a specimen from the grounds of the Woodlands, Upper Norwood (37).

Oenothera parviflora is a species which may be increasing in our Area. It was first noticed in 1961 in Surrey, found at Hyde Park in 1962, and in 1963 it was collected by me at Hurst Park Racecourse (16), where it was in quantity, and recorded by B. Wurzell as frequent near Mitcham Railway Station (26). *Berteroa incana* was reported by both E. J. Clements and B. Wurzell from the golf course on Mitcham Common (26) and seems to be permanent in this vicinity since our records go back to 1937. B. Wurzell also drew attention to seedlings of Holm Oak, *Quercus ilex*, by the path to Mickleham Downs and this is another species for which further information about natural spread is required. The discovery of a colony of *Epipactis phyllanthes* near Weybridge by L. W. Law is the first record for this rare orchid in the Surrey part of our Area; it is already known from two places in Kent.

V.-c. 18, South Essex.

The few records contributed in 1963 included *Filago germanica* and *Poa subcoerulea* (confirmed by D. H. Kent) found by Mr. and Mrs. J. C. Gardiner and P. J. Wanstall at Marden Ash Brickpit, south of Chipping Ongar (50); *Scirpus tabernaemontani* as dominant in the pond in Bower Park, near Romford (59) found by H. A. Sandford; *Inula helenium* near Gates Corner, South Woodford (49) reported by Miss D. E. Woods, and a very rare hawkweed *Hieracium angustisquamum*, named by P. D. Sell and Dr. C. West, which was collected by S. T. Jermyn from Grays Chalkpit (57).

V.-c. 19, North Essex.

No records of special interest were received.

V.-c. 20, Herts.

D. H. Kent has added *Centranthus ruber* to our records from an old wall at Cheshunt (30); Dr. J. G. and Mrs. C. M. Dony, Mrs. J. Russell and D. H. Kent collected *Potentilla x italica* from a field border near Wormley Wood (30); B. P. Pickess found Hemp, *Cannabis sativa*, at Maple Lodge Sewage Works (09); and B. Wurzell reports a single young tree of *Sorbus torminalis* from near Arnos Grove, East Barnet (29). An afternoon with Dr. and Mrs. Dony at a refuse tip near Bricket Wood (10) produced a long list of aliens including *Ambrosia artemisifolia*, *Setaria italica*, *Helianthus rigidus*, and *Artemisia verlotorum*.

V.-c. 21, Middlesex.

Interesting plants continue to be found in the central built-up parts of London. An excellent list was provided by R. S. R. Fitter from St. Katherine's Dock, Stepney (38) near the Tower of London. On the walls of the dock basin he found native species such as Gipsywort, *Lycopus europaeus*, Water Hemlock, *Oenanthe crocata*, Hart's-tongue Fern, *Phyllitis scolopendrium*, Male Fern, *Dryopteris filix-mas*, and a grass, *Poa compressa*, while introduced plants included *Lactuca scariola* and *Mentha x niliaca*. In an alley off Ebury Bridge Road (27), Lt.-Col. J. C. Codrington found a broomrape, *Orobanche minor*, which disappeared a few days later. D. McClintock found Lesser Stitchwort, *Stellaria graminea* in Stag Place, Victoria, and *Kickxia elatine* in the grounds of Buckingham Palace (27), and also sent me specimens of two sedges, *Carex hirta* and *C. contigua* collected by Miss R. Ronaasen in Bennett's Yard, Victoria (27). An

uncommon plantain, *Plantago indica*, was collected by P. C. Holland in Suffolk Lane near Cannon Street Station (38) and also by B. Wurzell on waste ground by the sewage works at Finchley (29). He found an extensive and vigorous patch of *Sambucus ebulus* on bombed sites north-west of Victoria Park (38), where *Physalis alkekengi* also grew. In Regent's Park (28) he found *Alchemilla glabra* spreading from flower beds and springing up between paving stones.

There are still interesting native plants persisting in Queen's Wood and Highgate Wood, Hornsey (28) and along the disused railway on the north-west side of the latter. For example, N. A. Martin reported Broad-leaved Helleborine, *Epipactis helleborine*, and Goldilocks, *Ranunculus auricomus*, from Queen's Wood this year, and I saw a magnificent show of Golden Road, *Solidago virgaurea* and other species along the sides of the old railway. On the railway side near Staines Station (07) D. H. Kent noted a well established colony of *Echinops sphaerocephalus*, and T. B. Ryves reports a large colony of Sweet Cicely, *Myrrhis odorata*, on both sides of the railway embankment east of Hampton Wick station. J. R. Phillips tells us that *Physalis alkekengi* has been established for a number of years at South Harrow (18), and B. Wurzell found numerous aliens on refuse tips at Yiewsley (08) including *Artemisia verlotorum*, *Ipomoea purpurea*, *Kochia scoparia*, and rather surprisingly *Acinos arvensis* which is usually found on chalky soils. E. J. Clements investigated Spout Wood, Stanwell (07) and his list includes *Polygonatum x hybridum* growing well away from gardens, and he also found *Viola hirta* in a small grassy area by the towpath at Hampton Court (16). T. G. Collett reports *Leonurus cardiaca* as a garden weed in Ealing (18), and C. C. Townsend found *Amaranthus lividus* growing abundantly with *Galinsoga parviflora* in a greenhouse at a nursery at Hampton (17).

On waste ground at Chiswick (27) D. Murray found *Vicia lutea*, which was determined by D. H. Kent. Lady Anne Brewis collected *Chenopodium hircinum* and *Avena strigosa* from a rubbish tip at Hendon (28), and *Melilotus sulcata* Desr. from a rubbish tip at Finchley—all these were confirmed by D. H. Kent.

V.-c. 24, Bucks.

B. P. Pickess contributed a most welcome list of Buckinghamshire records. In a meadow on the north bank of the River Misbourne he found *Veronica scutellata*, *Veronica anagallis-aquatica*, and *Dactylorchis praetermissa*, all new to our records for the county, and *Menyanthes trifoliata* and *Hydrocotyle vulgaris* for which we had previously only one other locality. D. H. Kent reported *Galinsoga ciliata* as a flower-bed weed near Denham.

Only a small proportion of the records received can be mentioned in this report but contributors can be assured that all additions are added to the Society's record cards. There has again been a welcome increase in the proportion of records for which full National Grid references are supplied. This greatly assists the Recorder and since it is now important that all our work should be available if required for recording based on the Grid system it is hoped that contributors will always supply the necessary references in future.

We are grateful to the following for contributing records during 1963, those who have sent lengthy lists being marked with an asterisk:—

Mrs. Beattie, Lady Anne Brewis, Mrs. Elsie A. Briggs, *R. Clarke, *E. J. Clements, T. G. Collett, Dr. J. G. Dony, Mrs. C. M. Dony, *R. S. R. Fitter, *Mrs. M. C. Foster, J. C. Gardiner, Mrs. M. W. Gardiner, *P. C. Hall, *Mrs. J. F. Hall, *Fl.-Lt. P. Halligey, *P. C. Holland, Dr. C. E. Hubbard, Bruce Ing, S. T. Jermyn, *D. H. Kent, Leslie W. Law, Mrs. K. Le Sueur, *J. E. Lousley, D. McClintock, *Mrs. J. K. McLean, N. H. Martin, Mrs. Missen, Miss B. M. C. Morgan, D. Murray, *A. F. Mussellwhite, J. R. Palmer, J. R. Phillips, *B. P. Pickess, *H. M. Pratt, Miss R. Ronaasen, Mrs. B. H. S. Russell, T. B. Ryves, *H. A. Sandford, P. Sells, K. C. Side, Mrs. A. G. Side, Mrs. L. M. P. Small, *Mrs. J. E. Smith, Dr. A. G. Spooner, Miss Joan Stoddart, D. Stoyel, C. C. Townsend, Miss P. Walker, P. J. Wanstall, Mrs. B. Welch, Dr. C. West, K. White, Miss D. E. Woods, *B. Wurzell, Dr. P. F. Yeo, Dr. D. P. Young.

A Survey of Calystegia in the London Area

Second Progress Report 1963

THE promising start shown by the survey, as reported last year by P. C. Holland, has led to satisfactory progress during its second year. Over 30 recorders have brought the total of cards returned to well over 500. All of these cards have been worked out by the method outlined in his paper (*Watsonia*, **5**, 88-105, 1961) by C. A. Stace and in this somewhat monotonous and time-consuming activity the Botanical Committee's gratitude must be expressed to Mrs. Sally Foster, who dealt with a large number of them.

So far, about 200 cards, i.e. two-fifths of the records submitted, have given intermediate results, the remainder being roughly equally divided between *C. sepium* (L.) R.Br. and *C. silvatica* (Kit.) Griseb. It would not be safe, however, to assume that this ratio of distribution, being based on uneven recording, will hold good in the final analysis. The adequate coverage, noted last year as a necessary requirement for the survey's success, has not yet been achieved and at least another season's work is needed.

To encourage workers in this aspect of the survey's activities a map has been acquired on which individual results are being plotted. It is hoped to show the map at meetings so that the development of the distributional pattern may be followed and the gaps in recording be emphasized. Nevertheless, new areas since last year have been visited and old ones extended.

In W. Kent (vc 16) more records have been taken in the Woolwich area and have been extended south-easterly from the Erith Marshes down through Sutton at Hone and out to Longfield. In the south-west an area down through Eltham and Mottingham to Elmstead has been visited.

The Richmond-Kew area in Surrey (vc 17) has been enriched by further records and a narrow belt of country right down to Leatherhead has been covered. In the south an area from Reigate through Redhill to Godstone has been worked.

The Ilford area in South Essex (vc. 18) received further attention and with records from Loughton and other intermediate localities the area has been linked up to Theydon Bois.

Only two individual records have come in from N. Essex (vc. 19), and Herts. (vc. 20) shows little improvement on last year with a number of cards from East Barnet and one or two localities further north.

Further recording in the area around Ealing, particularly south-eastward to Acton, Hammersmith and Fulham, has been carried out. To the north-east, an area of scattered localities including Hornsey, Wood Green, Southgate and Enfield has been worked. No records have been received from Bucks. (vc. 24).

In addition to the above a number of scattered localities have been visited but much of our area, as may be seen, is yet to be explored. Volunteers to record in Herts., Bucks. and N. Essex particularly are needed and any members who feel they might be able to help are urged to contact me at the Dept. of Botany, Brit. Mus. (Nat. Hist.), S. Kensington, S.W.7.

E.B.B.

A Further Visit to Moulsey Hurst

By A. M. Easton

As soon as I read the account of the Plants of Hurst Park Race-Course, Surrey, by Mrs. J. E. Smith and Mrs. B. Welch (*Lond. Nat.*, **42**, 13-15, 1963) I determined to search there for *Meligethes subrugosus* (Gyllenhal) (Col., Nitidulidae) on its host plant *Jasione montana* L. Accordingly that evening, August 7, I paid a clandestine visit to the locality.

From the western end much of the best turf had been removed, but the gravelly area south of Hampton Church was as yet undisturbed by development. As darkness fell, I was able to spend half an hour botanizing and sweeping.

The following plants, already noted, were still present:—

Lepidium heterophyllum	Smith's Cress
Ulex europaeus L.	Gorse
Sarothamnus scoparius (L.) Koch.	Broom
Trifolium arvense L.	Hare's-foot Clover
Pimpinella saxifraga L.	Burnet Saxifrage
Campanula rotundifolia L.	Harebell
Jasione montana L.	Sheep's-bit
Galium verum L.	Ladies' Bedstraw
Lotus corniculatus L.	Common Bird's-foot Trefoil
Achillea millefolium L.	Yarrow
Centaurea nigra L.	Knapweed

In addition one clump of *Origanum vulgare* L. was observed.

The following Coleoptera were subsequently taken from the sweeping bag:—

Olibrus aeneus (Fabr.) (8).
Rhyzobius litura (Fabr.) (1).
Adonia variegata (Goeze) (14++).
Coccinella septempunctata L. (3).
C. undecimpunctata L. (10++).
Mordellistena parvula (Gyll.) (2).

Cryptocephalus fulvus Goeze (41).
Phytodecta olivacea (Förster) (1).
Sermylassa halensis (L.) (40++).
Longitarsus succineus (Foudras) (28).
Crepidodera ferruginea (Scopoli) (1).
Apion marchicum Herbst (2).
A. rubens Stephens (10).
A. curtirostre Germar (1).
A. loti Kirby (3).
Otiorrhynchus ligneus (Olivier) (10).
O. ovatus (L.) (5).
Strophosomus faber (Herbst) (1).
Ceuthorhynchidius troglodytes (Fabr.) (1).
Mecinus pyraster (Herbst) (1).
Gymnetron pascuorum (Gyll.) (9).
Miarus campanulae (L.) (22).

In addition one Membracid (Homoptera) was present.

Flies of the London Area: an Appeal to Dipterists

MANY new species of Diptera were first described from specimens collected in the Society's area i.e. within a radius of 20 miles from St. Paul's Cathedral. These include types and para-types of the families Psychodidae, Ceratopogonidae, Scatopsidae, Mycetophilidae, Empididae, Ephydridae, Sphaeroceridae, Camillidae, Drosophilidae and Agromyzidae. An accumulation of records of distribution is being made for the Society: it already totals over 2,300 species and comprises records from over 230 collectors, including a valuable detailed list for Middlesex from our member Sir Christopher Andrewes, F.R.S.

In order to make this a more complete record, past literature is still being searched and collections of institutions examined. Records for the area of localities and dates for all stages are still required. Assistance from members is requested: for further records, references to literature and collections in local museums etc. and introduction to those who have or who still collect flies in the area and are not, as yet, members of the Society. These should be sent to: Mr. L. Parmenter, 94 Fairlands Avenue, Thornton Heath, Surrey.

A Review of the Macrolepidoptera of the London Area for 1962 and 1963

By C. G. M. de Worms, M.A., Ph.D., F.R.I.C., F.R.E.S.

IN my previous review (*Lond. Nat.*, **41**, 60-65, 1962) a biennial report on the Macrolepidoptera of the Area was envisaged so as to keep records well up to date and also all who are interested in the subject *au fait* with any special movement of insects as well as of newly discovered localities and species within the region. I am therefore now undertaking a similar resumé of the past two seasons of 1962 and 1963 and shall first give a general review of the weather conditions for each year as it affected the Lepidoptera and then pass on to the more outstanding records for the whole Area during the period in question before enumerating the various more important captures in each of the Vice-County regions. But, as I have pointed out elsewhere, there is inevitably one inherent weakness in all such overall reviews, that is that the compiler always has to rely upon the records of several keen entomologists who are resident in a particular area and who work a fairly small fraction of the whole of it both thoroughly and persistently. The result is that, though one or two restricted regions produce plenty of records, perhaps some large and important districts remain entirely blank, since there is no collector living on the spot nor any visiting entomologists. This is in many respects very true of several big tracts in the London Area, especially in the north-west and north-east, mainly in parts of Herts. and Essex.

Turning now to the weather in the respective seasons, the early months of 1962 were on the whole fairly mild and all the foliage together with the Lepidoptera began appearing at about the normal time. During May of that year there began a remarkable immigration of that little Noctuid moth, *Laphygma exigua* Hübn. (the Small Mottled Willow) which must have bred freely in this country, as large numbers were maintained throughout the summer till the autumn and more records of this species were reported than for any previous season when this fairly regular migrant has visited our shores. The London Area had its quota of this insect and several were captured in districts where it had not been previously noted. But the season as a whole produced by no means a rich harvest, especially as the summer was a poor one by usual standards. Very few other migrant species, especially among the butterflies, were observed, except for a fair prevalence of that great traveller *Pyrameis cardui* L. (the Painted Lady) which was reasonably numerous in many parts of the British Isles with a good number of records in the Area. But apparently London was not visited by some of the migrant Noctuid moths which were so very numerous in the southern part of England that autumn, such as the very attractive *Leucania vitellina* Hübn. (the Delicate Wainscot) of which there was one record for the Metropolis in 1961.

As for 1963 few people are likely to forget its first two months with the unbroken spell of arctic conditions in the South, the most severe for some 150 years. Nothing seemed to wake up in the natural history world till well into March so that the early part of the season was very behindhand compared with an average year. Many entomologists had hoped that a very fruitful summer would follow such rigorous conditions as it did in

1947 after a winter almost as severe, but this was not to be. The later months turned out very cool with only one or two warm spells, mainly in early June and there was no really hot weather. There seemed to be a general dearth of Lepidoptera, since all who ran mercury vapour light traps reported much lower numbers than the average over many years, while even the butterflies were far from plentiful in most parts. The chief exception was *Vanessa io* L. (the Peacock) which was more numerous than for a considerable time and this too was reflected in its appearance in the London Area. Also 1963 turned out to be one of the poorest seasons for migrant species. It was not, however, until well into the autumn that an apparently large wave invaded this country. By far the most spectacular insect to reach our shores at the end of October was *Hippotion celerio* L. (the Silver-striped Hawk) of which at least fourteen were noted. These ranged from southern England to the Highlands and were the largest number for any year since 1885 when over forty were recorded, but none of them unfortunately graced the Area at this period of 1963, though a few of this fine insect have done so over the years.

Turning now to the more outstanding captures made during the two years under review, in many ways the most remarkable single insect was an example of that small Geometrid moth *Sterrha aversata* L. (the Riband Wave) in which the left two wings are distinctly melanic, while the right side is the normal ochreous colour. Such a specimen having two forms in one individual is known as a somatic mosaic and the one in question must be unique for this particular species so far as Great Britain is concerned. It was captured on August 7, 1963 by Mr. P. Ward in his light-trap at Whetstone in Herts., bordering the Metropolis. Among the more spectacular and unexpected appearances in the Area was a specimen of *Papilio machaon* L. (the Swallow-tail Butterfly) of the foreign form f. *gorganus* which has been a very infrequent visitor to this part of England. It was found by a small boy, Jeffrey Hough at Bexley Heath on August 28, 1962 and recorded by Mr. A. Showler (*Ent. Record*, **74**, 246). There seems every evidence it was a genuinely wild insect and not an escape. Another aristocrat of the Lepidoptera world to grace the Area was a female *Celerio livornica* Esp. (the Striped Hawk) found by young John Mosedale at Sarratt, Herts, resting among tall grass on June 28, 1962 and reported by Mr. B. L. J. Byerley in the *London Naturalist* (**42,** 20). The insect was in perfect condition and was apparently only the ninth record of this fine species for the Area since 1900. Another rarity also from Herts was an example of *Catocala nupta* L. (the Red Underwing) with completely black forewings, referable to ab. *nigra* Cockayne. This was captured also by quite a young collector, Peter Barnes at Totteridge on September 30, 1962 and exhibited by Mr. R. I. Lorimer at the Annual Conversazione of the South London Entomological and Natural History Society and subsequently figured in the *Proceedings* of the Society for that year. Three days later, on October 3, 1962 Mr. Lorimer obtained a specimen of that uncommon insect *Heliothis armigera* Hübn. (the Scarce Bordered Straw), also at Totteridge. A further example of this species, a female, was found at rest by a light on the wall of a house by Mr. R. Birchenough, at West Wickham, Kent, on October 24, 1963.

Mr. Bernard Skinner has obtained two Noctuid moths *NEW* to the Area during the past two years. On August 1, 1962 he took in his mercury vapour light trap at West Norwood a male **Leucania unipuncta** Haworth (the White-speck Wainscot). This is essentially a migrant species from

Southern Europe, though there is evidence that it probably breeds fairly regularly in South-west England, but it has seldom been met with far from coastal regions. The other notable newcomer was **Hadena compta** Fab. (the Varied Coronet), also taken at West Norwood during June 1963. The appearance of this insect in the Area is not surprising, as it has been steadily extending its range since it first made its appearance in numbers in 1948 at Dover, though there had been a handful of records of it over the past century. Its larvae feed almost exclusively on Sweet William and may be met with in quantity in gardens over most of East Kent, also in large areas of Essex, Suffolk and Cambridgeshire, as well as in Norfolk. Its most westerly station to date has been Granborough in North Bucks.

Two unexpected visitors to Mr. P. Ward's light trap at Whetstone, Herts, were *Apamea oblonga* Haworth (the Crescent Striped), normally a denizen of salt marshes and seldom seen inland. It was taken on July 25, 1962. The most recent record of this species for the Area was from Tilbury on its easternmost limits in 1938. The other most surprising capture was a *Rhyacia simulans* Hufn. (the Dotted Rustic) on August 11, 1963. This insect usually inhabits downland and rocky coasts in the west and north of the British Isles and its appearance in the Area is quite astonishing. The only previous record is from Ewell, Surrey, in 1949.

Reviewing the Area in general, among the butterflies new localities have been noted for *Thymelicus lineola* Ochs. (the Essex Skipper), mainly in Surrey. Melanism in many species appears to be becoming increasingly prevalent throughout the London region. Species in which this phenomenon is especially pronounced are *Cryphia perla* Fab. (the Marbled Beauty), *Apamea monoglypha* Hufn. (the Dark Arches), *Apatele rumicis* L. (the Knotgrass), and the Geometers *Gonodontis bidentata* Clerck (the Scalloped Hazel) and *Cleora repandata* L. (the Mottled Beauty), also to a lesser degree *Tethea ocularis* L. (the Figure of Eighty) and *Procus literosa* Haworth (the Rosy Minor). Two species which seem to be steadily extending their range in the Area are *Cucullia absinthii* L. (the Wormwood Shark) and the little *Sterrha rusticata* Fab. (= *vulpinaria* H.-S.) (the Least Carpet) which is penetrating westwards south of the Thames.

Before embarking on a list of the captures of more special interest in each of the Vice-Counties covering the whole of the London Area, as before, I would point out that an asterisk shown after any particular species indicates that it has not been recorded before in the respective region.

Though there does not appear to be many new records for INNER LONDON (I.L.) one of special note was the capture of *Sterrha rusticata* Fab. (the Least Carpet)* at a lighted window in Guy's Hospital, Southwark, on June 24, 1963 by Mr. T. Peet who also saw swarms of larvae of *Hippocrita jacobaeae* L. (the Cinnabar) on waste ground in that area at a later date that year together with imagines of *Melanchra persicariae* L. (the Dot) and *Eupithecia centaureata* Schiff. (the Lime-speck Pug). In September 1958 he took an example of *Scopula marginepunctata* Goeze (the Mullein Wave) iust off King's Road in Chelsea.

Mr. C. W. Pierce who has now unfortunately left the Hounslow area whence he contributed many most interesting records, has kindly sent in several observations on fairly common moths in the centre of the Metropolis. He has seen *Agrochola circellaris* Hufn. (the Brick) in Covent Garden, also *Amathes c.-nigrum* L. (the Setaceous Hebrew Character) and *Phlogophora meticulosa* L. (the Angle Shades) on at least a dozen occasions in the autumn near Seven Dials. *Mamestra brassicae* L. (the Cabbage

Moth) and *Orgyia antiqua* L. (the Vapourer) both appeared in August 1963 in New Oxford Street. He met with *Apamea secalis* L. (the Common Rustic) in Gower Street, while *Caradrina clavipalpis* Scop. (the Pale Mottled Willow) and *Xanthorhoë montanata* Borkh. (the Silver-ground Carpet)* he noted in the Festival Gardens near Waterloo. The latter species had not been recorded for Central London.

From MIDDLESEX (M.21) Mr. A. A. Myers has seen a number of Noctuid species at Kingsbury during the past two seasons. These have included *Apatele tridens* Schiff. (the Dark Dagger) in 1962 and also in 1963, never as common as its near relative *A. psi* L. (the Grey Dagger). Melanic examples of *Cryphia perla* Fab. (the Marbled Beauty) have been re-appearing each year. *Diarsia festiva* Schiff. (the Ingrailed Clay) was noted for the first time in 1962, while among less prevalent species to be recorded on the outskirts of London were *Euschesis interjecta* Hübn. (the Small Yellow Underwing), *Hadena conspersa* Schiff. (the Marbled Coronet), *H. lepida* Esp. (the Tawny Shears) and *Eumichtis adusta* Esp. (the Dark Brocade). *Procus literosa* Haworth (the Rosy Minor) was fairly numerous both years with a melanic example in 1962. *Caradrina ambigua* Schiff. (Vine's Rustic) was abundant in 1962 which also produced a single *Laphygma exigua* Hübn. (the Small Mottled Willow). Two other interesting local captures were *Orthosia advena* Schiff. (the Northern Drab) in 1962 and a couple of *Zenobia subtusa* Fab. (the Olive Kidney) in 1963. *Apamea ophiogramma* Esp. was abundant at Brent Reservoir, while Scratch Wood supplied a larva of *Graptolitha ornithopus* Hufn. (the Grey Shoulder-knot) in 1963 with an imago of *Dicycla oo* L. (the Heart Moth) in July of that year.

Mr. Barry Goater reports a number of noteworthy captures, all from Mill Hill during 1963. These comprised *Pheosia gnoma* Fab. (the Lesser Swallow Prominent) and *Cerura hermelina* Goeze (the Poplar Kitten), both rare in the district. Several melanic specimens of *Tethea ocularis* L. (the Figure of Eighty) appeared in June of that year, including a very dark example from Edgware. He also records the second melanic *Apatele megacephala* Fab. (the Poplar Grey). This form seems to be distinctly on the increase. *Aporophyla lutulenta* Borkh. (the Deep Brown Dart) reappeared on September 11 after an interval of five years, the last record for this area being in 1958. *Agrocola lota* Clerck (the Red-line Quaker) also turned up on October 22, the first since 1956, while four species new to his trap included *Tiliacea citrago* L. (the Orange Sallow) on September 21, *T. aurago* Fab. (the Barred Sallow) on October 7, *Acasis viretata* Hübn. (the Yellow-barred Brindle) on June 5 and *Selenia lunaria* Hufn. (the Lunar Thorn) on June 6. *Odezia atrata* L. (the Chimney Sweep) was very common on June 26 at Brockley Hill in that vicinity.

Mr. B. R. Stallwood has been making a survey of the comparative numbers of various species of butterflies during 1962 and 1963. In every instance in the neighbourhood of Sunbury-on-Thames they were appreciably more plentiful in 1963 than in 1962. This was especially noticeable with *Maniola jurtina* L. (the Meadow Brown), *Coenonympha pamphilus* L. (the Small Heath), *Pieris rapae* L. (the Small White) and *P. brassicae* L. (the Large White). Dr. Michael Harper reports a flourishing colony of *Zygaena lonicerae* Esp. (the Narrow-bordered Five-spot Burnet) at Enfield in 1962.

For HERTS (H.20) there are numerous interesting records in addition to those already mentioned. Mr. B. Goater reports *Polyploca ridens* Fab.

(the Frosted Green) from Elstree on May 14, 1963, a scarce species in that region, also larvae of *Eupithecia albipunctata* Haworth (=*tripunctaria* H.-S.) (the White-spotted Pug) in abundance on Angelica in that area in September. Mr. R. I. Lorimer has also made some captures of note during 1963 mainly in his garden at Totteridge. These include *Celaena leucostigma* Hübn. (the Crescent) which he last took there in 1958, an apparently very uncommon insect for the whole county. Another most surprising visitor was *Thera juniperata* L. (the Juniper Carpet)* on October 19, only previously recorded from Tring. It is possible that larvae may have been imported on ornamental juniper. *Thera variata* Schiff. (the Grey Spruce Carpet)* was another welcome newcomer on October 14. The *Celerio livornica* Esp. (the Striped Hawk) reported from Sarratt on June 28, 1962 by Mr. B. L. Byerley has already been referred to.

Mr. P. Ward had a remarkable series of captures at Whetstone during the period under review. Besides *Rhyacia simulans* Hufn. (the Dotted Rustic)* and *Apamea oblonga* Haworth (the Crescent Striped)* enumerated earlier, he obtained the unique mosaic of *Sterrha aversata* L. (the Riband Wave). Other noteworthy visitors to his mercury vapour trap included melanic forms of *Apamea monoglypha* Hufn. (the Dark Arches), some with the forewings uniformly black, also very black forms of *Apatele rumicis* L. (the Knotgrass), a melanic *A. megacephala* Fab. (the Poplar Grey) in June 1963 as well as several deep grey *Cryphia perla* Fab. (the Marbled Beauty). The record of single specimens of *Lycophotia varia* Vill. (the True Lover's Knot)* in June 1962 and again in July 1963 is of particular interest, as this insect is very rare in most of Herts and has not been noted before in that part of the Area. Another insect in this category is *Laphygma exigua* Hübn. (the Small Mottled Willow)* of which Mr. Ward saw a number at Whetstone in September 1962. *Cucullia absinthii* L. (the Wormwood Shark) appeared there both in 1962 and in 1963. Its only other locality in the Vice-County was at Totteridge in 1954. Other species apparently scarce in this part of the Area which Mr. Ward observed comprise *Hadena conspersa* Esp. (the Marbled Coronet), seen in June 1962, also *Aporophyla lutulenta* Borkh. (the Deep Brown Dart) in September 1962, *Orthosia advena* Schiff. (the Northern Drab), a few both years, *Tiliacea aurago* Fab. (the Barred Sallow) in October 1962. The first *Dicycla oo* L. (the Heart Moth) was seen on July 29, 1962 and *Lygephila pastinum* Treits. (the Blackneck)* apparently another newcomer to the area, was taken on July 18, 1963. Several abnormal forms of moths were also noted at Whetstone. These included a remarkable *Arctia caja* L. (the Garden Tiger) having the spots on the hindwings merged into blotches, captured on August 2, 1963, also an *Agrotis exclamationis* L. (the Heart and Dart) with a large black area on the forewings, taken on September 9, 1963. A female *Agrotis puta* Hübn. (the Shuttle-shaped Dart) obtained on August 28, 1962, had the shuttle mark missing. There were two aberrant example of *Xanthorhoe fluctuata* L. (the Garden Carpet), one with the cross-bands absent, referable to ab. *costovata* Haworth, taken on August 1, 1963, while another of the suffused form was secured on July 20 of that year. The dark brown form, ab. *fuscata* Tutt of *Hemerophila abruptaria* Thunb. (the Waved Umber) reappeared in this district in 1962 and again in 1963.

For Essex (E2.18) Mr. G. R. Sutton reports from Loughton that he saw several *Mimas tiliae* L. (the Lime Hawk) there after many years of scarcity. Mr. R. I. Lorimer says he discovered an old specimen of

Heliophobus albicolon Hübn. (the White Colon)* apparently taken by his brother at Barking in June 1941 and new to the V.-c. area.

There are numerous noteworthy records for KENT (K.16) during the two seasons, especially from the West Wickham district where Mr. R. F. Birchenough has sent in a very varied and interesting list for 1963. His most outstanding capture there was a *Heliothis armigera* Hübn. (the Scarce Bordered Straw) on October 24, 1963, no doubt one of the big incursion of migrants at that late period of the year. Among captures of species not occurring regularly or commonly in this region he reports a *Celaena leucostigma* Hübn. (the Crescent) on August 28. This insect has only one other record for the V.-c. area, in 1957. *Brachionycha sphinx* Hufn. (the Sprawler) was another welcome and infrequent visitor on November 1. The little *Sterrha rusticata* Fab. (the Least Carpet) appeared with seven individuals on July 23, while a newcomer to the district and Vice-County were several *Eupithecia helveticaria* Boisd. (the Edinburgh Pug)* of the form *arceuthata* Freyer on June 12. This insect seems very partial to the *Cupressus macrocarpa.* Another Geometer of interest in the locality was *Philereme transversata* Hufn. (the Dark Scallop) in early August. Mr. M. Chalmers Hunt also records *E. helveticaria* from West Wickham in 1963. Other captures of note he made there that year include a black *Lycia hirtaria* Clerck (the Brindled Beauty) in April 1963, only the second record of this form for the whole of Kent. A further species new to the V.-c. area was *Eupithecia satyrata* Hübn. (the Satyr Pug)* taken on June 19. *Polia nitens* Haworth (the Pale Shining Brown) was another uncommon visitor to his trap on July 3, while several *Apamea scolopacina* Esp. (the Slender Brindle) came to it in early August. In early September he observed 25 specimens of *Cerapteryx graminis* L. (the Antler) at rest at night on grass, apparently a scarce insect in that region. Near Shoreham in September 1962 he obtained several larvae of *Euphyia cuculata* Hufn. (the Royal Mantle).

Mr. C. G. Bruce has made several valuable records from Lee. These include a female *Nonagria dissoluta* Treits. (the Brown-veined Wainscot)* on August 2, 1963, new to the Vice-County, also *Amathes glareosa* Esp. (the Autumnal Rustic) on September 11, 1963, scarce in the south-eastern areas. Two males of *Orthosia advena* Schiff. (the Northern Drab) were noted on April 28, 1962, and another on April 14, 1963. A single *Cucullia absinthii* L. (the Wormwood Shark) was recorded on July 27, 1963. *Sterrha rusticata* Fab. was abundant in 1962 and 1963, with sometimes as many as twenty a night at light. Two melanic *Gonodontis bidentata* Clerck (the Scalloped Hazel) ab. *nigra* Prout were noted, a male on May 13, 1962 and a female on May 22, 1963.

Mr. R. Châtelain has a good many worthwhile records, mainly from his garden at Orpington in 1963, where he took a single *Tethea fluctuosa* Hübn. (the Satin Lutestring) on July 1 of that year. This is always a scarce species for that part of the Area. *Cucullia asteris* Schiff. (the Starwort Shark) was another desirable arrival on August 3, also a rare insect in that vicinity. Another uncommon moth for that part of Kent is *Tholera cespitis* Fab. (the Hedge Rustic) which came to his trap on September 6, 1962, a year when *Caradrina ambigua* Fab. (Vine's Rustic) was abundant there as it was in most other parts of the Area. Mr. Châtelain also reported other special records from other localities in Kent in particular two larvae of *Lophopteryx cucullina* Schiff. (the Maple Prominent) at Farningham Woods on September 9, 1962 when he also

took there *Laphygma exigua* Hübn. *Aporophyla lutulenta* Borkh. (the Deep Brown Dart) and *Tiliacea citrago* L. (the Orange Sallow), both rare moths for that region, were taken at High Elms, near Farnborough, in September 1962 and again in 1963. This locality also produced many *Cirrhia gilvago* Esp. (the Dusky-lemon Sallow) in September 1963 and also numbers of *Abraxas sylvata* Scop. (the Clouded Magpie) on August 1, 1962, as well as several *Philereme vetulata* Schiff. (the Brown Scallop) on July 23, 1963. That little daytime Geometer *Cepphis advenaria* Hübn. (the Little Thorn) was plentiful at Westerham at the end of May 1963, its only locality in the Area, while *Ennomos autumnaria* Wernb. (the Large Thorn) reappeared at Orpington on September 24, 1962. Mr. D. M. Long reports several *Laphygma exigua* at Bromley on May 7, 1962 (*Ent. Record* **74**, 162).

From Pinden near Longfield Mr. E. J. Hare records several important captures, most noteworthy among which is another *Heliothis armigera* Hübn. on October 5, 1962. A futher surprising visitor on June 6 that year was an all-white *Hadena lepida* Esp. (the Tawny Shears), a form normally confined to Dungeness and the Crumbles at Eastbourne. The autumn migration of 1963 brought in two *Rhodometra sacraria* L. (the Vestal) during the last week in October, while a *Spaelotis ravida* Hübn. (the Stout Dart) appeared there as late as November 17. He also took an *Apamea oblonga* Haworth (the Crescent-striped) on August 22, 1963, always a notable capture for the Area. Black forms of *Cleora rhomboidaria* Schiff. (the Willow Beauty) have become increasingly prevalent there and a very dark *Deuteronomos fuscantaria* Haworth (the Dusky Thorn) turned up in October 1963. A male *Oporinia christyi* Prout (Christy's Autumnal Carpet) was taken at Pinden in October 1961, an insect with very few records for the Vice-County. Besides the *Papilio machaon* L. (the Swallow-tail) from Bexley, Mr. A. Showler reports the abundance of *Sterrha rusticata* Fab. from Blackheath and Hither Green, also *Eupithecia inturbata* Hübn. (the Maple Pug)* at Eynsford, another species new to K.16. Mr. R. L. E. Ford has recorded in his garden at Bexley the rare *Cerura bicuspis* Borkh. (the Alder Kitten) on several occasions, including during 1963. Another uncommon insect he has observed there in its larval form on alder is *Aegeria spheciformis* Schiff. (the White-barred Clearwing)*.

For SURREY (S.17) Prof. J. V. Dacie published a complete list of his captures at his home at Wimbledon up to the end of 1961 (*Ent. Record*, **74**, 109 *seq.*). Since then he has made the following additions to his list which are of especial interest. They include *Polyploca ridens* Fab. (the Frosted Green) in 1962, the first from this noted locality. Melanic *Tethea ocularis* L. (the Figure of Eighty) appeared in this region in 1963. Four *Leucania pudorina* Schiff. (the Striped Wainscot) turned up in July of that year, another insect not noted before so near the Metropolis. *Plusia pulchrina* Haworth (the Beautiful Golden-Y), taken in 1963, does not appear to have been noted before from Wimbledon nor had *Ectypa glyphica* L. (the Burnet Companion) caught on the Common there in 1962. Another very noteworthy capture was a melanic *Plusia gamma* L. (the Silver-Y) in 1963. Also in 1962 Prof. Dacie took both *Zygaena filipendulae* L. (the Six-spot Burnnet) and *Z. trifolii* Esp (the Five-spot Burnet), both only previously recorded very sparingly from the Common.

Besides *Hadena compta* Fab. (the Varied Coronet)* and *Leucania unipuncta* Haworth (the White-speck Wainscot)*, both new to the Area, Mr. B. F. Skinner also reports other captures of note from West Norwood. These comprise *Spaelotis ravida* Hübn. (the Stout Dart) on September 18,

1963, with only one other old record from Reigate, and several *Laphygma exigua* Hübn. (the Small Mottled Willow) in September 1962.

In his garden at Ewell Mr. H. Tunstall saw a *Macroglossa stellatarum* L. (Humming-bird Hawk) on June 23, 1962, and a *Pyrameis cardui* L. (Painted Lady) on August 23, 1963. Mr. A. S. Wheeler reports that the colony of *Thymelicus lineola* Ochs. (the Essex Skipper) was flourishing in 1962 and in 1963 at Farthing Downs, near Coulsdon. In 1962 he took a newly-emerged female of *Gastropacha quercifolia* L. (the Lappet) to Epsom Downs and attracted a number of males there. Mr. S. Wakely in an article (*Ent. Record* **76**, 22) describes finding a number of larvae of *Cucullia absinthii* L. (the Wormwood Shark) feeding on *Artemisia absinthium* in his garden at Camberwell. Near Chessington Mr. B. R. Stallwood saw *Pyrameis cardui* and *Aphantopus hyperantus* L. (the Ringlet) in 1962, also *Thymelicus lineola* Ochs. in both years.

Finally for Bucks (B.24) Sir Eric Ansorge has sent in several most interesting additions to his captures at Chalfont St. Peter. These include a *Hyloicus pinastri* L. (the Pine Hawk) in 1962, always a rarity in that part of England. *Odontosia carmelita* Esp. (the Scarce Prominent) re-appeared in that year as also did two male *Lophopteryx cucullina* Schiff. (the Maple Prominent) in 1963. A newcomer to his trap, though not to the V.-c. area, was *Anaplectoides prasina* Schiff. (the Green Arches) in 1962 when another *Gypsitea leucographa* Schiff. (the White-marked) was seen. Two newcomers, however, to this part of the Area, were *Hadena contigua* Schiff. (the Beautiful Brocade)* in 1962 as well as *Laphygma exigua* Hübn. (the Small Mottled Willow)* of which eight appeared that year. The second *Zenobia subtusa* Schiff. (the Olive Kidney) also arrived in 1962. Among the Geometers a further couple of species new to the district were *Eupithecia subnotata* Hübn. (the Plain Pug)* and *Apeira syringaria* L. (the Lilac Beauty)* both with single specimens in 1962. Yet a third was *Epione repandaria* Hufn. (the Bordered Beauty)* with one example in 1962 and another in 1963. *Oporinia christyi* Prout (Christy's Autumnal Carpet) also reappeared in October 1962, as did *Hepialus fusconebulosa* Deg. (the Map-winged Swift) with three records for 1963. Among the Zygaenidae *Z. lonicerae* Esp. (the Narrow bordered Five-spot Burnet)* was taken by Sir Eric Ansorge in the vicinity, while *Procus statices* L. (the Green Forester)* was reported also from Chalfont Park, both not previously noted in that area.

This brings the total number of species of Macrolepidoptera for the London Area to 722 up till the end of 1963. For the whole of the British Isles the grand total now stands at 921 valid species comprising the Families covered by the above survey. The overall percentage is therefore 78·4.

Hemiptera-Heteroptera of the London Area

PART I

By Eric W. Groves, F.R.E.S.

"Thou shalt not nede to be afraid of any bugs by night"
The Bible (T. Matthew's version, 1537) Psalm xci. 5

Introduction

This present paper on the Land and Water Bugs forms part of a series on the insects of the London Area, the publication of which was first planned by the London Natural History Society as far back as in 1946 (see *E.M.M.*, **82**, 120 (1946)). To date such papers have been published on the Lepidoptera, Odonata, Orthoptera, Neuroptera, some groups of Diptera and Thysanoptera. No account has so far appeared on the Hemiptera, nor perhaps would this have been possible much before now because of the paucity of workers and, in consequence, the lack of available records. Even now it is not without some hesitancy that the first part of this present check-list is brought forward for publication, for no one is more conscious of its gaps than the author himself. Yet, at the same time, it is realized that the very lack of such a preliminary list may sometimes dissuade a budding entomologist from taking up the study of a group in his own locality. Nothing spurs on the tyro more than the searching for species not previously recorded in the local list for his area. The lack of a modern textbook (the previous one was published as long ago as 1892) may also have discouraged many would-be heteropterists, but this situation was rectified with the appearance in 1959 of T. R. E. Southwood and D. Leston's *Land and Water Bugs of the British Isles*. This book, reasonably priced in Warne's excellent Wayside and Woodland series, not only gives up-to-date information on each species and workable keys but also, above all, good illustrations both in colour and black and white. If the present list, coupled with the use of the now available modern work on the group, stimulates beginners or other entomologists to take up the Heteroptera in the London Area (or elsewhere for that matter) then the publication of this list, with all its shortcomings, will be more than justified. Much is yet to be learnt about our British species and the keen beginner has still a chance of adding some new facet of knowledge to that already known about their life histories. I shall be pleased to receive any Heteroptera records that may be made in the London Area, if sent to my home address at 3 Richmond Road, Coulsdon, Surrey. Any I am notified of in this way will be incorporated in an addendum which will follow on after the last part of the list has appeared.

Definition of the Area

The London Area covered by this list is the sphere of interest of the London Natural History Society. It is that area bounded by a circle drawn with a radius of 20 miles from St. Paul's Cathedral. In the north the circle borders on the town of Hertford; to the east to the limits of Gravesend; in the south to the town of Redhill and in the west to the outskirts of Slough. Most of the records in the list are within this boundary though a few just beyond have been included (and are so indicated) where they may show a continuation of distribution or where

the particular species may yet be discovered within the prescribed limits.

Botanists and conchologists have for many years used the Watsonian vice-county system for tabulating their county records. Heteropterists on the other hand have, in the past, always arranged their records on a purely county basis (*vide* lists of E. A. Butler[1], E. C. Bedwell[2], and A. M. Massee[3, 4]). The home counties boundaries as recognized by those authors were those existing prior to 1889 at which date the London County administrative area was formed from the corners carved out of these adjacent counties. As the precedent has already been set, the same county arrangement and its interpretation is therefore followed in this present list. However, for those interested in knowing which vice-counties (or parts thereof) lie within the L.N.H.S. boundary they are: the N.W. corner of v.c. 16 (West Kent); the northern part of v.c. 17 (Surrey); the western half of v.c. 18 (South Essex); a small part in the S.W. corner of v.c. 19 (North Essex); the most southerly part of v.c. 20 (Herts.); the whole of v.c. 21 (Middlesex) and the extreme eastern part of v.c. 24 (Bucks.).

Variety of Habitats

The London Area as defined above is fortunate in having a great diversity of habitats including woodland, commons, agricultural and waste land, rivers, streams, marshes, lakes and ponds. The true maritime habitat with sand dunes is perhaps the one that entomologists may regret as not available to them, but there are, however, still a few stretches remaining of salt marsh, with their characteristic vegetation, along the lower reaches of the Thames both on the N. Kent and S. Essex sides. The description of habitats in the London area has been ably treated previously in a paper by J. H. G. Peterken (1953)[5]; to which the reader is referred for further details. Quite a few of the localities around London that were available to earlier heteropterists are now no more, having been long since covered by bricks and mortar in the outward spread of the suburbs. A large number of aquatic habitats have also been lost, such as ponds which have been filled in and streams and brooks culverted by zealous local authorities. For such species as *Ranatra linearis* and *Hydrometra stagnorum* one must go further and further out before finding a habitat suited to their ecological requirements. Nevertheless the picture is not entirely black and many interesting species may still be found within the distance of a short train ride from any of London's main line railway termini. Such places as Epping Forest, Wimbledon Common, Ruislip Woods, Esher Common, Boxhill and Darenth Wood are yearly visited by entomologists and still yield certain species for which they have long been noted. Although now in the process of redevelopment, the area of bomb sites around Cripplegate Church in the City itself provided for about 15 years after the war an oasis for colonization of plants and their invasion by insects. During a 1955-56 study by Groves (25) some 20 species of Heteroptera were recorded from these sites, thus giving some indication of the versatility of this sub-order in utilizing such unfavourable niches as that provided by the limited vegetation cover on a rubble substrate. It is likely therefore that the more favourable conditions prevailing in

1 BUTLER, E. A., 1923, *Biology of the British Hemiptera-Heteroptera*, pp. 644-671.
2 BEDWELL, F. C., 1945, *Ent. mo. Mag.*, **81**, 253-273.
3 MASSEE, A. M., 1946, ibid, **82**, 94-95 (Supplement to Bedwell's list).
4 ——— 1955, ibid, **91**, 7-27.
5 *Lond. Nat.*, **32**, 2-12.

parks elsewhere in London, e.g. in Battersea Park, Kensington Gardens, Regents Park and Kew Gardens may still be the reservoirs in otherwise built-up surroundings for a number of plant bug species. They would be the probable source of such records as *Acanthosoma haemorrhoidale* flying into a doctor's surgery and *Pentatoma rufipes* found at a shop window, both in Kensington (less than a quarter of a mile from Kensington Gardens), and *Sehirus bicolor* found by a path on Kew Green.

A Short History of Collecting in the London Area

Space does not permit of more than brief mention of some of the names connected with Heteroptera study around the Metropolis. **J. W. Douglas** (1814-1905) and **J. Scott** (1823-1888), both living at Lee (Scott later moving to nearby Lewisham) are forever partnered in heteropterists' minds because of their classic book *The British Hemiptera-Heteroptera*—the outcome of years of collecting and collaboration. Before this was published in 1865 the sub-order had been almost entirely neglected. Their collections made in the London area are mostly from N.W. Kent and Surrey. **J. A. Power** (1816-1886), a London medical tutor, did not take up the group until 1853, yet for a period of over 25 years became one of the most successful British collectors. He discovered many rarities (including some from Surrey localities) and added not a few new species to the British list. **T. R. Billups** (1841-1919), a fruit and vegetable salesman in the Borough Market, had an interest in all insect orders except Lepidoptera. He served on the Royal Entomological Society's Council from 1884-86 and was also connected with the South London Society for many years. His Heteroptera captures were almost all made on the latter Society's excursions in Surrey and Essex. **Edward Saunders** (1868-1941) was a coleopterist who later turned to Heteroptera and Hymenoptera. After marriage he lived first at Reigate, then nearer London and finally out at Woking, the surroundings of which places reflect many of his London area captures. Well known for his book on the British Heteroptera published in 1892, he did much in his long life to encourage others to study the group. Among them was **E. A. Butler** (1845-1945), a school teacher who lived after retirement at Clapham. It was from there that he made many collecting sorties, radiating out to many localities in Surrey, Herts. and Middlesex. He was a great field man and his book on the biology of the British species (1925) will for ever remain a lasting monument to the contribution he made to Heteroptera science. The whole of his collection was acquired by the British Museum. **E. A. Bedwell** (1875-1945) was another coleopterist who later, after persuasion from Saunders, turned to collecting Heteroptera in the Home Counties and elsewhere. His assiduousness in the field enabled him during the rest of his life to collect all but 30 out of the then known 500 species on the British list. His beautifully mounted collection of several thousand specimens was, on his death, bequeathed to the Castle Museum, Norwich. **George C. Champion** (1851-1927) was also essentially a coleopterist but became interested in Heteroptera some years before leaving for Central America in 1879. On his return to England he wrote a volume on the group for the 52-volume "Biologia" series. **Charles Nicholson** (1869-1940), President of our Society for 1897, maintained a wide natural history interest embracing botany, ornithology, and the insect orders of Lepidoptera and Hymenoptera as well as Heteroptera.

His records of the latter group came from the Epping Forest district of Essex and were all made prior to his retirement in 1928 and removal to Tresillian, near Truro. There has been a marked increase of interest in Heteroptera within the last 25-30 years and **F. J. Coulson** and **A. M. Massee,** prominent collectors in Surrey and Kent respectively before World War II and since, have been instrumental in giving a lead to the present rising number of heteropterists in the London area. Amongst those who have been actively studying the group in the Home Counties in recent years may be mentioned **A. A. Allen** (W. Kent), **E. S. Brown** (Herts.), **E. W. Groves** (Surrey), **D. Leston** (Middx.), **W. J. Le Quesne** (Bucks.), **K. C. Side** (Kent), **T. R. E. Southwood** (Kent and Herts.), and **G. E. Woodroffe** (Bucks. and Surrey).

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(N.B.—This list is in no order other than that which the items were worked through to extract records).

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(*b*) Museum collections referred to

Records obtained from Museum collections are indicated by the following abbreviations:—

BM = British Museum.
WBM = Woolwich Borough Museum.
MM = Maidstone Museum.
HD = Hope Dept. of Entomology, University Museum, Oxford.

Index to Recorders' Names

M. Ackland	(*MA*)	P. S. Broomfield	(*PSB*)
R. G. Adams	(*RGA*)	G. E. Brown	(*GEB*)
A. A. Allen	(*AAA*)	F. R. Browning	(*FRB*)
C. H. Andrewes	(*CHA*)	G. Bruce	(*GB*)
W. J. Ashdown	(*WJA*)	F. D. Buck	(*FDB*)
M. B. Bacchus	(*MBB*)	L. C. Bushby	(*LCB*)
F. Bancroft	(*FB*)	A. W. Pickard Cambridge	(*AWPC*)
C. G. Barrett	(*CGB*)	E. Capron	(*AC*)
E. C. Bedwell	(*ECB*)	C. P. Castell	(*CPC*)
A. Beaumont	(*AB*)	G. C. Champion	(*GCC*)
M. Bewley	(*MB*)	H. C. Champion	(*HCC*)
T. R. Billups	(*TRB*)	W. E. China	(*WEC*)
K. G. Blair	(*KGB*)	A. J. Chitty	(*AJC*)
W. Blatch	(*WB*)	D. J. Clark	(*DJC*)
J. A. Brewer	(*JAB*)	J. J. Collins	(*JJC*)
		F. G. Cuerdon	(*FGC*)

C. W. Dale (*CWD*)
J. Disney (*JD*)
W. R. Dolling (*WRD*)
H. St. J. K. Donisthorpe (*HStJKD*)
J. W. Douglas (*JWD*)
J. W. Douglas & J. Scott (*D&S*)

T. R. Eagles (*TRE*)
A. M. Easton (*AME*)

H. W. Forster (*HWF*)

A. E. Gardner (*AEG*)
W. H. Goddard (*WHG*)
E. E. Green (*EEG*)
E. W. Groves (*EWG*)

C. G. Hall (*CGH*)
D. G. Hall (*DGH*)
P. Harwood (*PH*)
A. Hayward (*AH*)

D. A. James (*DAJ*)
F. B. Jennings (*FBJ*)
C. Johnson (*CJ*)
A. W. Jones (*AWJ*)

H. K. Kenward (*HKK*)
S. W. Kemp (*SWK*)
G. W. Kirkaldy (*GWK*)

D. Leston (*DL*)
W. J. LeQuesne (*WJLeQ*)
J. & T. Linnell (*J&TL*)
W. J. Lucas (*WJL*)

T. A. Marshall (*TAM*)
E. L. Martin (*ELM*)
A. M. Massee (*AMM*)
B. P. Moore (*BPM*)

E. A. Newbery (*EAN*)
E. Newman (*EN*)
C. Nicholson (*CN*)

D. Ollevant (*DO*)

R. Palmer (*RP*)
L. Parmenter (*LP*)
F. P. Pascoe (*FPP*)
C. J. Pool (*CJP*)
J. A. Power (*JAP*)
E. Prince (*EP*)

E. Milne-Redhead (*EMR*)

R. G. Rigden (*RGR*)
P. J. L. Roche (*PJLR*)
F. Rumsey (*FR*)
E. C. Rye (*ECR*)
G. B. Ryle (*GBR*)

G. Samouelle (*GS*)
J. H. P. Sankey (*JHPS*)
E. Saunders (*ES*)
F. S. Saunders (*FSS*)
H. A. Sauzé (*HAS*)
J. Scott (*JS*)
G. G. E. Scudder (*GGES*)
W. E. Sharp (*WES*)
H. K. Airy Shaw (*HKAS*)
K. C. Side (*KCS*)
South London Entom. & N.H. Soc. excursions (where no collector is specifically mentioned) (*SL*)
A. Smith (*AS*)
B. J. Southgate (*BJS*)
T. R. E. Southwood (*TRES*)
W. H. Spreadbury (*WHS*)
C. H. Stokes (*CHS*)
H. D. Swain (*HDS*)
R. C. H. Sweeney (*RCHS*)
E. E. Syms (*EES*)

J. E. Thomas (Miss) (*JET*)
D. C. Thomas (*DCT*)
A. A. Thorp (*AAT*)
H. J. Turner (*HJT*)

R. W. J. Uffen (*RWJU*)

G. V. Vredenberg (*GVV*)

S. Wakely (*SW*)
F. A. Walker (*FAW*)
J. J. Walker (*JJW*)
C. O. Waterhouse (*COW*)
W. J. Watts (*WJW*)
R.D. Weal (*RDW*)
W. West (*WW*)
L. S. Whicher (*LSW*)
B. S. Williams (*BSW*)
C. L. Withycombe (*CLW*)
G. E. Woodroffe (*GEW*)

I. H. Yarrow (*IHY*)
J. W. Yerbury (*JWY*)

Nomenclature, Arrangement of the Records, and other Abbreviations used

Before commencing the systematic list it is necessary to give some explanation of the arrangement of records under each species and the abbreviations adopted. The Latin names given in the present list are those used in Southwood and Leston's *Land and Freshwater Bugs of the British Isles* (1959). In each case they are followed first by the number allocated to the species by those authors, then the page (in brackets) on which it is dealt with in their book. Next are given page references to the same species described in the earlier standard works of Douglas and Scott, Saunders and Butler[1] (abbreviated to "D&S", "S" and "B" respectively). Much text matter in these volumes is still invaluable but modern nomenclature study has shown that many of the Latin names in use when they were written have now to be changed. Space limitations here preclude the listing of synonyms, but if a name used in any of these older works differs much from that in Southwood and Leston's book, then it is given in brackets immediately following the page reference.

The species records are arranged under counties in the following sequence: Middx., Herts., Essex, Kent, Surrey and Bucks. The records themselves are set out giving first the major locality, sometimes further amplified in brackets, followed by the date of collection (only the last two figures of the year being given for dates within this century).[2] After this come any significant notes where these were available. Next are given the recorder's initials ("n.c." indicates no collector mentioned in the original record), and finally, in brackets, the source of the record itself.

Acknowledgements

I must express my grateful thanks to the Keeper of the Dept. of Entomology, British Museum (Natural History) and to Prof. G. C. Varley of the Hope Dept. of Entomology, Oxford, for kindly allowing me to work through the British Heteroptera in their respective Departments; to Dr. Frazer of the Nature Conservancy for making available to me some Heteroptera records of the late H. W. Swain; and to all those who have sent in records or permitted me to see their collections. Finally I wish to acknowledge with gratitude the help of Mr. K. C. Side. Unbeknown to me he had also been preparing a similar paper on the Heteroptera of the London Area, but later generously placed at my disposal all the records he had accumulated. His kind gesture helped in no small way to hasten the production of this present list.

1 See "Sources of records" items (28), (37) and (38).
2 If no date is given it means that this was lacking in the original record. With regard to those quoted from literature one may get some idea by referring to the appropriate entry in "Sources of Records". The specimen in question must obviously have been collected *before* the date of its published source.

Systematic List

Aradidae (Flat bugs)

There are five British species, four of which have been recorded in the London area (two recently). Found under bark of conifer and deciduous trees, living on fungal hyphae.

Aradus corticalis (Linn.) Sp. 1 p. 12
D&S p. 272 S p. 138 B p. 216 (Sp. 158)
KENT. West Wickham, under fir bark, *D&S* (28). An old record, not been found again in the county.

Aradus depressus (Fab.) Sp. 3 p. 12
D&S p. 271 S p. 140 B p. 217 (Sp. 159)
MIDDX. Northwood, 26.iv.44 and 10.iv.44, *PJLR* (20); Ealing, 17.v.37, a single ♂ crawling on fence, *DCT* (33a); Enfield Chase, 26.v.63, *RGA* (BM).
HERTS. Totteridge, 30.vi.46, *CHA* (17); Cheshunt, beneath willow bark, *CJP* (HD).
ESSEX. Walthamstow, on oak stump, *CN* (35a); Loughton, *GCC* (37).
KENT. Given as widespread and locally common by Massee (22); Bromley, *ES* (22); 1897 *WW* (39); Catford, 24.iv.1889, *AJC* (HD); Lewisham, vi.1887, *AJC* (HD); Blackheath, *AAA* (22); Darenth Wood, under bark, *WW* (1/**1903**, 63); *JAP* in *FPP* coll. (HD); *TAM* (37) and (22); Westerham district, 17.vi.51, *DL* (1/**1951-52,** 72); *AMM* (22); and recorded just beyond the boundary at Trottiscliffe, *AAA* (22).
SURREY. Coombe, vii.1874, *ES* (HD); Riddlesdown, 20.vi.53, *EWG* (24); Caterham, *GCC* (37); Reigate, *TAM* (37); and just outside the boundary at Dorking, i.1890, *AJC* (HD); Woking, v.1888, *ES* (HD); and at Horsley (Sheep Leas), 14.v.38, *SL* (1/**1938-39,** 43).
BUCKS. Recorded on the boundary at Slough (PILG)[1], 26.iv and 12.v.51, two examples taken in light trap, *BJS* and *GEW* (31e); vi.50, a single example on horse radish (*Armoracia rusticana*), *BJS* and *GEW* (31d); and just outside at Chesham, 17.vi.06, *AJC* (HD); Stoke Common, 26.vi.55, on birch, *WJLeQ* (21) and Little Chalfont, 24.ii.52, larva, *WJLeQ* (21).

Aradus aterrimus (Fieb.) Sp. 4 p. 12
D&S p. 274 S p. 140 B p. 219 (Sp. 160)
Always associated with fungal mycelium on chippings left by wood cutters especially in sweet chestnut woods.
KENT. Darenth Wood, 30.v.1861, a single ♀ among chips on stump of felled oak, *JWD* (28). The first English record *vide AMM* (1/**1961,** 8) and (22). Not been found since in the London area part of Kent but was discovered again in the county at East Malling in 1933 and 1934 by Dr. A. M. Massee and at several other localities since *vide AMM* (1/**1961,** 8) and (22).

Aradus cinnamomeus (Panz.) Sp. 5 p. 13
Confined to young Scots pine (*Pinus sylvestris*) either beneath the bark or on the branches. First discovered in Surrey in 1950 and would seem to have spread since from its epicentre in the W. part of that county.
SURREY. On the boundary at Byfleet, 9.vii.50, two brachypterouss ♀♀ by beating branches, *DL* (EMM **87**, 285-6) (First British record); within the London area at Oxshott Heath, 28.vii.51, a macropterous ♂ and a brachypterous ♀ beneath bark *DL* (EMM **87,** 285-6) and (1/**1951-52,** 13); 2.ix.51, a series beaten from young pine incl. ♂♂, macropterous and brachypterous ♀♀ and last instar larvae, *DL* (1/**1951-52,** 18); 12.vii.52, I, II, and III instars in profusion under scabs on fir boles, adults present on branches, *DL* (1/**1952-53,** 84); 10.v.53, IV and V instars, *DL* (1/**1953-54,**

1 This abbreviation occurring throughout indicates records from the grounds of the Pest Infestation Laboratory.

6); 28.vii.57, *GGES* (HD); 13.ix.60, *MA* (HD); Walton Heath, 12.iv.52, two brachypterous ♀♀ beneath fir bark ; 14.iv.52, 7 brachypterous ♀♀ and one macropterous ♂, *GEW* (EMM **88,** 139). Also taken just beyond the boundary at Ash Vale, 9.ix.51, ♂♂, macropterous and brachypterous ♀♀ and a few larvae, *DL* (EMM **87,** 286) and in *WJLeQ* coll. (21); 8.iv.52, a single brachypterous ♀, *HDS* (EMM **88,** 184); Wisley Common, 7.i.52, a single brachypterous ♀ *HDS* (EMM **88**, 184); and at Woking (Horsell Common), 9.i.52, two macropterous ♂♂ and two brachypterous ♀♀, *BJS* and *GEW* (EMM **88,** 106).

Bucks. Just outside the boundary at Burnham Beeches, 28.ii.52, 19 brachypterous ♀♀ and 13 macropterous ♂♂ on young pine, *BJS* and *GEW* (EMM **88,** 106).

Aneuridae (Bark bugs)

Two British species both occurring in the London area under bark on fallen logs or dead branches.

Aneurus laevis (Fab.) Sp. 6 p. 14
D&S p. 268 S p. 141 B p.220 (Sp. 161)

Locally common, associated with fungal hyphae beneath bark on fallen logs especially oak.

Kent. Bromley, *ES* (36); Abbey Wood, *WW* (39); Darenth Wood, *FPP* (HD); *TAM* (36) and (22); 21.viii.04, under oak bark, *WW* (1/**1904-5,** 75); Farningham Wood, 2.iv.56, *KCS* (14) and (6/**16,** 13); 6.i.60, *KCS* (14); Westerham, 28.x.51, *AMM* (22) and *AMM* in *EWG* coll. (24).

Surrey. Wimbledon Common, 1949-51, very common, *AWJ* (19); Caterham, *TRB* (36); Reigate, *ES*, (36); Oxted, 11.vi.1898, *AJC* (HD); Mickleham, *TRB* (36); Bookham Common, 9.ix.49, *AME* in *FJC* coll. (34); Oxshott, *TRB* (36); Weybridge, *TRB* (36); and just outside the boundary at Effingham, 2.v.53, *SL* (1/**1953-54,** 78) and Chobham, *TRB* (36).

Aneurus avenius (Duf.) Sp. 7 p. 15
B p. 222 (Sp. 161a.)

Local and rare. Recorded from only two counties in the London area.

Kent. Farningham Wood, 29.ix.63, *KCS* (14); Magpie Bottom, E. of Shoreham, 20.ii.60, *KCS* (14).

Surrey. Godstone, 2.iii.63, *KCS* (14).

Acanthosomidae (Shield bugs)

Five British species, four of which are known from the London area (three being of frequent occurrence).

Acanthosoma haemorrhoidale (Linn.) Sp. 8 p. 17
D&S p. 107 S p. 39 B p. 76 (Sp. 34)

Frequent and widely distributed. Mainly on hawthorn (especially mature bushes that fruit) but also on oak, birch and whitebeam. Records from within London area boundary for all counties except Bucks., but likely to occur there also (Records wanting).

Middx. S. Kensington 6.x.52, *MB* (BM); Hampstead ix.1943, *CHA* (17); Hampstead Heath, 1949, widely distributed on *Crataegus DL* (1/**1949-50,** 36-38); Finchley, ix.43, *CHA* (17); Palmers Green, 20.ix.18 and 9.vii.19 (II instar larva), *EAB* (BM); Enfield, 5.x.04, beneath oak, *AJC* (HD); Ruislip, 11.viii.34, abundant on *Crataegus*, *DCT* (33a).

HERTS. Thomas (12) gives it as common and widely distributed in the county on *Betula* and *Crataegus*, hibernating in moss or conifers; Cuffley Great Wood, W. of Cheshunt, 25.v.58, *FB* (18) and over the boundary at Harpenden, 20.ix.54, *GGES* (HD).

ESSEX. Epping Forest, ix.1892, x.1891 (V instar) 28.ix.15 (IV instar), *EAB* (BM); (Chingford), x.1891, *EAB* (BM); 2.x.60, *DTC* (BM); (Loughton), viii.16, larvae common, *CN* (35a); (Fairmead), *CN* (35a); (High Beach) ix, *CN* (35a).

KENT. Lewisham, *WW* (39) (4) and (22); Abbey Wood, 1898 on birch, *WW* (39) (4) and (22); Darenth *JAP* (BM); Gravesend, 10.x.46, on wall, *TRES* (13); West Wickham, 4.vi.51, *WTW* in *EWG* coll. (22); Eynsford, 19.viii.33, adults and larvae freely beaten, *KGB* (1/**1933,** 33); Shoreham, 1.ix.61, *KCS* (14); Knockholt, 17.ix.27, *JET* (BM); and on the boundary at Sevenoaks, *AMM* (22).

SURREY. Brixton, 23.ii.1899, hibernating specimen, *HAS* (1/**1899,** 73); East Dulwich, 11.xi.33, n.c. (BM); East Croydon, 10.x.59, *GB* (BM); Selsdon, 26.ix.29, on elderberry leaves, *CLC* (BM); Shirley, 5.v.21, *LCB* (MM); Carshalton, 16.x.56, taken indoors, *EWG* (24); Banstead Downs, 23.viii.55, IV instar larvae, *EWG* (23); Wimbledon, *GWK* (3); (Southfields) xi.46, *AAT* (BM); Wimbledon Common, 25.vi.55, *EWG* (24); Ashtead Woods, 12.v.51, *SL* (1/**1951-52,** 69); Bookham Common, vi, *DL* (34); Buckland Hills, by beating, *J&TL* (32); Headley, 27.v.00, *AJC* (HD); Mickleham Downs 29.v.05, and *HStJKD* (HD); 7.x.56 adults and V instar larvae, *EWG* (24); Headley Lane, on *Betula*, *TRB* (36) and (3); Boxhill, 24.ix.1892, *AJC* (HD); 27.viii.50, *DL* (1/**1950-51,** 77); 2.x.55, *EWG* (24); Oxshott, 12.x.00, *AJC* (HD).

BUCKS. Records so far available are: on the boundary at Slough (PILG) xii.50, single adult overwintering in *Deschampsia* tuft near birch trees, *BJS* and *GEW* (31e); ix.50 in some numbers on birch and one on oak *BJS* and *GEW* (31d); and just beyond, at Chalfont St. Giles (Hodgemoor Wood), 11.v.51, *WJLeQ* (21); Amersham, 4.ix.50, larvae, *WJLeQ* (21); and Chenies, 25.viii.15, V, IV, III and II instar larvae, *EAB* (BM).

Cyphostethus tristriatus (Fab.) Sp. 9 p. 19
D&S p. 105 (*Acanthosoma pictum*) S p. 41 (*A. tristriatum*)
B p. 85 (Sp. 38)

Found on juniper but sometimes strays to other bushes. Only known to feed on ripe juniper berries. Rare.

HERTS. Just over the boundary in the Harpenden district, *BSW* (1/**1922-23,** 115) and beyond at Ashridge nr. Berkhamsted, 2.x.33, on *Crataegus* and 2.i.34 hibernating in *Thuya*, *DCT* (12).

KENT. Lee, *JAP* (BM); Birch Wood, 26.iii.1831, on juniper, *EN* (29); and just outside the boundary on the Pilgrim's Way at Ryarsh nr. Wrotham, *AMM* (22).

SURREY. Purley Downs, 20.x.51, *WJW* in *EWG* coll. (24); Riddlesdown, *SW* (1/**1951-52,** 43-44); 11.xi.51, *WJW* in *EWG* coll. (24); Mickleham, *ES* (37) and (3); *JAP* (BM); viii 1886, *EAB* (BM); Boxhill, *ES* (HD), (37) and (3); viii.1892, *EAB* (BM); 24.ix.1892, *AJC* (HD); beaten from juniper, *WW* (1/**1897,** 147); and beyond the boundary at Gomshall, 19.ix.10, IV and II instar larvae, *EAB* (BM); and Shere, viii.1892, *EAB* (BM) and (3).

BUCKS. Beyond the boundary at Wendover, *HJT* (1/**1903,** 6); Coombe Hill, 15.iv.51, 1.ix.51 (larva) and 22.ix.51, *WJLeQ* (21).

Elasmostethus interstinctus (Linn.) Sp. 10 p. 20
D&S p. 104 (*Acanthosoma dentatum*) S p. 39 (*A. dentatum*)
B p. 78 (Sp. 35, *A. interstinctum*)

Locally frequent on birch (especially if catkin-bearing) in mixed woodland. Hibernates in leaf litter or moss.

MIDDX. Hampstead Heath, 15.viii.43, *CHA* (31f) and (17); Ruislip N.R.,[1] 1.ix.55, *EWG* (24).

HERTS. Oxhey, 24.viii.16, V instar larva, *EAB* (BM); and beyond the boundary from Berkhamsted Common, 2.x.35, on *Betula alba*, *DCT* (12).

ESSEX. Epping Forest (High Beach), *FBJ* (24).

KENT. Blackheath (Shooter's Hill), on oaks, *WW* (4) and (22); *AAA* (22); Plumstead, *TRB* (37), (4) and (22); Abbey Wood, 1898, on oak, *WW* (39/under *A. dentatum*); Keston, 25.viii.51, *WJW* in *EWG* coll. (24); Westerham district, 17.vi.51, *DL* (1/**1951-52,** 72).

SURREY. Coombe Wood, *EAN* (3); Shirley, *JAP* (BM); *TRB* (37) and (3); *Walton-on the-Hill*, 9.ix.51, *DJC* (BM); Reigate, *JAB* (37) and(3); Boxhill, 27.viii.37, *SL* (1/**1937-38**, 51); Ashtead Wood, 12.v.51, *SL* (1/**1951-52**, 69); Bookham Common, viii, *DL* (34); 27.viii.55, *EWG* (24); Oxshott Heath, 30.vi.51, by beating, *SL* (1/**1951-52**, 73); Esher Common, *JAP* (BM); 18.v.01, *SWK* (1/**1901**, 12); 11.vi.49, *FJC* (1/**1949-50**, 75); 2.ix.50, *DL* (1/**1950-51**, 79); Weybridge, 25.v.47, beaten from *Betula*, *TRES* (13).

BUCKS. Records at present available are from on the boundary at Slough (PILG), ix.50, larvae and adults in large numbers on birch *BJS* and *GEW* (31d); and beyond at Little Chalfont (Pollard's Wood), 6.ix.50, *WJLeQ* (21), and Chalfont St. Giles (Hodgemoor Wood), 30.viii.50 and 11.v.51, *WJLeQ* (21).

Elasmucha grisea (Linn.) Sp. 12 p. 22
D&S p. 101 (*Acanthosoma griseum*) S p. 39 (*A. interstinctum*)
B p. 80 (Sp. 36, *Elasmostethus griseus*).

Locally frequent on birch (the chief foodplant) in birch plantations and mixed oak-birch woods. Overwinters in leaf litter of these woods or sometimes in conifers.

MIDDX. Kensington, 25.iii.03, *HStJKD* (HD); Hampstead Heath, 15.viii.43, *CHA* (17) and (31f); 1949, common and widespread on *Betula*, *DL* (1/**1949-50**, 36-38); Northwood (Copse Wood), ix.51, *ELM* (BM); Uxbridge, vii-ix.33-36, abundant on *Betula pendula;* 6.iii.34, hibernating in *Abies*, *DCT* (33a).

HERTS. Oxhey, 24.viii.16, *EAB* (BM) and (11); Bricket Wood, *HStJKD* (11); on the boundary at Chorley Wood, 16.viii.16, *EAB* (BM); and beyond on Berkhamsted Common, 5.vii.34, a ♀ sitting over 34 freshly hatched larvae on *Betula pendula*, *JCT* (12).

ESSEX. Epping Forest (Lords Bushes), (near Wake Arms, High Beach), and (Theydon), all on birches, *CN* (24).

KENT. Lee, 1897, on birch, *WW* (39), Kidbrook, 1897, on birch, *WW* (39); Blackheath (Shooter's Hill), on birch *WW* (39), (4) and (22); *AAA* (22); Keston, 25.viii.56, *SL* (1/**1956,** 84); Westerham district, 17.vi.51, *DL* (1/**1951-52,** 72) and (22).

SURREY. Kew (Royal Botanic Gardens grounds), 1958, III and IV instar larvae, *GEB* (BM); Richmond Park, 6.vii.07, *HStJKD* (HD); Wimbledon Common, III instar larva on *Scrophularia*, *EAB* (BM);

1 Ruislip N.R. abbreviation throughout stands for Ruislip Local Nature Reserve.

1949-51, *AJW* (19); Addington Hills, x.51, *AS* (BM); Banstead Wood, 13.v.51, *DJC* (BM); Colley Hill district, 13.v.50, *SL* (1/**1950-51,** 57); Betchworth, *ES* (HD); Boxhill, 2.x.55, *EWG* (24); Mickleham Downs, *J&TL* (32); viii, 1886, *EAB* (BM); Ashtead Wood, 12.v.51, *SL* (1/**1951-52,** 69); Bookham Common, 10.vii.42, *LCB* (MM); iv and VII, *DL* (34); 8.v.55, *DGH* in *EWG* coll. (24); 14.x.56, 19 V instar larvae clustered on underside of birch leaf, 5 subsequently bred to adult, *EWG* (24); Oxshott, 2.vi.00, *AJC* (HD); *CLW* (1/**1922-23,** 108); Esher Common, *JAP* (BM); 2.ix.50, *DL* (1/**1950-51,** 79).

BUCKS. Gerrards Cross, 19.viii.52, *FGC* (BM); Slough, *GEW* (40).

CYDNIDAE (Shield Bugs)

Nine British species seven of which occur in the London area.

Legnotus limbosus (Geoff.) Sp. 13 p. 24

D&S p. 56 (*Sehirus albomarginatus*) S p. 21 (*Gnathoconus albomarginatus*) B p. 36 (Sp. 13, *G. albomarginatus*)

Occurs on dry earth banks (preferably sandy and facing the sun) covered with flowery vegetation including its foodplant, the bedstraws (*Galium* spp.). Occasional though widely distributed. Douglas and Scott (28) gave it as common in the London district. It could not be termed so now.

MIDDX. Highgate, *JAP* (BM); Hendon, v.07, *EAB* (BM).

HERTS. The only two records available are outside the boundary at Royston, v.01, vi.03 and 28.v.12 (III instar larva), *EAB* (BM); and at Heronsgate, 2.ii.34, hibernating under dead *Verbascum* leaves, *DCT* (12).

ESSEX. On the boundary at Stanford-le-Hope, 22.v.54, *SL* (1/**1954-55,** 81); and just beyond at Benfleet, 17.ix.50, *SL* (1/**1950-51,** 81).

KENT. C. G. Hall (4) gives it as "common by sweeping in lanes"; Lee, 1900, at roots, common, *WW* (4) and (39); Bromley, *ES* (37); Plumstead, 1858, *ES* in *FPP* coll. (HD); Darenth Wood, *FPP* (HD); *GCC* (37); *ECB* (22); Farningham, *AAA* (22); and on the boundary at Gravesend, *TRES* (22).

SURREY. Wandsworth, *ES* (37); Croydon, *WB* (37); Reigate (Redstone), under stones and in sand pits, *J&TL* (32); *ES* (HD) and (37); shaken from moss, *TRB* (37); Headley, 29.v.00, *AJC* (HD); Headley Lane, shaken from moss, *TRB* (37); Mickleham, 27.v.00, *HStJKD* (HD); Ashtead, *GCC* (37); Oxshott, *COW* (BM); Esher, *JAP* (BM); and just beyond the boundary at Woking, *JJW* in *JJC* coll. (HD); Horsley (Sheep Leas), 1903, *WW* (1/**1903,** 53); 17.v.52, *TRE* (1/**1952-53,** 77); and at Shalford, *JAP* (BM); vii.1886, *EAB* (BM).

BUCKS. On the boundary at Slough (PILG), v. and vi.50, small number of adults by sweeping in grassy places, *BJS* and *GEW* (31e); and just beyond in the Chesham valley, 5.vii.52, *WJLeQ* (21).

Legnotus picipes (Fall.) Sp. 14 p. 24

S p. 21 (*Gnathoconus picipes*) B p. 37 (Sp. 14, *G. picipes*)

Occurs at roots of *Galium verum* and *G. saxatile* in dry sandy places. Less frequent than the previous species.

MIDDX. Hampstead, *ES* (36); Hounslow Heath, 5.x.52, three adults under *Galium saxatile*, *GEW* (33b); 5.v.53, extremely abundant under

same food plant in various parts of the Heath, *GEW* (33c) and in *WJLeQ* coll. (21). Not found subsequently (33c).

KENT. Bromley, vii.1887, *ES* (HD), (37), (4), (39) and (22).

SURREY. Oxshott, *COW* (BM); Esher, *JAP* (BM); *ES* (36); and beyond the boundary at Chobham, vii.1880, *ES* (HD), (36) and (3).

Sehirus bicolor (Linn.) Sp. 15 p. 25
D&S p. 52 S p. 19 B p. 30 (Sp. 9)

Found on *Lamium album* and sometimes on *Ballota nigra* on which it feeds. Hibernates beneath moss and leaf litter often burrowed into the soil. Is a strong flyer on warm days. Widely distributed in the London area. (More Essex records required).

MIDDX. Lampton, 17.vii.44 and 11.vi.47, *HStJKD* (HD); Boston Manor, 29.v.43, *HStJKD* (HD); Hounslow Heath, 1953, several adults taken on *Lamium album* on waste tip, *GEW* (33c); Staines, 13.iv.35, *DCT* (33a); Uxbridge, 2.v.33, *DCT* (33a); Harefield, 29.vii.33, *DCT* (33a).

HERTS. West Hyde, 14.ix.34, hibernating, *DCT* (12); Whippendell Wood, 3.vi.60, *DL* (HD); Bushey, 27.v.43, *CHA* (17); St. Albans, *EAB* (37) and (11); and on the boundary at Chorley Wood, 1925, *JD* (BM) and beyond in the Harpenden district, *BSW* (1/**1922-23,** 115);(Rothamsted Expt. Station grounds), 21.iv.53, *TRES* (1/**1953-54,** 4).

ESSEX. Orsett, 27.iii.55, *KCS* (14).

KENT. Lee, sweeping nettles, *WW* (37) and (39); Plumstead, 1858, *ES* in *FPP* coll. (HD); 23.iv.57, *RGR* (WBM); Abbey Wood marshes, 24.vii.54, V instar larva, *EWG* (24); Darenth Wood, *JAP* (BM); *ES* (37); 14.v.1893, *AJC* (HD); 7.v.1905, *JWY* (HD); Eynsford, 14.ix.52, larva, *SL* (1/**1952-53,** 87); 19.iv.53, half a dozen specimens sunning themselves on nettles by roadside, *SL* (1/**1953-54,** 76); Farningham, *AAA* (22); Horton Kirby, 9.iv.55, *KCS* (14) and (22); Wilmington, 24.v.60, *KCS* (14) and (22); and on the boundary at Gravesend, v.43, on the ground, and 11.viii.52 on *Lamium album*, *TRES* (13).

SURREY. Kew Green, 9.v.47, a single specimen on path, *EMR* (7/**1949,** 231-237); Kew (Royal Botanic Gardens grounds); 13.v.47, a single specimen by tennis courts, *HKAS* (7/**1949,** 231-237); 11.vi.49, larvae in same place, *HKAS* (7/**1952,** 285-288); Dulwich, *TRB* (37); Croydon, *WB* (37); Selsdon, 15.xi.48, *RCHS* (BM); Wimbledon Common, 1949-51, occasional, along Beverley Brook, *AWJ* (19); Banstead, 2.ix.51, *FR* in *EWG* coll. (24); Banstead Downs, 11.iv.54, *DJC* (BM); Reigate (Redstone), by beating and sweeping and under stones, *J&TL* (32) and (37); *ES* (HD); Mickleham Downs, 27.vii.52, *SL* (1/**1952-53,** 79); Headley Lane, *TRB* (37); Boxhill, 27.viii.50, *DL* (1/**1950-51,** 77); Ranmore Common, 27.iv.52, *SL* (1/**1952-53,** 74); Bookham Common, 9.v.54, *EWG* (24) and (2/**37,** 57); Gt. Bookham (Church Rd. green), 8.ix.56, V and IV instar larvae, *EWG* (24); Weybridge, *TRB* (37).

BUCKS. On the boundary at Slough, on *Ballota nigra*, *GEW* (40); (PILG), 27.iv.51, in numbers on young nettle; xii.50, overwintering in tuft of *Deschampsia*, *BJS* and *GEW* (31e) v and ix.50, adults extremely common, and vi.50, larvae swarming at roots of *Alliaria petiolata* and among *Stellaria media*, *BJS* and *GEW* (31d); and just beyond at Amersham, *HJT* (1/**1903,** 6); 2.ix.51, *WJLeQ* (21) and Burnham Beeches, 22.vi.12, III instar larva, *EAB* (BM).

Sehirus dubius (Scop.) Sp. 16 p. 26
D&S p. 53 S p.19 B p. 33 (Sp. 10)

Confined to those areas of dry chalky soil in which its food plant *Thesium humifusum* grows. Rare and very local, having been recorded in only two counties in the London area.

KENT. Dartford, 18.ix.08, *JJC* (HD); *ECB* (22).

SURREY. Chalk downs near Croydon, hibernating in moss under juniper, *GCC* (38); Caterham, *GCC* (37) and (3); Riddlesdown, *JAP* (BM); Chipstead, hibernating beneath leaves on chalk hillside below Banstead Wood, *AMM* (pers. comm. to *EWG*, 8.i.58); *EAB* (BM); Whitedown nr. Boxhill, 8.iv.62, mostly larvae on *Thesium humifusum*, *RWJU* (1/**1962,** 102); and just over the boundary at Horsley, *TRB* (3) and at Abinger, 3.v.53, a single ♂ *AMM* (BM).

Sehirus biguttatus (Linn.) Sp. 17 p. 28
D&S p. 54 S p. 20 B p. 34 (Sp. 11)

Very few records of this rare bug have so far been made in the London area. These have been in woods or on heaths mostly of a sandy nature where its food plant *Melampyrum pratense* occurs.

ESSEX. Loughton, *TRB* (37).

KENT. Darenth, *GCC* (37) and (4); *FPP* (HD).

SURREY. Reigate (Redstone), under stones and in sand pits, *J&TL* (32), (37) and (3); Walton, *JAP* (BM); and beyond the boundary at Ewhurst, vii.1895 and viii.1896, *EAB* (BM) and (3). There is a specimen in the BM collected by P. Harwood and marked as "London district" but without further precise locality.

BUCKS. Has been recorded just beyond the boundary at Chalfont St. Giles (Hodgemoor Wood), 11.iv.53 and xi.54, *WJLeQ* (21).

Sehirus luctuosus (Muls. and Rey) Sp. 18 p. 28
D&S p. 55 (*Sehirus morio*) S p. 20 (*S. morio*)
B p. 35 (Sp. 12)

Locally common especially on chalky soils or waste ground where it is generally found at the roots, or feeding on the nutlets, of its host plants, *Myosotis arvensis* or *Echium vulgare*.

MIDDX. Uxbridge, 28.viii.34, a single ♀ at roots of grass on railway bank, *DCT* (33a).

ESSEX. Between Rainham and Stanford-le-Hope, 7.ix.38, two ♂♂ and a single ♀ under *Polygonum* and *Matricaria*, buried in the sand, *DCT* (31b).

KENT. Darenth, *JAP* (BM); 14.v.22, *PH* (BM); Otford, *ECB* (37) and (22); 16.vii.22, *PH* (BM).

SURREY. Claygate, *JAP* (BM); Shirley, 1893, *AJC* (HD); Chipstead, vi.10, *WES* in *EAB* coll. (BM); 28.vii.55, in association with *Myosotis discolor*, *M. arvensis* and *M. ramosissima* growing on a derelict arable field, *GEW* (EMM **92,** 47); Reigate, *TRB* (1/**1886,** 69), (37) and (3); Mickleham, *GCC* (37) and (3); Boxhill, *FBJ* (3); Oxshott, 6.ii.1893 and 7.vi.1895, *AJC* (HD); and beyond the boundary, at Farnham 10.v.52, *WJLeQ* (21).

Thyreocoris scarabaeoides (Linn.) Sp. 21 p. 29
D&S p. 58 (*Corimelaena scarabaeoides*) S p. 15 (*C. scarabaeoides*)
B p. 27 (Sp. 6)

Occasional, being found on dry sunny slopes on the chalk (particularly in suitable sites along the scarp face of the N. Downs) or in sandy

places. Hibernates beneath moss or leaves. Recorded from three London area counties.

Essex. Buckhurst Hill, *EAB* (BM).

Kent. Darenth Wood, *JAP* (BM); *GCC* (37), (4) and (22); Otford, x.20, *PH* (BM); 12.iv.52, *AMM* (22) and *AMM* in *EWG* coll. (24); 18.v.55, *KCS* (14); Brasted, ix.20 and 18.iii.23, *PH* (BM); and just beyond the boundary at Birling, on chalk downs, *AMM* (22).

Surrey. Carshalton, *ECR* (37); Croydon, *WB* (37) and (3); Purley, *ES* (3); Purley Downs, under fallen leaves in Spring, *D&S* (28); Caterham, *GCC* (37); Banstead Wood, 16.viii.52, *SL* (1/**1952-53,** 85); Chipstead, 27.ix.08, *JJC* (HD); x.08, *EAB* (BM); Colley Hill district, 13.v.50, *SL* (1/**1950-51,** 57); Reigate, *ES* (37) and (3); *TRB* (1/**1886,** 69) and (37); Buckland Hill, at roots of grass, *J&TL* (32); Headley Lane, *TRB* (37) and (3); Mickleham, *ES* (37); *TRB* (3); *ECR* (28); a number of records from Boxhill made at various dates over the past 100 years, during the months of April-July and Sept.-Nov.; Weybridge, 28.iii.07, *AJC* (HD); and just beyond the boundary at Woking, *ES* (37); and Horsell, *JAP* (BM).

Scutelleridae (Shield bugs)

Five members of this family are represented in the British Isles, three of which have been recorded in the London area.

Odontoscelis dorsalis (Fab.) Sp. 22 p. 31
B p. 19 (Sp. 2)

Very rare. A species to be met with in sandy places by the coast though a few inland records have been reported. It is considered that this bug is associated with *Erodium* spp.

Surrey. Weybridge, *JAP* (BM); and beyond the boundary at Witley Common, 22.v.60 adult and larvae on *Erodium*, *AMM* (1/**1960,** 4).

Eurygaster maura (Linn.) Sp. 25 p. 33
D&S p. 65 (*E. maurus*) S p. 16
B p. 21 (Sp. 3)

Occasional, in a few localities in Surrey and Kent, mainly along the scarp face of the N. Downs. Taken by sweeping in grasses on sunny slopes. Has in the past been confused with the next species.

Kent. Brockley, 1894, a single specimen taken on railway bank, *WW* (39); Otford, *ES* (37); 15.iii.24, *PH* (BM); 19.viii.35, *AMM* in *EWG* coll. (24); 1.vii.51, *AMM* (BM) and (22); Swanscombe, 17.viii.62, *WRD* (15) and (22); Darenth, *AMM* (22); Farningham Wood, 23.ix.51, *SL* (1/**1951-52,** 81) and (22).

Surrey. Addington, 1952, *SW* (1/**1952-53,** 49); Coulsdon (Happy Valley), 4.vii.54, larva, *EWG* (24) and (EMM **90,** 39); Riddlesdown, *SW* (1/**1951-52,** 43-44); 1.viii.53, larva, *EWG* (24); Reigate (Redstone fields), under stones, *J&TL* (32), (37) and (3); Headley Lane, *TRB* (37) and (3); Headley, vi.03 and 1905, *WES* in *EAB* (BM); Mickleham, *JAP* (BM); Boxhill, *JAP* (BM); (Dorking chalk pits), 20.viii.26, *EAB* (BM); 27.viii.50, "abundant" in grass on hillside, *DL* (1/**1950-51,** 77); Bookham Common, 19.vii.53, larva, *EWG* (24); and beyond the boundary at Dorking (Westcott), viii.1895, *EAB* (BM); Abinger, viii.1899 and viii.1900, *EAB* (BM); Gomshall, *EAB* (3); Shalford, *EAB* (3); Ewhurst, *EAB* (3) and Woking, *ES* (3).

Eurygaster testudinarius (Geoff.) Sp. 26 p. 34

Rare. Known in the London area from a few records only in Surrey.

SURREY. Addington, 1952, *SW* (1/**1952-53,** 49); Headley, vi.1903, *WES* (BH); and from beyond the boundary at Woking, vii.1891 and x.1892, *ES* (HD); and Ewhurst, viii.1889, *EAB* (BM).

PENTATOMIDAE (Shield bugs)

Nineteen native and two alien species recorded in Britain of which 8 are known from the London area. Several are predatory on small caterpillars at some stage of their life history, or are themselves prey to parasitizing Diptera or Hymenoptera.

Podops inuncta (Fab.) Sp. 27 p. 35

D&S p. 73 S p. 17 B p. 25 (Sp. 5)

Occasional, though widely distributed. Taken either by sweeping in rank grass, or whilst hibernating during winter at bases of tufts of grass.

MIDDX. Hounslow Heath, 1953, occasionally on the ground on gravelly bank, *GEW* (33c); Harefield, 23.x.43 and 1.iv.44, *PJLR* (20).

HERTS. West Hyde, 2.ii.34, hibernating adult, *DCT* (12); Rickmansworth, 28.viii.16, II instar larva, *EAB* (BM); and just beyond the boundary in the Harpenden district, *BSW* (1/**1922-23,** 115) and at Berkhampsted, 14.x.62, *PSB* (16).

ESSEX. Has been recorded just beyond the boundary at Stanford-le-Hope, 22.v.54, *SL* (1/**1954-55,** 81); at South Benfleet, beneath *Statice limonium*, 16.vii.33, *KGB* (1/**1933-34,** 25) and at Canvey Island, 7.v.50, n.c. (6/**10,** 6).

KENT. Kidbrook, 1897, under vegetable matter, not common, *WW* (39); Swanscombe cutting, 27.vii.61, *WRD* (15) and (22); Farningham Wood, 27.iv.62 and 4.xi.62, *KCS* (14) and (22); Downe (Darwin's Bank), 15.ix.62, *KCS* (14); Orpington, *TRB* (37); Otford, 12.iii.22, *PH* (BM); Magpie Bottom, N.E. of Otford, 30.iv.62, *KCS;* and just beyond the boundary at Harvel, N.E. of Wrotham, *TRES* (22); at Ryarsh, 25.ix.34, *AMM* in *EWG* coll. (24); and at Trottiscliffe, 25.viii.62, *AMM* (1/**1962,** 100) and (22).

SURREY. Often on chalk slopes (of N. Downs) (8); Chessington, 10.xi.51, *LW* in *EWG* coll. (24); Banstead, 16.vi.00, *SL* (1/**1900,** 14); Chipstead, 1.v.60, *KCS* (14); Reigate (Redstone), under stones, *J&TL* (32); Reigate, *ES* (HD) and (37); Mickleham, *JAP* (BM); Headley Lane, *TRB* (37); Bookham Common, vi, *DL* (34); Oxshott, *TRB* (37); and outside the boundary at Ranmore Common, 15.x.50, *SL* (1/**1950-51,** 82); Ewhurst, viii.1896, *EAB* (BM); Godalming, 11.1920, *HStJKD* (HD); and Chiddingfold, 1898, *HStJKD* (HD).

BUCKS. On the boundary at Slough (PILG), 1950, common under debris, old wood, etc., on grassy areas, *BJS* and *GEW* (31d); and beyond at Amersham, a few, *HJT* (1/**1903,** 7); 19.ix.53, *WJLeQ* (21); Burnham, n.c. (26) and Wendover, n.c. (26).

Sciocoris cursitans (Fab.) Sp. 28 p. 36

D&S p. 60 (*S. terreus*) S p. 23

B p. 39 (Sp. 15)

Occasional, on dry chalky or sandy slopes (Boxhill is a well known locality). Taken either by sweeping or searching at roots of grass and ground plants in sunny, sheltered localities. Hibernates in moss.

Essex. Purfleet, 30.viii.38, a single ♀ under *Erodium* on side of chalk pit, *DCT* (31b).

Kent. Darenth Wood, 31.vii.52, *SL* (1/**1952-53,** 86) and (22); 1952, *SW* (1/ **1952-53,** 49) [probably these two records are the same;] Swanscombe, 27.viii.61, *WRD* (15); *HKK* (22).

Surrey. Banstead Wood, 16.viii.52, larva, *SL* (1/**1952-53,** 85); Mickleham, 18.vii.46, *LCB* (MM); Boxhill, *FBJ* (3); iv.09, *WES* (BM); 27.viii.10 and 15.iv.11, *JJC* (HD); 9 and 16.vi.17 and 15.ix.17, *EAB* (BM); 31.v.19, *EAB* (BM); 7.v.22, *PH* (BM); 3.ii.51, in moss, *WJW* in *EWG* coll. (24); (Slopes of Juniper valley), 12.ix.53, *DL* (1/**1953-54,** 91); 17.iv.55, *SL* (1/**1955,** 68); 23.iv.60, *DL* (HD); and just beyond the boundary at Ranmore Common, 18.vi.10, *WJA* (1/**1910-11,** 155).

Aelia acuminata (Linn.) Sp. 29 p. 37

D&S p. 68 S p. 23 B p. 40 (Sp. 16)

Occasional, and of a somewhat local distribution. Seems to favour grassy verges by roadsides or tall grass on dry commons, heaths, and chalk downland. Hibernates at roots of grass or in moss. (Records for Herts wanting).

Middx. Hounslow Heath, 14.vii.53, several larvae swept from small area of seeding grasses, *GEW* (33c); 26.vii.53, III and IV instar larvae swept from grass, *DL* (EMM **89,** 303).

Kent. Bickley, FBJ (4); Darenth Wood, vi, *D&S* (28), (4) and (22); *TRB* (37); *GCC* (37).

Surrey. Bookham Common, 9.viii.53, V instar larva, *EWG* (24); Reigate, 1869, *ES* (HD), (37) and (3); Mickleham, *GCC* (37) and (3); Weybridge, viii, amongst grass, *D&S* (28); *GCC* (37) and (3); *JAP* (BM); 30.vi.63, *PBS* (16); and beyond the boundary at Shere, *EC* (3); Gomshall, *EAB* (3); Abinger, viii.1899, *EAB* (BM); Albury, viii.1899, *EAB* (BM) and (3); Milford, 13.vii.63, *PSB* (16); Byfleet (Basingstoke Canal bank), 8.vii.50, a single specimen "presumably a late survivor of the over-wintered generation", *DL* (1/**1950-51,** 73); Chobham Common, 29.v.55, *WJLeQ* (21); Camberley, 27 and 31.v.20, *EEG* (BM); Ash Vale, 4.ix.49, swept from grass, *DL* (1/**1949-50**, 78); 10.ix.50, 3 adults and one last instar larva in long grass, *DL* (1/**1950-51,** 80); Farnham, 3.vii.53, roadside grass bank E. of the town, *EWG* (24).

Bucks. On the boundary at Slough (PILG), viii.50, several taken by sweeping grassy areas, *BJS* and *GEW* (31d).

Neottiglossa pusilla (Gmel.) Sp. 30 p. 39

D&S p. 71 (*Aelioides inflexa*) S p. 24 (*N. inflexa*) Sp. 30 p. 39

Occasional. Occurs in grass on commons and heaths but prefers damper situations than the last species. Hibernates from October onwards beneath leaf litter, dead grass culms, matted sticks, etc. (Essex records wanting).

Middx. Harefield chalk pit, 10.viii.33, V instar larvae, 15.viii.33 adults, 8.ix.34 ♀ on *Festuca*, 12.ix.34 ♂ on *Agrostis*, *DCT* (33a).

Herts. West Hyde, 8.vii.35, *DCT* (12); Bushey, vii.44, *CHA* (17); and just beyond the boundary at Chorley Wood, 26.v.57, *WJLeQ* (21).

Kent. Bromley, *ES* (37); Dartford Brent, *D&S* (28); Darenth Wood, *ES* (37); Darenth, in chalk pit, *AAA* (22); Birch Wood, *JAP* (BM); Swanscombe, 8.vi.63, *KCS* (14); and just beyond the boundary at Ryarsh nr. Wrotham, *AMM* (22).

SURREY. Shirley, *JAP* (BM); Reigate (Redstone), *J&TL* (32); 26.viii.49, on *Ulex*, *GBR* (EMM **87,** 139); Limpsfield, 23.3.45, *CHA* in *EWG* coll. (17) and (24); Headley Lane, *TRB* (37) and (3); Bookham Common, 14.vi.53, ♀, *EWG* (24); vi, *DL* (34); Esher Common, *JAP* (BM); *TRB* (37) and (3); *FPP* (HD); on the boundary at Byfleet, 19.vi.15, adults and I-IV instar larvae, *EAB* (BM); and beyond at Woking, viii.1880 and vii. 1896, *ES* (HD) and (3); Chobham, ix.1890 and 29.ix.1892, *AJC* (HD); Camberley, 27.v.20, *EEG* (BM); Gomshall, *EAB* (3); Albury, viii.1899, *EAB* (BM) and (3); Abinger, viii.1899 and viii.1900, *EAB* (BM); and Shalford, *JAP* (BM).

BUCKS. Datchet (Ditton Park), vi.59, *GEW* (40); and beyond the boundary at Burnham Beeches, 24.vii.54, *WJLeQ* (21).

Eysarcoris fabricii (Kirk.) Sp. 31 p. 39
D&S p. 75 (*E. melanocephalus*) S p. 25 (*E. melanocephalus*)
B p. 44 (Sp. 18 *Eusarcoris melanocephalus*)

Frequent wherever its food plant *Stachys sylvatica* occurs, hibernating there also amongst the dead leaves and fallen stems. This species, rare at the turn of the century, is one that in S.E. England at least is much more common now.

MIDDX. Finchley, 25.vi.44, *CHA* (17); Harefield, 26.vii.51, reared from larvae, *WJLeQ* (21); Uxbridge, vi.50, several adults swept from waste ground, *BJS* and *GEW* (EMM **86,** 301); Hillingdon, 8.vii.36 (V instar larvae) and 16.viii.36 (adults) *DCT* (33a); Osterley, 20.vii.47, *BPM* in *WJLeQ* coll. (21); Hounslow Heath, 8.viii.54, larvae abundant feeding on nutlets of *Stachys sylvatica*, *GEW* (33c).

HERTS. Whippendell Wood, 24.v.59, *RWJU* (1/**1959,** 79); 5.vi.60, *DL* (EMM **97,** 27); 13.vi.60, *DL* (HD); Batchworth (Bishop's Wood), 14.vi.60, (HD); Radlett, 26.vi.60, *DL* (HD); and just beyond the boundary at Harpenden, *BSW* (1/**1922-23,** 115); 20.vi.24, 28.v.36 and other dates, *PH* (BM); (Rothamsted Expt. Station grounds), 21.iv.53, *TRES* (1/**1953-54,** 4); 13 and 15.vii.54, *GGES* (HD).

ESSEX. North Weald, 29.v.49, *RDW* (31a).

KENT. West Wickham, 21.ix.51, *WJW* in *EWG* coll. (24); Darenth Wood, vi, by sweeping, *D&S* (28), (4) and (22); *TRB* (37); near Gravesend, 12.ix.50, *TRES* (13) and (22); Westerham district, 17.vi.51, *DL* (1/**1951-52,** 72) and (22); and just beyond the boundary at Addington (Kent), *KCS* (22) and Ryarsh, *AMM* (22).

SURREY. Wimbledon Common, 25.vi.55, *EWG* (24); Banstead Downs, 22.v.55 (adults) and 5.vii.57 (III and II instar larvae), *EWG* (24); Coulsdon (Happy Valley), 4.vii.54, *EWG* (24) and (EMM **90,** xxxix); Reigate, 29.v.50, ova and adults abundant on *Stachys sylvatica*, *GBR* (1/**1951-52,** 10 and 126-130) and (EMM **87,** 139); 26.v.51, *GBR* in *EWG* coll. (24); Boxhill, 6.vi.26, ova and I instar larvae, *WEC* (BM); 23.vi.28, *JJC* (HD); 27.viii.50, *DL* (1/**1950-51,** 77); Bookham Common, 13.viii.61, two V instar and one III instar larvae, *CPC* (*EWG* pers. comm. 21.viii.61); Esher, *GCC* (37) and (3); Ockham Common, 18.vi.50, apparently swept from *Solanum dulcamara*, *SL* (1/**1950-51,** 70); Weybridge, *TRB* (37) and (3); and just beyond the boundary at Ranmore Common, ova, young larvae and adults, *WHS* (1/**1953-54,** 8); and East Horsley, 7.vii.00, rare, *HJT* (1/**1900,** 16 and 81); *GCC* (1/**1900,** 81); 6.vi.03, a pair and nine more specimens on *Stachys sylvatica*, *HJT;* two in cop. and two separate individuals also taken at same place by *GWK* (1/**1903,** 11); *WW* in *PH* coll. (BM).

BUCKS. Gerrards Cross, feeding on "nettle", *EES* (exhibited 10.xi.48 and reported in 1/**1948-49,** 53); 24.v.53, *WJLeQ* (21); on the boundary at Slough (PILG), 12.v.51, two adults by sweeping; 14.iv.51, a single adult overwintering beneath piece of sacking, *BJS* and *GEW* (31e); v and vi.50, extremely common in groups of 20 or more on small clumps of vegetation ix.50, large groups both adults and larvae, associated with *Stachys sylvatica*, *Urtica dioica* and *Lamium purpureum*, *BJS* and *GEW* (31d); and just beyond the boundary at Amersham, 2.ix.51 (larva) and 20.ix.52 (adult), *WJLeQ* (21).

Eysarcoris aeneus (Scop.) Sp. 32 p. 40
D&S p. 76 S p. 26 B p. 45 (Sp. 19, *Eusarcoris aeneus*)

Very rare. Associated with *Hypericum pulchrum* on damp heaths. Hibernates in the soil or under moss. The main headquarters of this species is in the New Forest.

SURREY. Just outside the boundary at Woking, *GCC* (HD); and at Brookwood, 8.vi.31, a single specimen, *FJC* (1/**1931-32,** 64).

Holocostethus vernalis (Wolff.) Sp. 33 p. 41
D&S p. 82 (*Peribalus vernalis*) S p. 27 (*P. vernalis*)
B p. 46 (Sp. 20, *P. vernalis*)

Very rare. There is a single specimen of this bug in the South London Entom. and N.H. Society's collection, taken by W. J. Ashdown in Darenth Wood, 17.vi.1899 (see Leston, D., EMM **88,** 102). It has not been recorded in the London area since. Intensive search of that wood might still produce the species. Elsewhere in Kent it has recently been taken after an interval of 35 years (Southwood and Leston p. 41) at Church Woods, Blean, 27.v.1950, by sweeping mixed herbage in an oak wood, *AMM* (EMM **86,** 224).

Palomena prasina (Linn.) Sp. 34 p. 41
D&S p. 83 (*Pentatoma dissimile*) S p. 29 (*Pentatoma prasina*)
B p. 51 (Sp. 23)

Common over most of the London area occurring on heaths, commonland, in parks and in woodland clearings. Found on a variety of trees and shrubs including oak, birch, hazel, aspen, lime, etc., and sometimes taken by sweeping along hedgebanks.

MIDDX. Notting Hill, *JAP* (BM).

HERTS. [No records available though it undoubtedly occurs].

ESSEX. Roydon, ix.05, *PH* (BM).

KENT. Bromley, bred from larvae beaten from ivy, *WW* (4); Blackheath, 1901, beating ivy, *WW* (39); Darenth, *JAP* (BM); Swanscombe, 8.vi.63, *KCS* (14); Longfield, v.51, *GGES* (HD); Orpington, *TRB* (37); Otford, 18.ix.55, *KCS* (14); *AMM* (22); Farningham Wood, 23.ix.51, *SL* (1/**1951-52,** 81) and (22); Westerham district, 17.vi.51, *DL* (1/**1951-52,** 72) and (22).

SURREY. Riddlesdown, 20.vi.53, adult by beating scrub oak, 1.viii.53, IV instar larva, *EWG* (24); Banstead Wood, 13.v.51, found under a tree, *DJC* (BM); Reigate (Redstone), *J&TL* (32); Redhill, *J&TL* (37) and (3); Headley Lane, *TRB* (37) and (3); Mickleham Downs, 19.x.47, common, *SL* (1/**1937-38,** 51); 27.viii.50, *DL* (1/**1950-51,** 77); 2.x.55, a single ♀ *EWG* (24); Norbury Park, 19.vii.52, V instar larvae, *EWG* (24); Ashtead Woods, 14.ix.47, *SL* (1/**1947-48,** 71); 12.v.51, *SL* (1/**1951-52,** 69); Book-

ham Common, adults taken 4.v.52, *DL;* 9.vii.53, 4.x.53 and 14.x.56, *EWG* (24); 15.viii.53, V instar larvae swept from thistles, *SL* (1/**1953-54,** 89), 16.viii.53, 27.viii.55 and 26.ix.55, all V instar, *EWG* (24); IV instar larvae taken between 9.viii and 26.ix.1953-55, *EWG* (24); III instar larvae taken between 10.vii. and 16.viii.1953-56, *EWG* (24); and II instar larvae taken between 10.vii. and 13.ix.1953-56, *EWG* (24); Gt. Bookham (Church Rd.), 8.ix.56, V instar larva, *EWG* (24); Oxshott, 5.v.51, *WJW* in *EWG* coll. (24); Esher Common, 2.ix.50, *DL* (1/**1950-51,** 79); and on the boundary at Ranmore Common, 15.x.50, *SL* (1/**1950-51,** 82); and in the Effingham district, 2.iv.49, in dark winter colouration, *SL* (1/**1949-50,** 70).

BUCKS. On the boundary at Slough (PILG), 17.viii.51, several larvae on nettles, *BJS* and *GEW* (31c); and just beyond at Amersham, 18.xi.50, *WJLeQ* (21) and Burnham Beeches, viii.50, taken in large numbers on birch, (*BJS* and *GEW* (EMM **86,** 301).

Pitedia juniperina (Linn.) Sp. 35 p. 42

D&S p. 81 (*Pentatoma juniperina*) S p. 28 (*P. juniperina*)
B p. 54 (Sp. 24, *Chlorochroa juniperina*)

The only records for this bug in the London area have been from Surrey but these are old. The loss of many of the sites where its food plant, the juniper, formally grew has probably been responsible for the decline in status of this species.

SURREY. Sanderstead Downs, *AH* (28), (37) and (3); Caterham, *D&S* (37) and (3); Mickleham, *D&S* (37) and (3); mention is made by J. H. P. Sankey (8) of this species occurring on junipers in the Boxhill district but no date is given. Southwood and Leston (p. 42) state that this bug has not been taken in Britain since 1902.

Dolycoris baccarum (Linn.) Sp. 37 p. 43

D&S p. 80 (*Pentatoma baccarum*) S p. 28 (*P. baccarum*)
B p. 49 (Sp. 22)

Frequent. Occurs along the margins and rides of deciduous woods, amongst mixed vegetation. It is almost always taken by sweeping. (Records for Herts. and Essex wanting).

MIDDX. Hampstead Heath (Ken Wood), x.49, on *Rhododendron* possibly predatory on the homopteron *Graphocephala occcinea, DL* (1/**1949-50,** 36-38).

KENT. Bickley, *FBJ* (4) and (22); Darenth Wood, *AMM* (22); and just over the boundary at Ightham (Hope Farm), 28.vii.50, *TRES* (13) and (22); and at Ryarsh nr. Wrotham, *AMM* (22).

SURREY. Shirley, 14.x.51, *WJW* in *EWG* coll. (24); Reigate, *ES* (HD); *TRB* (37); (Redstone), from broom, *J&TL* (32); Reigate Hill, 4.viii.49, sweeping on the Downs, *GBR* (24); Colley Hill district, 13.v.50, *SL* (1/**1950-51,** 57); Headley Lane, 20.ix.50, on flower head of *Heracleum sphondylium, EWG* (24); Boxhill, 27.viii.50, *DL* (1/**1950-51,** 77); 24.vi.51, *DL* (1/**1951-52,** xvi); Bookham Common, viii and ix (larvae), *DL* (34) 16.viii.55, *EWG* (24); Oxshott, *TRB* (37); Weybridge, *JAP* (BM); and just beyond the boundary at Byfleet (Basingstoke Canal bank), 14.v.49, *SL* (1/**1949-50,** 72).

Piezodorus lituratus (Fab.) Sp. 38 p. 44

D&S p. 100 (*P. purpureipennis*) S p. 31
B p. 55 (Sp. 25)

Occasional. Associated with gorse from which the adults are best

taken by beating. They hibernate in the dead spines and debris beneath the bushes or in old seed pods that have fallen close by. Broom is sometimes an alternative host.

MIDDX. Hampstead Heath, v.43 and 12.vi.43, *CHA* (17) and *CHA* in *EWG* coll. (24); two examples of larvae, 30.vii.39 (IV instar) and 31.vi.40 (V instar) were recorded on the Heath as prey to a Sphecid wasp *Astata boops* Schr., *IHY* (2/**1947,** 89) and (BM); Uxbridge, 17.viii.34, 22.iv.35 and 16.ii.36, *DCT* (33a).

HERTS. Two records have been noted just beyond the boundary at Harpenden, *RP* (11) and at Knebworth, adults and ova on birch leaves, *RP* (11) and (27).

ESSEX. Epping Forest, v.1905, *EAB* (BM); (Loughton), v.1905, *EAB* (BM); xi.16, on *Calluna*, not common, *CN* (2/**1917,** 12) and (35a); (nr. Wake Valley ponds), v, on furze bushes, *CN* (35a).

KENT. Brockley, *WW* (4) and (22); Plumstead, *WW* (4) and (22); Abbey Wood, *WW* (4) and (22); 16.iv.52, *RGR* (WBM); Blackheath, 1903, by beating furze, *WW* (39); and recorded just beyond the boundary at Wrotham Heath, *AMM* (22); and Ryarsh, *AMM* (22).

SURREY. Wimbledon Common, 8.x.51, *DJC* (BM); Croham Hurst, *JAP* (BM); Shirley, *JAP* (BM); Reigate, *ES* (HD); (Redstone), by beating, *J&TL* (32); Redhill, iv.1870, *WW* (BM); Colley Hill district, 13.v.50, *SL* (1/**1950-51,** 57); Bookham Common, ix, larvae, *DL* (34); Oxshott, 28.ix.-1892, 13.v.1893 and other dates, *AJC* (HD); 5.x.07, on birch, *SL* (1/**1907-08,** 81); Weybridge, 13.v.06, *AJC* (HD); 25.v.47, *TRES* (13); and just beyond the boundary at Chobham, 30.v.06, *AJC* (HD); Byfleet (Basingstoke Canal bank), 14.v.49, *SL* (1/**1949-50,** 72); Send, ix.02, *WJL* (HD); Ash Vale, 14.x.49, on broom, *DL* (1/**1949-50,** 78); Effingham (Barnsthorn Wood), 10.v.52, on gorse, *SW* (1/**1952-53,** 49 and 76).

BUCKS. Just on the boundary at Chalfont St. Peter, 14.vii.25, (IV instar larva), *EAB* (BM).

Pentatoma rufipes (Linn.) Sp. 39 p. 45
D&S p. 98 (*Tropicoris rufipes*) S p. 32 (*T. rufipes*)
B p. 60 (Sp. 26)

Frequent over most of the London area in woods, wooded commons, and sometimes gardens on various deciduous trees especially oak. Adult die off in early autumn, and the larvae of the year overwinter in the II and III instar stages.

MIDDX. S. Kensington, ix.50, *DJC* (BM); (Brompton Rd.), 14.ix.62, at shop window, *DAJ* (BM); Regents Park (London Zoo grounds), 5.ix.51, *LCB* (MM); Scratch Wood, E. of Elstree, 29.viii.54, *FB* (18); Ruislip, 7.viii.44, *CHA* (17); vii.59, *DJC* (BM).

HERTS. Rickmansworth, 1.ix.34, *DCT* (12); and beyond the boundary at Berkhamsted, III instar larvae hibernating in conifer, *DCT* (12).

ESSEX. Epping Forest, 1885-9, *JAW* (23); vi.12, V instar larva partly eaten by *Taeniocampa* (Lep.) larva, *EAB* (BM); 5.vi.15, IV instar larva, *EAB* (BM); (Chingford), vii.1893, *EAB* (BM); on oak, not common, *CN* (35a); (Wake Arms), 2.viii.54, *FB* (18); (Theydon Bois), vii.22, V instar larva, *EAB* (BM).

KENT. Blackheath (Shooter's Hill), 1904, beaten from oak, *WW* (39), (4) and (22); Plumstead, 2.ix.54, *RGR* (WBM); and just beyond the boundary at Ide Hill, *AMM* (22).

SURREY. Putney, 15.ix.20, on path, *HStJKD* (HD); Wimbledon Common, 21.ix.52, *DJC* (BM); Croham Hurst, *JAP* (BM); Banstead

Downs, 16.x.56, *EWG* (24); Reigate, *J&TL* (32); Redhill, *J&TL* (32); Mickleham, *JAP* (BM); 18.vii.46, *LCB* (MM); Norbury Park, 21.vii.57, *DO* (HD); Ranmore Common, 18.vii.57, *DO* (HD); Bookham Common, 11.ix.04, *HStJKD* (HD); 12.viii.42, *LCB* (MM); vii, viii, and ix, *DL* (34); Cobham, 7.x.00, *HStJKD* (HD); and just beyond the boundary at Byfleet, 8.ix.35, numerous on oak, *FJC* (1/**1935-36,** 28); 21.vii.46, *LCB* (MM); (Basingstoke Canal bank), 8.vii.50, a single specimen on oak, *DL* (1/**1950-51,** 73); Woking, *ES* (HD); and Horsley, 22.vi.24, V instar larva, *GVV* (BM).

Eurydema oleracea (Linn.) Sp. 40 p. 46

D&S p. 86 (*Strachia oleracea*) S p. 30 (*S. oleracea*)
B p. 64 (Sp. 28, *Eurydema oleraceum*)

Occasional. Feeds on various cruciferous plants incl. *Alliaria petiolata*, *Armoracia rusticama* and *Rhaphanus raphanistrum*, the adults found on the host plants from mid-May onwards. (Records for Herts. and Essex wanting).

MIDDX. Brentford (Docks), 4.vii.51, single adult probably feeding on *Cardaria draba*, swept from waste ground between sidings; Hounslow Heath, 26.vii.53, a single adult and V instar larva swept from crucifers, *WJLeQ* (21) and (EMM **98,** 303); 14.vii.53, one adult and several larvae on *Sisymbrium officinale*, *GEW* (33c).

KENT. Plumstead, *AAA* (22); Bickley, 13.vii.46, a single specimen in garden, *FRB* (EMM **83,** 61); Otford, *AMM* (22); and just beyond the boundary at Ryarsh, *AMM* (22); and Kingsdown, *ECB* (22).

SURREY. Esher Common, 2.ix.50, *DL* (1/**1950-51,** 79); 24.iv.54, a single specimen, *SL* (1/**1954-55,** 79); Weybridge, 30.vi.63, *PSB* (16); Chobham, vii.1874, V instar larva, *ES* (HD) and (3); and beyond the boundary at Ash Vale, 10.ix.50, a single specimen in rank mixed herbage *DL* (1/**1950-51,** 80); and at Farnham, 10.v.52, *WJLeQ* (21).

BUCKS. Gerrards Cross, *EES* (1/**1953-54,** 7); on the boundary at Slough (PILG), vi.50, four adults on or near *Alliaria petiolata;* viii.50, another adult taken same place, *BJS* and *GEW* (31d); 21.v.51, 23 specimens swept from clumps of *Alliaria petiolata* in the open. None found on same plant growing in the shade, *BJS* and *GEW* (31e); 10.v.52, *WJLeQ* (21); and just beyond at Common Wood, S.W. of Amersham, 10.ix.56, *WJLeQ* (21).

Eurydema dominulus (Scop.) Sp. 41 p. 48

D&S p. 85 (*Strachia ornata*) S p. 30 (*S. festiva*)
B p. 63 (Sp.27)

Rare. This species is associated with *Cardamine pratensis* and other crucifers. The adult hibernates under moss or debris in woods and emerges in May. Massee (22) states that in Kent this shield bug is also attracted to hawthorn blossom.

KENT. Lee, a single specimen, *D&S* (28), (4) and (39); Otford, 21.v.22, *PH* (BM) and (22); 21.v.22, *HStJKD* (HD).

SURREY. Battersea Fields, C. Carey in Hope-Westwood coll. (HD). An old record. This species has not been recorded in Surrey since. It is nowadays mainly confined to Kent and E. Sussex.

Picromerus bidens (Linn.) Sp. 42 p. 48

D&S p. 96 S p. 33 B p. 66 (Sp. 29)

Common and widely spread over the London area. Occurs along hedgebanks, edges of woods, in flowery clearings and amongst vegetation

growing over damp ditches. Also may be beaten from scrub oak and willow. The larvae are phytophagous in the I instar but become predatory on small caterpillats and beetle larvae in the subsequent instars. (More Herts. records required).

MIDDX. Uxbridge, 11.vii.43, common on *Betula* and *Salix*, *DCT* (33a); Hounslow Heath, 16.ix.52, two adults swept from low vegetation at edge of scrub, *GEW* (33b); Ruislip N.R., 24.vii.56 (V instar larva) and 27.vi.55 (IV and III instar larvae), *EWG* (24); [P. W. E. Currie showed me (28.vi.55) a single adult which he had swept earlier from *Salix* on the bombed sites at Cripplegate, City of London. This would certainly be the innermost London record for this species—E. W. G.].

HERTS. The only record available is from just outside the boundary at Berkhamsted Common, ix.33, on *Betula*, *DCT* (12).

ESSEX. Epping Forest, ix.12 and ix.20, *EAB* (BM); (Loughton), *TRB* (37); (Monk Wood), ix, by sweeping, not common, *CN* (35a).

KENT. Otford, 18.ix.55, feeding on small lepidopterous larva, *FB* (18); 18.ix.55, *KCS* (14) and (22); Downe, *WRD* (22).

SURREY. Coombe, ix, *JS* (BM); Wimbledon, *ES* (37) and (3); Croham Hurst, *JAP* (BM); Addington, 28.viii.1881, *FPP* (HD); Riddlesdown, 4.ix.54, dislodged from *Juniperus*, *SW* (1/**1954-55,** 13 and 93); Coulsdon (Devilsden Wood), 4.vii.54, II-IV instar larvae, four examples of which were bred to adult, *EWG* (24), (EMM **92,** 65) and (HD, adult ♀); Banstead Wood, 16.viii.52, *SL* (1/**1952-53,** 85); Reigate, *ES* (HD), (37) and (3); Reigate Hill, by beating, *J&TL* (32); Walton-on-the-Hill, 9.ix.51, *DJC* (BM); Headley Lane, *TRB* (37) and (3); Bookham Common, 29.vii.50, *DL* (1/**1950-51,** 76); vii, viii and ix, *DL* (34); adult ♂♂ and ♀♀ taken from 9.viii-4.x during the period 1953-58; V and IV instar larvae taken on 21.v.55, *EWG* (24); Oxshott Heath, 4.viii.55, *EWG* (24); Esher Common, *JAP* (BM); *TRB* (37) and (3); 2.ix.50, *DL* (1/**1950-51,** 79); 24.vi.52, III instar larva feeding on *Zygaena* larva (Lep.) and subsequently bred to adult, n.c. (BM); 11.x.54, *LP* (EMM **91,** 3); 4.viii.55, *EWG* (24); and 8.ix.56, *SL* (1/**1956,** 86); Weybridge, 14.x.1860, n.c. (BM); *TRB* (37) and (3); and just beyond the boundary at Byfleet, 3.viii.1892, *AJC* (HD); (Basingstoke Canal bank), 23.vii.04, larvae taken and subsequently bred to adult, *WJA* (1/**1904-5,** 35); Chobham, *ES* (37) and (3); 18.x.40, *ECB* (HD); and Woking, viii.1882, *ES* (HD).

BUCKS. On the boundary at Slough (ICBFS[1]), 15.viii.33 and 11 and 12.ix.34 on *Armoracia rusticana* and *Calystegia sepium*, *WHG* (41).

Troilus luridus (Fab.) Sp. 43 p. 48

D&S p. 94 (*Asopus luridus*) S p. 34 (*Podisus luridus*)

B p. 70 (Sp. 31)

Occasional, though widely distributed. Occurs on a number of different deciduous trees and shrubs (and sometimes conifers) in woods and on wooded heaths and commons. Hibernates in moss or bark crevices.

MIDDX. Hampstead Heath, viii.43, *CHA* (17); Northwood, 4.v.43, *PJLR* (20); 9.v.43, *LCB* (MM); Uxbridge and the Colne Valley, 9-20.viii.33, 8.ix.34 and 12.ix.35, common on *Alnus*, *Corylus* and *Fraxinus* in summer; hibernates in *Abies*, *DCT* (33a).

HERTS. West Hyde, 7.ix.34, on *Corylus*, *DCT* (12).

1 Grounds of the former Imperial College Biological Field Station, now the Pest Infestation Laboratory.

ESSEX. Epping Forest, vii.1893 and 8.ix.15 (adults) and 8.ix.15 (III instar larva), *EAB* (BM); (Bell Inn), 12.vii.58, *FB* (18); (Wake Arms), 9.ii.63, in moss, *FB* (18); (Chingford), vii, *CN* (35a); (Monk Wood), ix, *CN* (35a).

KENT. Abbey Wood, 1900, *WW* (39), (4) and (22); Darenth Wood, *JAP* (BM); *GCC* (37), (4) and (22); Southfleet, *AMM* (22); Bromley, *ES* (HD) and (39); Eynsford, 19.viii.33, less numerous, *KGB* (1/**1933-34**, 33); Otford, 18.ix.55, *KCS* (14) and (22); Fawkham, 28.vii.50, *GGES* (HD).

SURREY. Caterham, GCC (37) and (3); Walton Heath, 28.viii.55, last instar cast skin on furze bush, *EWG* (24); Colley Hill district, 13.v.50, *SL* (1/**1950-51,** 57); Mickleham Downs, 7.x.56, *EWG* (24); Headley Lane, *TRB* (37) and (3); Boxhill, *WW*, bred specimen, (1/**1898,** 110); Ranmore, ix.1899, *EAB* (BM) and (3); Leatherhead, 12.viii.25, V instar cast skin on oak, *WEC* (BM); Bookham Common, 20.vi.53 (larva) and 16.viii.53 (IV instar larva), *EWG* (24); adults iv, vi, and ix, *DL* (34); Arbrook Common, 12.xi.54, *LP* in *EWG* coll. (24); Oxshott Heath, 30.vi.51, larvae, *FJC* (1/**1951-52,** 73); Esher Common, 26.iii.23, *WJC* (HD); Chertsey, *TRB* (37) and (3); Weybridge, *TRB* (37) and (3); and just beyond the boundary at Chobham, *WB* (37) and (3); vii.1874, V instar larva, *ES* (HD); Byfleet, 8.ix.35, numerous on oak, *SL* (1/**1935-36,** 28); 18.ix.51, *WJW* in *EWG* coll. (24); Woking, *GCC* (HD) and (3); Horsley, v.27, *GVV* (BM); Gomshall, *EAB* (3); and Albury, *EAB* (3).

BUCKS. Slough, *GEW* (40).

Rhacognathus punctatus (Linn.) Sp. 44 p. 51

D&S p. 92 S p. 35 (*Asopus punctatus*)
B p. 69 (Sp. 30)

Uncommon and local. Found in the damper places on heaths or in woodland clearings where *Sphagnum* moss occurs. (Middx. and Herts. records wanting).

ESSEX. Epping Forest (Loughton), *TRB* (37) and (5).

KENT. Abbey Wood, *WW* (22); Darenth Wood, *GCC* (22).

SURREY. Wimbledon Common, in moss under furze bush, *JS* in *ES* coll. (HD); *ES* (37); *CWD* (3); Croham Hurst, *JAP* (BM); Shirley, *ECR* (28); Mickleham, *GCC* (37) and (3); Headley Lane, *TRB* (37) and (3); Bookham Common, 14.vii.58, V instar larva, *EWG* (24); Oxshott Heath, 15.v.49, *FDB* in *WJLeQ* coll. (21); Esher Common, *JAP* (BM); *GCC* (37) and (3); 2.ix.50, *DL* (1/**1950-51,** 79); 12.vii.52, on *Calluna*, *SL* (1/**1952-53** 84); 4.viii.55, adults and IV and III instar larvae, *EWG* (24); Ockham, 1952, *SW* (1/**1952-53,** 49); Weybridge, *TRB* (37) and (3); 13.v.06, *AJC* (HD); and just over the boundary on Horsell Common, *JAP* (BM); Chobham Common, 1.v.60, *DJC* (BM) and Woking, 3.viii.1889, n.c. (BM); and beyond at Albury, 17.vii.43, *ECB* (HD); Leith Hill, *GCC* (37) and (3); Eashing, 4.vi.60, by River Wey, *SL* (1/**1960,** 83) and Haslemere, *CGB* (3).

BUCKS. Recorded from just on the boundary at Stoke Common, 17.viii.52, *WJLeQ* (12).

Zicrona caerulea (Linn.) Sp. 45 p. 51

D&S p. 88 S p. 36 B p. 73 (Sp. 33)

Occasional and local. This bug occurs on chalky or sandy situations, and feeds on lepidoptera larvae and larvae and adults of certain leaf beetles. It hibernates as an adult under moss.

MIDDX. Harefield, 8.ix.34, one dead specimen under a holly bush, *DCT* (33a); 23.x.43, *PJLR* (MM) and (20).

HERTS. Cuffley Station, 5.v.60, *FB* (18).

ESSEX. Epping Forest (Monk Wood), ix, *CN* (35a).

KENT. Cudham (New Years Wood), 6.v.56, *DJC* (BM); and just beyond the boundary at Leybourne, *WRD* (22).

SURREY. Wimbledon, *FSS* (3); Wimbledon Common, *ES* (37); Banstead, 9.v.54, a pair, *AEG* (1/**1954-55,** 5); (Park Downs), 28.vii.55, *GEW* (EMM **92,** 47); Reigate, sweeping on chalk hills, *J&TL* (32); Mickleham Downs, taken in moss in winter, *JAP* (BM) and (28); *HCC* (HD); *EAN* (3); *EAB* (37); 16.viii.25, *CHS* (BM); ("Hilly Field"), 29.viii.54, *SL* (1/**1954-55,** 92); Headley Lane, *TRB* (37) and (3); Boxhill, 18.x.1892, *AJC* (HD); *JHPS* (9); Leatherhead, 29.viii.45, *CHA* in *EWG* coll. (24); Oxshott, 16.x.1895, *TRB* (1/**1895,** 71); Esher, *EAN* (3); and beyond the boundary at Woking, *GCC* (37) and (3); Horsley, *TRB* (37) and (3); Gomshall, *EAN* (3); viii.1892, *EAB* (BM); Shere, *EAN* (3); and Chilworth, *EAB* (3).

BUCKS. Slough, vii.55, IV instar larva swept from rank herbage, *GEW* (EMM **92,** 47); and beyond the boundary at Wendover (Long Down Hill), somewhat common on juniper, n.c. (26); 7.vi.54, 3 adults, a IV instar larva and a younger instar larva; 2.viii.54, a IV instar larva at same place, *WJLeQ* (21) and (EMM **90,** 303); and at Coombe Hill, 1 and 2.viii.54, two V instar and one IV instar larvae, *WJLeQ* (EMM **90,** 30).

Nezara viridula (Linn.) Foreign species p. 52

A few records of this cosmopolitan bug have been made in the London area, the source of its introduction being imported vegetables and fruit, particularly in that arriving from Italy or the Canary Islands. It is unlikely to establish itself in this country.

MIDDX. i.49, a single specimen found in a lettuce in London that had originated from the S. of France, (BM); ix.53, a single ♂ found in an art gallery, London, W.1. (EMM **90,** 168).

HERTS. Just on the boundary at Harpenden, xii.53, a single ♀ (EMM **90,** 168).

BUCKS. 1951, Iver, a single specimen found in a hospital room, the source of which was probably a bag of imported grapes that had been bought locally (EMM **88,** 19).

COREIDAE (Squash bugs)

There are 10 members of this family occurring in Britain of which 8 have been recorded in the London area.

Gonocerus acuteangulatus (Goeze) Sp. 46 p. 58
D&S p. 114 (*G. venator*) S p. 47 (*G. venator*)
B p. 95 (Sp. 43)

The only known locality in Britain for this species is the Boxhill area of Surrey where it is associated with the box tree. Overwintering adults pair in June and July and the new generation becomes mature from mid-August onwards. It would seem that the bug must leave its host plant at times for in Oct. it has often been found on blossom of ivy growing in the neighbourhood.

SURREY. Boxhill. The earliest record is probably that noted on box in early May by Douglas and Scott (28). Others record the bug

having been taken in iv-vi and viii-x. One record, 12.ix.53, *DL* (1/**1953-54,** 91) specifically mentions that a specimen was beaten from ivy in Headley Lane.

Coreus marginatus (Linn.) Sp. 48 p. 59
D&S p. 110 (*Syromastes marginatus*) S p. 45 (*S. marginatus*)
B p. 91 (Sp. 41, *S. marginatus*)

Occasional. This large bug may be found along margins of woods, in hedgebanks, waste places, damp meadows, etc., wherever docks (*Rumex* spp.) occur; Sheep's sorrel (*Rumex acetosella*) being particularly favoured. The species reaches adult state by Aug. and overwinters at the roots of its host plant. (Herts. records wanting).

MIDDX. Hounslow, 9.vi.54, *EP* (BM); Hounslow Heath, viii-ix.52, larvae and adults, *GEW* (33a); Harefield, 26.viii.51, *WJLeQ* (21).

ESSEX. Beyong the boundary at Benfleet, 24.ix.55, *SL* (1/**1955,** 90).

KENT. Darenth, *JAP* (BM).

SURREY. Lane between Coombe Wood and the Robin Hood, [prior to 1833], abundant in vi and vii, *GS* (29) (mentioned in text under No. 22, fig. 6); Dulwich, vi.51, *CJ* (BM); Bookham Common, 11.v.58 (adult ♀ and I instar larvae), 8.vii.56 (III instar larvae) and 12.viii.56 (II instar larvae), *EWG* (22); ix, adults, *DL* (34); Esher, *JAP* (BM); Weybridge, 25.v.47, *TRES* (13); and beyond the boundary at Chobham, *ES* (HD); 10.vi.1893, *AJC* (HD); Horsell Common, *JAP* (BM); Byfleet, 8.ix.35, *FJC* (1/**1935-36,** 28); Woking, vii.1871, *ES* (HD); ix.19, *EAB* (BM); Ash Vale, 10.ix.50, *DL* (1/**1950-51,** 80); Camberley, 23.viii.47 and 9.v.48, *LCB* (MM); Farnham, 10.v.52, *WJLeQ* (21); Eashing, by River Wey, 4.vi.60, *SL* (1/**1960,** 83); and Horsley (Sheep Leas), 2.vi.56, *SL* (1/**1956,** 76).

BUCKS. On the boundary at Datchet, 6.viii.52, by flooded gravel pit on vegetation-covered soil mound, *GEW* (EMM **88,** 255); Slough (PILG), v.50 (4 adults) and ix.50 (a single adult) all on or near *Rumex;* viii.50 larvae swept in some numbers, *BJS* and *GEW* (31d); 2.vi.51, two adults swept from weed covered air-raid shelter, *GEW* (31f); and beyond at Taplow, 23.vii.52, in disused sand pit associated with *Rumex* sp., *GEW* (EMM **88,** 255).

Syromastes rhombeus (Linn.) Sp. 49 p. 61
D&S p. 116 (*Verlusia rhombea*) S p. 46 (*V. rhombea*)
B p. 94 (Sp. 42, *V. quadrata*)

Occasional and local. This species is found in dry, sandy places and also in well drained chalk pits. Its host plants are said to be species of *Minuartia, Arenaria, Spergularia* and other Caryophyllaceae. Massee (22) says that it is often found where Bladder Campion (*Silene vulgaris*) grows and Woodroffe (33c) has found it frequently associated with *Lychnis.* It overwinters as adult in the soil or near its host plant.

MIDDX. Hounslow Heath, 6.viii.52, a single adult on ground beneath *Calluna;* 5.x.52, three more taken on waste tip, *GEW* (33b); 8.viii.53, three last stage larvae under *Cerastium semidecandrum* on waste tip, *GEW* (33c).

HERTS. Bushey, *JAP* (BM); West Hyde, 30.ix.34, *DCT* (12); and on the boundary at Ayot, 26.xii.24, *PH* (BM).

ESSEX. Has been recorded from beyond the boundary on Canvey Island, 7.v.50, n.c. (6/**10,** 6).

KENT. Abbey Wood, *JAP* (BM); Swanscombe, 27.viii.61, *WRD* (15) and (22); Darenth Wood, *WW* (1/**1907-8,** 62); *GCC* (37), (4) and (22);

Darenth, 24.vii.48, in disused chalk pit, *AMM* (EMM **85,** 23), Birch Wood, *JAP* (BM); Farningham Wood, 22.iv.56, *KCS* (14), (6/**16,** 13) and (22).

SURREY. Croydon, *FPP* (HD); Caterham, *GCC* (37); Boxhill, *JHPS* (9); Claygate, *JAP* (BM); Esher, *GCC* (37); Weybridge, *JAP* (BM); and just beyond the boundary at Ripley, viii.1900, *EAB* (BM); Albury, viii.1899, *EAB* (BM); and Gomshall, viii.1890, *EAB* (BM).

BUCKS. On the boundary at Datchet, 6.viii.52, by flooded gravel pit on vegetation-covered spoil mound, *GEW* (EMM **88,** 255); Slough (PILG) v and vi.50, extremely common usually on nettle but also swept from herbs and grasses; ix.50, single adult seen on the wing; larvae present in large numbers on nettle throughout summer 1950, *BJS* and *GEW* (31d); 2.vi.51, nine adults swept from weed covered air raid shelter, *GEW* (31f); and just beyond at Burnham, n.c. (26); *WES* in *EAB* coll. (BM); 28.xi.01, *PH* (BM); and at Taplow, 23.vii.52 in disused sand pit, on *Trifolium arvense*, *GEW* (EMM **88,** 255).

Spathocera dahlmannii (Schill.) Sp. 50 p. 61
D&S p. 122 (*Spathocera dalmani*) S p. 43
B p. 87 (Sp. 39, *S. dalmani*)

Rare and local. Occurs on acid soils such as on sandy heaths, more especially where its food plant *Rumex acetosella* has regenerated on recently burnt areas. The bug becomes adult in Aug. and overwinters, usually in numbers, on the ground in dead pine needles or at the bases of grass clumps. (Records for Herts., Kent and Bucks. wanting).

MIDDX. Hounslow Heath, 22.ix and 5.x.52, adult and IV instar larva beneath *Rumex acetosella* on charred ground, *GEW* (33b) 26.v.53, one adult in same area, *GEW* (33c).

ESSEX. Epping Forest, 7.x.51, in dead leaves and debris on a rough open piece of ground, *HWF* (EMM **88,** 72).

SURREY. Reigate Heath, x.1893, *ES* (HD); *TRB* (37); Weybridge, viii.1863, under moss on sandy hillock, *D&S* (28) and (37); v.1864, *JAP* (BM), (28) and (37); and beyond the boundary at Byfleet, 31.7.01, *AB* in *AJC* coll. (HD); Chilworth, 26.viii.(♀), 28.viii. (♂) & 6.ix. (♂) 43, *ECB* in *PH* coll. (BM); 2.ix.43, *ECB* (HD); Farley Heath nr. Albury, viii.1896, *EAB* (BM).

Arenocoris falleni (Schill.) Sp. 51 p. 62
D&S p. 124 (*Pseudophlaeus falleni*) S p. 48 (*P. falleni*)
B p. 96 (Sp. 44, *P. falleni*)

Very rare. Only a single capture of this species has been made in the London area and this was probably in the 1880's. Elsewhere in Britain most of the records are from evolved sand dunes in coastal areas, associated with *Erodium* spp.

SURREY. Weybridge (St. George's Hill), *TRB* (37).

Bathysolen nubilus (Fall.) Sp. 53 p. 63
D&S p. 125 (*Pseudophlaeus nubilus*) S p. 49
B p. 98 (Sp. 46)

Rare and local. A species of dry areas covered only sparsely with vegetation. Its host plants are species of *Medicago*, particularly *M. lupulina*. (Records for Middx., Herts. and Surrey wanting).

ESSEX. Purfleet, in a chalk pit, 30.viii.38, a single ♀ under clump of *Erodium*, *DCT* (31b) and (EMM **79,** 199).

KENT. Plumstead, 8.x.52, a single adult beneath a piece of board on open waste ground, *AAA* (EMM **89,** 134) and (22); Swanscombe,

27.viii.61, *WRD* (15) and (22); Darenth, 31.vii.48, *AAA* (BM); 9.iv.49 and 8.vii.50, amongst grass roots in chalk pit, *TRES* (13); 24.vii.49, in disused chalk pit, an adult ♀ and a larva on ground amongst sparse vegetation, *AMM* (EMM **85,** 23); Swanscombe cutting, 1962, *WRD* (15).

Bucks. Slough, 13-19.vi.54, four specimens beneath *Medicago lupulina* on waste ground 1 mile E. of the town, *GEW* (EMM **90,** 239); viii.54, larvae *GEW* (given to and bred by *WJLeQ* to adult) (21).

Ceraleptus lividus (Stein.) Sp. 54 p. 63

D&S p. 127 (*C. squalidus*) S p. 50

B p. 98 (Sp. 47)

Rare and local. Occurs in chalk, gravel and sand pits, associated with *Trifolium pratense*, *T. arvense* and *T. campestre*, and possibly other *Papilionaceae*. Hibernates in moss or under bark in Oct. though it may become active on the occasional warm day throughout the winter. (More records from all counties required).

Middx. Harefield, 15.ix.52, in old gravel pit, two adults and one last instar larva at roots of *Trifolium campestre*, *BJS* and *GEW* (EMM **89,** 11).

Essex. Has been taken beyond the boundary at Writtle nr. Chelmsford, 7.x.45 on reeds in a gravel pit, *WJLeQ* (21).

Kent. Darenth, associated with *Medicago lupulina*, *AMM* (22); Farningham Wood, 4.xi.62 and 24.iv.63, *KCS* (14); and just beyond the boundary at Trottiscliffe, *KCS* (22).

Surrey. All records so far available are from just outside the boundary, at Chobham, by sweeping, *TRB* (37); Woking, 4.ix.06, *HStJKD* (HD); Ash Vale, 10.ix.50, a single specimen found in late evening beneath *Calluna*, *DL* (1/**1950-51,** 80); Guildford, 23.vi.46, *LCB* (MM); and at Gomshall, 25.viii.52, in sand pit by railway station, five adults and one last instar larva beneath *Trifolium arvense*, *BJS* and *GEW* (EMM **89,** 11).

Bucks. On the boundary at Slough (PILG), 2.vi.51, a single specimen swept from grassy top of old air-raid shelter, *GEW* (31f); 19.x.51, another specimen at roots of grass in same place, *BJS* (EMM **89,** 11); and beyond at Taplow, 21.viii.52, 3 adults in old sand pit, *BJS* and *GEW* (EMM **89,** 11).

Coriomerus denticulatus (Scop.) Sp. 55 p. 64

D&S p. 118 (*Coreus hirticornis*) S p. 51 (*Coreus denticulatus*)

B p. 99 (Sp. 48)

Occasional (though sometimes locally frequent) and widely distributed. It occurs in sand and gravel pits chalk cuttings and chalk pits, chalk grassland and sometimes on rubbish tips. It is associated with *Medicago lupulina*, *Trifolium arvense*, and *Melilotus* spp. The bug becomes mature by Aug. and overwinters in the adult state in moss or in the soil. (Essex records wanting).

Middx. Lampton, 8.v.44, *HStJKD* (HD); 10.iv.49, *HStJKD* (BM); Edgeware, 13.vi.50, *CHA* in *EWG* coll. (24); Hounslow Heath, 13.viii.52, a single adult beneath *Medicago lupulina*, and 5.x.52, 4 adults overwintering on grass tufts, *GEW* (33b); Harefield chalk pit, 16.viii.33, a single adult in grass, and 14.vi.36, a single ♀ ŏvipositing on *Hieracium* leaves, *DCT* (33a); 15.ix.52, in old gravel pit, a single adult at roots of *Trifolium campestre*, *BJS* and *GEW* (EMM **89,** 11).

Herts. Bushey, *JAP* (BM); West Hyde, 12.v.34, *DCT* (12); St. Albans, 8.ix.36, *DCT* (12); and just beyond the boundary at Boxmoor by Hemel Hempstead, 17.vi.34, *DCT* (12); and Harpenden, 15.ix.39, n.c. in *PH* coll. (BM).

KENT. Lee (Burnt Ash Lane), 1900, sweeping meadows, *WW* (39) and (4); Plumstead, *GCC* (37), (4), (39) and (22); Eltham, in moss on ground, *D&S* (28), (4) and (22); Erith, 29.vii.51, larva, *WJW* in *EWG* coll. (24); Bexley, [prior to the 1830's], in large sand pit, *GS* (29); Darenth, on thistle, *D&S* (28), (4) and (22); *GCC* (37); 8.vii.50, in chalk cutting, II-V instar larvae amongst grass and *Medicago lupulina* roots, *TRES* (13) and (EMM **87,** 172-3); Northfleet, vii.46, on parth, *TRES* (13); Swanscombe, 27.vii.61, *WRD* (15) and (22); 8.vi.63, *KCS* (14); Farningham Wood, 5.vi.58, *KCS* (14) and (22).

SURREY. Caterham, *GCC* (37); Reigate (Redstone fields), *J&TL* (32); (S. slopes of Downs along "Pilgrim's Way"), 11.viii.1898, *WW* (1/**1898**, 105); Boxhill, *JAP* (BM); Oxshott, *TRB* (37); Weybridge, viii, by sweeping grass, *D&S* (28); and beyond the boundary at Woking, *ECR* (37); Abinger, viii.1899, *EAB* (BM); 14.vii.43, *ECB* (HD) Gomshall, 25.viii.52, in sand pit by railway station, 3 adults and 3 larvae beneath *Trifolium arvense*, *BJS* and *GEW* (EMM **89,** 11); Albury, viii.1899, *EAB* (BM); and at Thursley, 29.vi.48, *LCB* (MM).

BUCKS. On the boundary at Slough (PILG), vi.50, two adults taken, one in flight, the other at roots of *Stellaria media*, *BJS* and *GEW* (31d) 2.vi.51, eleven adults swept from weed covered air raid shelter, *GEW* (31f); Datchet, 6.viii.52, on vegetation-covered spoil mound by a flooded gravel pit, adults and larvae beneath patches of *Medicago lupulina*, *GEW* (EMM **88,** 255); and beyond at Little Chalfont, 1.iii.53, *WJLeQ* (21); Burnham, 18.iv.01, *PH* (BM); n.c. (26); Booker nr. High Wycombe, 3.v.51, flying over chalk grassland "in such number that it was impossible to count those that entered the net", *GEW* (31f); and at Taplow, in a disused sand pit, 23 and 30.vii.52, over 30 adults and several hundred last instar larvae and many younger stages, on an area dominated by *Trifolium arvense*, *GEW* (EMM **88,** 255); 21.viii.52, in same sand pit, adults and larvae associated with same host plant, *BJS* and *GEW* (EMM **89,** 11).

ALYDIDAE

Only a single representative of this family is found in the British Isles, of which several records have been made in the London area.

Alydus calcaratus (Linn.) Sp. 56 p. 65
D&S p. 143 S p. 52 B p. 100 (Sp 49)

Locally frequent. The larvae of this bug are found in nests of the wood ant and other species, which they closely resemble. The species favour dry sandy heaths, and those in western Surrey have been a classic locality for it for many years. The adults are found from July onwards and on warm days may be seen running about on bare patches or swiftly flying short distances when alarmed.

MIDDX. Hounslow Heath, 6.viii.52, two adults running on bare ground amonst *Calluna*, *GEW* (33b).

ESSEX. Purfleet, *TAM* (37).

KENT. Plumstead Common, viii and ix, amongst heath, *G&S* (28), (4) and (22); Swanscombe, 27.viii.61, *WRD* (15); *HKK* (22); Farningham Wood, 4.xi.62, *KCS* (14); and just beyond the boundary at Wrotham Heath, *AMM* (22).

SURREY. Esher, *JAP* (BM); *GCC* (37); Weybridge, ix, on *Ulex minor*, *D&S* (28); *JAP* (BM); *GCC* (37); 10.vii (very abundant) and 18.vii.12, in association with the ants *Formica sanguinea*, *F. rufa*, *F. fusca*,

and *Lasius flavus;* 15.vii.19, in association with *Lasius niger;* 11.viii.20 in association with *Formica rufa*, *HStJKD* (10); and beyond the boundary at Chobham, ix.1882, *EAB* (BM); 16.v.1886, *AJC* (HD); Woking, 29.v.06 and 12.vi.14 (larva), in association with *Formica sanguinea*, *HStJKD* (10); viii.28, *JJC* (HD); Ash Vale, 10.ix.50, swept from scrubby grass on sand, *DL* (1/**1950-51,** 80); 8.ix.50, *WJLeQ* (21); Abinger, viii.1900, n.c. (BM); Ewhurst, viii.1889, *EAB* (BM); and Chilworth, viii.1886, *EAB* (BM).

Rhopalidae

Eight native species and two aliens of this family are known in Britain, of which six native and one alien species have been recorded in the London area.

Stictopleurus punctatonervosus (Goeze.) Sp. 58 p. 68

D&S p. 131 (*Corizus crassicornis*) S p. 56 (*C. crassicornis*)
B p. 109 (Sp. 54, *C. crassicornis*)

Rare. Inland this species is a bug of sandy heaths feeding mainly on seeds of flowers belonging to the family *Compositae*. There have been no recent records from the London area.

Surrey. Reigate, *ES* (37); and just beyond the boundary at Chobham, *ES* (37).

Aeschyntelus maculatus (Fieb.) Sp. 59 p. 68

D&S p. 133 (*Corizus maculatus*) S p. 57 (*C. maculatus*)
B p. 110 (Sp. 55, *C. maculatus*)

Rare. Occurs on damper heaths and marshy ground where its host plants *Potentilla palustris* and *Cirsium palustre* are to be found. It hibernates as adult at the bases of grass clumps. Records in the London area at present available, are from Surrey only.

Surrey. Bookham Common, adults taken by sweeping, vii, ix, x and xi (the 14th of the month being the latest date) and larvae (various instars) from vii (at end of month)—early x, during the period 1953-58, *EWG* (22); vii, *DL* (34); and just beyond the boundary on Cobham Common, vi.1876, *ES* (HD) and (37); 31.v.63, *WJLeQ* (21); Woking, 17.viii.1837, *JJW* in *JJC* coll. (HD); Camberley, 19.x.19, *EEG* (BM) and (1/**1919-20,** 82); and at Ewhurst, *ES* (37).

Rhopalus parumpunctatus (Schill.) Sp. 60 p. 69

D&S p. 135 (*Corizus parumpunctatus*) S p. 58 (*C. parumpunctatus*)
B p. 112 (Sp. 57, *C. parumpunctatus*)

Occasional. Locally distributed usually on dry sandy areas on heaths and commons. It appears to have several host plants including *Hypericum* spp., *Geranium* spp., *Cerastium vulgatum* and the grass *Dactylis glomerata*. (Middx., Herts., and Essex records wanting).

Kent. Blackheath (Shooter's Hill), 1898, a single secimen on *Senecio jacobea*, *WW* (39); Abbey Wood, *WW* (4) and (22).

Surrey. Caterham, *GCC* (37); Reigate, *ES* (37); Mickleham, *GCC* (37); Bookham Common, viii, *DL* (34); Esher, *GCC* (37); *HStJKD* (BM); Weybridge, ix, under leaves of herbacous plants, *D&S* (28); *JAP* (BM); *GCC* (37); and beyond the boundary at Chobham, viii.1895, *ES* (HD); Woking, ix.02, *ES* (HD); *GCC* (HD); Ripley, viii.1900, *EAB* (BM); Byfleet, 27.vii.1899 and 31.vii.01, *AB* (HD) Ash Vale, 4.ix.49, *DL* (1/**1949-50,** 17); and at Guildford, 18.viii.43, ♂, *ECB* in *EWG* coll. (24).

Bucks. Slough, *GEW* (40); and beyond the boundary at Burnham, n.c. (26); Chesham, n.c. (26); and Taplow, 23.vii.52, in disused sand pit associated with *Trifolium arvense*, *GEW* (EMM **88,** 255).

Rhopalus rufus (Schill.) Sp. 61 p. 70
B p. 112 (Sp. 57a)

Said in Southwood and Leston's book to be common on the heaths of Surrey, but this is not borne out by available records. The host plants are as yet unknown.

SURREY. None at present available from within the boundary but from beyond it has been taken at Ripley, viii.1900 *EAB* (BM); Ash Vale, 8.ix.51, *WJLeQ* (21); and at Farnham, 10.v.52, *WJLeQ* (21).

BUCKS. Has been recorded just outside the boundary at Burnham, 13.iv.02, *H* (BM).

Rhopalus subrufus (Gmel.) Sp. 62 p. 70
D&S p. 133 (*Corizus capitatus*) S p. 58 (*C. capitatus*)
B p. 111 (Sp. 56, *C. subrufus*)

Occasional, though more widely distributed than *R. parumpunctatus*. Usually found at margins and in open clearings of woodland on various soils where the vegetation is lush and its host plant, *Hypericum perforatum* is present. It overwinters in the adult state. (Records for Middx., Herts. and Essex wanting).

KENT. Dartford, *AMM* (22); Darenth Wood, *JAP* (BM); 21.viii.04, by sweeping *Hypericum perforatum*, rare, *WW* (1/**1904-5,** 75); Downe (Darwin's Bank), 15.ix.62, *KCS* (14); Bean, 25.ix.55, *KCS* (14); Westerham district, 17.vi.51, *SL* (1/**1951-52,** 72) and (22); and just over the boundary at Wrotham, 22.iv.47, amongst roots of plants, *TRES* (13) and (22).

SURREY. Addington, 6.x.62, *SL* (1/**1962,** 104); Chipstead valley, 16.vii.52, common on *Teucrium botrys*, *SL* (1/**1952-53,** 85); Reigate district, *J&TL* (32); Reigate, *ES* (HD); Mickleham, ix, by sweeping *ECR* (28); *JAP* (BM); Boxhill, 27.vii.50, *DL* (1/**1950-51,** 77); Epsom Common, 6.ix.53, *EWG* (24) Bookham Common, 16.viii.53, 16.viii.55, and 13.ix.53, *EWG* (24); viii, *DL* (34); Oxshott, 26.v.51, *WJW* in *EWG* coll. (24); and just beyond the boundary at Woking, ix.02, *ES* (HD); Byfleet, ix.13 (II instar larva), *EAB* (BM); Gomshall, *GCC* (HD); and Abinger, viii.1899, *EAB* (BM).

BUCKS. On the boundary at Slough (PILG), 4.x.50, on *Betula*, *BJS* and *GEW* (31e); 2.vi.51, five adults swept from weed covered air-raid shelter, *GEW* (31f); and beyond at Booker nr. High Wycombe, 3.vi.51, frequent on vegetation at margins of beechwoods, *GEW* (31f).

Liorrhyssus hyalinus (Fab.) Foreign species p. 75
B p. 114 (Sp. 58, *Corizus hyalinus*)

The British Isles is beyond the northern limit of this bug's European distribution but at infrequent intervals a particular year may be suitable for widespread migration to take place, when a few may reach this country The last year that such a migration took place was in 1958 when a single specimen was recorded in the London area.

KENT. Blackheath, 14.ix.58, one specimen in a garden, *AAA* (22).

Myrmus miriformis (Fall.) Sp. 63 p. 70
D&S p. 137 S p. 59 B p. 115 (Sp. 59)

Common and widely distributed in open grassland on heaths, commons and in meadows. It feeds on many different species of grass both on the unripe seeds and on the leaves. This bug exhibits two forms of wing development; the brachypterous (where the forewings are reduced, reaching only to about the 5th abdominal segment) and macropterous (where the wings are fully developed). The ♂♂ also have two colour

forms, brown and green; the ♀♀ are always green. The species overwinters in the egg state; these having been laid from July to Sept.

MIDDX. Hampstead Heath, 1949, both macropterous and brachypterous forms, *DL* (1/**1949-50,** 36-38); Finchley, vii.44, *CHA* (17); Scratch Wood, 26.vii.60, *DL* (HD); Hounslow Heath, 1952, widely distributed on grassy areas, *GEW* (33b); Ruislip N.R., 24.vii.56 (♀), 29.vii.55 (several ♂♂ (brown and green forms)) and 2 ♂♂ (one gravid with eggs, the other having just laid them), 1.ix.55 and 19.ix.56 ♀♀ only; 18.vi.57 (V, IV, and III instar larvae) and 26.vi.55 (III instar larva), *EWG* (24); Ruislip Woods, 7.viii.35, a single ♂ on *Melampyrum*, *DCT* (33a); Harefield, 16.viii.33, a single ♀ in long grass, *DCT* (33a).

HERTS. Bushey, 4.viii.44, *CHA* (17); Chorley Wood, 16.vii.16, *EAB* (BM); and beyond the boundary at Harpenden, 12.vi.55, *GGES* (HD).

ESSEX. Epping Forest, 13.ix.12 and 10.ix.14, *EAB* (BM); (Chingford), x.1891, *EAB* (BM); (Strawberry Hill), larvae only by sweeping, not common, *CN* (35a).

KENT. Brockley, *WW* (39); Lewisham, *WW* (39); Kidbrook, *WW* (4), (39) and (22); Plumstead, *WW* (39); Blackheath, *AAA* (22); Dartford Brent, *D&S* (28), (4) and (22); Swanscombe, 17.vii.62, both green and brown forms, *WRD* (15) and (22); Otford, *AMM* (22); Downe (Darwin's Bank), 15.ix.62, *KCS* (14); Eynsford, 15.viii.37, *SL* (1/**1937-38,** 50); and Westerham, vii.22 (macropterous), *PH* (BM).

SURREY. Banstead Downs, 5.vii.57, ♂ and ♀, *EWG* (24); Bookham Common, 29.vii.50, brachypterous form only, abundant, *DL* (1/**1950-51,** 76); 8.vii.56, 10.viii.58, 13.ix.53 and 4.x.53 all ♂♂ on these dates, 9.viii.58 ♂♂ ♀♀, 14.vi.53 (III instar larvae) and 10.vii.55 (V instar larvae), *EWG* (24); Ashtead Common, 20.vii.46, *FJC* (1/**1946-47,** 74); Weybridge, vii, by sweeping grass, *D&S* (28); macropterous and brachypterous forms, *JAP* (BM); and just beyond the boundary at Chobham, vi and viii.1891, vii.1892 and other dates, *ES* (HD); Byfleet, 19.vi.15, *EAB* (BM); Wisley, *GCC* (BM); Ash Vale, 4.ix.49, a "micropterous" pair, *DL* (1/**1949-50,** 78).

BUCKS. Slough (PILG), *WHG* per *GEW* (40); *GEW* (40); Stoke Common, 5.ix.53, *WJLeQ* (21); and just beyond the boundary at Chalfont St. Peter, 14.vii.25, *EAB* (BM); Amersham, 22.ix.56, *WJLeQ* (21); and Burnham Beeches, 22.vi.12 (III instar larva), *EAB* (BM).

STENOCEPHALIDAE (Spurge bugs)

There are two species on the British list that belong to this family, one of which has been recorded in the London area.

Dicranocephalus medius (Muls. and Rey.) Sp. 67 p. 74
B p. 106 (Sp. 51, *Stenocephalus medius*)

Rare. This bug occurs in woodland clearings on its host plants, *Euphorbia amygdaloides* and *E. esula*. It overwinters as an adult either under bark or on the ground beneath plant debris.

KENT. Erith, 1905, a single specimen, *WW* (39); Darenth Wood, *GCC* (4) and (22); *JAP* (BM) and (EMM **47,** 134); 4.viii.21, *PH* (BM).

SURREY. Reigate (Redstone), under stones, *J&TL* (32); Redhill, *J&TL* (37).

BUCKS. Just beyond the boundary at Burnham, 22.vi.01, *PH* (BM) and (26); 9.v.48, in a wood 1 mile N.W. of village, a pair in cop. taken by sweeping in clearing, *DL* (31a); Latimer, 3.iii.51, *WJLeQ* (21); and at Maidenhead, viii.1893, *EAB* (BM).

(End of Part I)

Distribution of the Stag Beetle in Britain

By D. G. Hall

A FIRST report on the survey of the stag beetle, *Lucanus cervus* (L.) (*Lond. Nat.*, **40**, 80-82, 1961) dealt with the distribution of this insect in the London area. As explained in that report, the information was obtained from as wide a public as possible. Scattered throughout the correspondence that accumulated were records from outside the London area, and with the aid of records already published it is now considered possible to formulate some opinion as to the distribution of the beetle throughout England and Wales.

In the previous report, mention was made of an article on the distribution of *Lucanus cervus* in Britain by H. St. J. K. Donisthorpe (*Ent. mon. Mag.*, **77**, 198-9, 1941). In this paper, Donisthorpe listed a number of records that were known to him and which he had found in the literature. These have been incorporated in the present paper in order to give as comprehensive a picture as possible of the distribution. Another valuable source is the list of specimens in the Hope Department of Entomology, Oxford University, compiled in 1941 by E. Taylor (*E.M.M.*, **77**).

In the list given below, only the most recent record for any particular locality has been mentioned. In some cases there have been very long intervals between the records. For instance, according to the literature, the stag beetle was last recorded in Woking in 1902 and might perhaps have been supposed to be extinct there, but Mr. K. G. Smith sent in a record of its occurring there again in 1949.

Before setting the records out, mention should be made of the distribution as set out in Fowler's *Coleoptera of the British Isles* Vol. **4.** In this work, published in 1890, Canon Fowler describes the stag beetle as generally distributed and common throughout Kent and Surrey and not uncommon in other southern counties; Arundel; New Forest; Southampton; Havant and Devon. He also states that it occurs in Essex, Berks, Suffolk etc.; rare in the Midlands and mentions only Bewdley and Calke (one record from each).

The records of the localities from which the beetle has been reported have been listed under Vice-counties for easy reference.

Localities in which the Stag Beetle has been Reported

Vice-county 2—East Cornwall

Between Polperro and Par 1954. The exact place and date were not noted—the insect flew into a moving car. (Monica Brown, *E.M.M.*, **91,** 1955).

Vice-county 3—South Devon

Buckland Monachorum, near Yelverton, Plymouth 1961 (F.W. Jeffery). In correspondence Mr. Jeffery told me that it is seen regularly but at intervals of three or four years. Mr. Ashe wrote a note concerning an earlier capture of the insect by Mr. Jeffery at Buckland Monachorum in 1954 (G. H. Ashe, *E.M.M.*, **91,** 1955).

Vice-county 6—North Somerset

Castle Cary (Macmillan in T. Bainbrigge Fletcher, *E.M.M.*, **77,** 1941).

Vice-county 8—South Wiltshire

Salisbury 1954 (R. T. Thompson). Specimen is in my collection.

Vice-county 9—Dorset

Parkstone and West Howe, near Poole 1960 (B. L. J. Byerley and A. W. Evans).

Vice-county 11—South Hants.

Beaulieu Abbey 1954 (R. T. Thompson) specimen in my collection, Burley 1960 (P. J. Gent), Calmore, near Totton 1935 (Calmoor (*sic*), M. Worner in R. R. U. Kauffman, *E.M.M.*, **78**, 1942), Gosport 1960 (G. H. Room), Hamble 1936 (G. W. R. Bartindale), Lymington 1920 (H. P. Jones, *Entomologist*, 1920) and Southampton 1938 (E. K. Worner in R. R. U. Kauffman, *E.M.M.*, **78**, 1942).

Vice-county 12—North Hants.

Baughurst and Tadley 1960 (F. G. Berry) and Winchester 1948 (E. A. Sadler).

Baughurst and Tadley are villages six miles north-west of Basingstoke.

Vice-county 13—West Sussex

Bramber and Henfield 1918 (G. B. Ryle, *E.M.M.*, **54**, 1918), Chichester 1962 (Miss M. Perowne), Lancing College 1960 (N. Hopkins and P. Roper), Midhurst 1956 (E. A. Sadler), Shoreham 1960 (L. Christie), Sompting 1945 (P. Morris per K. G. Smith), Steyning 1960 (Miss E. M. C. Isherwood) and Worthing 1917 (H. Donisthorpe in E. Taylor, *E.M.M.*, **77**).

Miss Perowne has records from within the city walls of Chichester going back to 1922. She adds that in 1951 several were seen round the cathedral.

Vice-county 15—East Kent

Isle of Sheppey. Cdr. J. J. Walker records it as very scarce and taken singly at long intervals in his *Coleoptera of Sheppey*, 1932. There is a specimen from the Isle of Sheppey in the Hope Department of Entomology (E. Taylor, *E.M.M.*, **77**).

Vice-county 16—West Kent

Birling 1958 (Dr. A. M. Massee per K. C. Side), Ditton 1961 (L. S. Beaufoy) and Eccles 1962 (C. R. Chatfield)—all villages near Maidstone—Gravesend 1961 (H. A. Sandford), Rochester 1900 (J. J. Walker, Coleoptera of Rochester District in *Rochester Naturalist*, 1897-1900) and Stone, Dartford 1957 (K. C. Side).

Since the first report was published additional information has been received from correspondents concerning the distribution of the beetle within the London area as follows: Bromley 1963 (J. Cooper). (See Vice-county 17 for more London records).

Vice-county 17—Surrey

Bagshot Heath 1962 (K. G. Smith), Brockham 1954 (A. W. Jones), Brookwood 1945 (E. A. J. Duffey, *E.M.M.*, **81**, 1945), Chiddingfold 1890 (H. Donisthorpe in E. Taylor, *E.M.M.*, **77**), Eashing (D. G. Hall), Godalming 1905 (Chitty coll. in E. Taylor, *E.M.M.*, **77**), Guildford 1963 (K. G. Smith), Horsley 1959 (S. G. L. Cole), Merrow 1947 and Woking 1949 (Infestation Control Laboratory, Ministry of Agriculture, Fisheries and Food per K. G. Smith), Ranmore 1911 (S. R. Ashby per C. MacKechnie Jarvis), and Wisley 1962 (F. Brown and D. Keen).

Messrs. Brown and Keen reported that while on a cycle run to Wisley

on July 1 1962, they found a short stretch of country lane where there were a large number of crushed remains of stag beetles. At one point there were about seven beetles in twenty yards and at another at least twelve in fifty yards.

Additional London area records are as follows: Ashtead 1963 (R. A. Davis per K. G. Smith), Barnes 1963 (Miss G. C. Williams per K. G. Smith), Battersea 1961 (D. G. Hall), Beddington 1962 (M. J. Smart), Chessington 1962 (Mrs. J. Parr), Claygate 1959 and East Molesey 1961 (F. Brown and D. Keen), Esher 1963 (Dr. G. Beven), Fetcham 1963 (K. G. Smith), Kingston 1963 (J. D. Taylor per K. G. Smith), Lambeth 1963 (K. G. Smith), New Malden (F. Brown and D. Keen), Thornton Heath 1963 (R. Kettle), Wandsworth 1962 (W. G. Teagle) and Wandsworth Common 1959 (D. G. Hall).

The specimen from Lambeth was a male found squashed near an entrance to a factory near Vauxhall Park. It was collected by Mr. E. C. Slattory and sent to the Infestation Control Laboratory, Tolworth.

Vice-county 18—South Essex

Harold Wood 1961 (A. B. Warren), Ilford 1963 (Miss D. E. Woods) and Leyton 1963 (K. Burgess). This last locality is at the southerly tip of Epping Forest.

Vice-county 19—North Essex

Great Leighs Rectory (A. Clark in E. Taylor, *E.M.M.*, **77**).

The Colchester Royal Grammar School Field Club has been carrying out a general survey of the stag beetle in North-east Essex, and in 1963 the members recorded no fewer than 245 individuals of the species from the following localities: Boxted, Bradfield, Brightlingsea, Bures, Coggeshall, Colchester, Dedham, Great Bentley, Halstead, Layer Breton, Layer de la Haye, Mersea Island (East and West), Peldon, Salcot, Witham and Wivenhoe. In 1962 it was recorded additionally from Braintree, Clacton, Fingringhoe, Lawford and Stanway.

The members of this club report that they have covered every parish in North-east Essex—an area of some 400 square miles. They are to be congratulated on their achievement.

It is interesting to note that H. M. Edelsten (1942) recorded a larva from Lawford in 1922 (*E.M.M.*, **78**).

Vice-county 22—Berks.

Bray 1960 (R. W. Elsey), Brightwell 1953 (P. Osborne, *E.M.M.*, **91**, 1955), Cookham 1960 (H. Jones), Maidenhead 1959 (W. J. Eeles), Reading (F. G. Berry), Tidmarsh, near Pangbourne 1941 (E. Taylor, *E.M.M.*, **77**), Tilehurst, near Reading 1918 (T. W. Marshall in E. Taylor, *E.M.M.*, **77**), Sunninghill 1953 (P. F. Prevett) and Windsor Forest 1939 (H. Donisthorpe, *E.M.M.*, **77**).

Vice-county 23—Oxford

Henley 1962 (W. J. Eeles and M. J. Smart), Swyncombe Down 1959 (S. G. L. Cole), Whitchurch 1959 (D. Leatherdale, *E.M.M.*, **95**, 1959). In this note Leatherdale refers to earlier published records for Oxfordshire which included Henley and Ewelme but no details were given.

Vice-county 24—Bucks.

Marlow 1934 (H. M. Edelsten, *E.M.M.*, **78**, 1942) and East of Slough (H. Donisthorpe, *E.M.M.*, **77**).

Vice-county 25—East Suffolk

Woolverstone, near Ipswich 1962 (Miss G. E. Churley) and Woodbridge 1925 (C. MacKechnie Jarvis).

Miss Churley reported that while clearing away rotted remains of an old beech stump at her home in Woolverstone about the middle of March, 1962, about twenty stag beetles were displaced, both male and female. She further reported that the insect had occurred at Woolverstone for very many years.

Vice-county 29—Cambridge

Recorded for the County by Bloomfield in Donisthorpe, *E.M.M.*, **77**, 1941.

Vice-county 33—East Gloucester

Birdlip 1912 (Rev. G. M. Smith in T. Bainbrigge Fletcher, *E.M.M.*, **77**, 1941) and Cheltenham College 1890 (Burkill, *E.M.M.*, **77**, 1941).

Vice-county 34—West Gloucester

The only records for this vice-county I have traced are set out in T. Bainbrigge Fletcher, *E.M.M.*, **77**, 1941. He gives Apperley, 5 miles South-west of Tewkesbury 1937 (Dr. O. H. Wild), the district between Bromsberrow and Redmarley d'Abitot on the Worcestershire and Gloucestershire border (Mr. Allsop) and Newnham (E. W. Morse).

Vice-county 37—Worcester

Bewdley, near Kidderminster (Fowler, *Coleoptera of the British Isles*, **4**, 1890).

Vice-county 38—Warwick

Warwick (Willoughby Ellis in H. Donisthorpe, *E.M.M.*, **77**, 1941).

Vice-county 40—Salop

Church Stretton 1938 (Burkill, *E.M.M.*, **77**, 1941).

Vice-county 51—Flint

Prestatyn 1941 (E. Lewis). Mr. Lewis reported that he knew someone who saw five in 1941.

Vice-county 53—South Lincoln

Boston (Billups in Fowler, *Coleoptera of the British Isles*, **6**, 269, 1913).

Vice-county 57—Derby

Calke, near Derby (Garneys in Fowler, *Coleoptera of the British Isles*, **4**, 1890).

Vice-county 70—Cumberland

Keswick 1960 (E. C. Wilson). Mr. Wilson, who is not an entomologist, reported that one evening during the week ending May 21, 1960 (probably on Thursday, May 19) a male stag beetle entered the bathroom window at his home in Keswick at approximately 11.30 p.m., attracted no doubt by the light. As this is the most northerly record received, the nearest record for the same year being as far south as Reading, further details were requested. He replied by saying that the beetle observed was close on 2″ in overall length (i.e. including antlers) and a not very glossy beech-brown colour. He added that when touched, the beetle reared up and that he did not kill it but put it out of the window. He admitted he was not an entomologist but after looking at a copy of Linssen's *Beetles of the British Isles*, he wrote back to say he was completely satisfied that the beetle was a *Lucanus cervus* but was more brown in colour than

suggested in the description. He made countless enquiries among farmers and other town and country dwelling friends but failed to find anyone with any recollection of seeing or even hearing of the presence of any of these "curious" beetles. The fact that Mr. Wilson referred to the beech brown colour of the insect at the outset inclines me to believe this is an authentic record. *Dorcus parallelopipedus* (L.), with which it could be confused, is also a southern species and no records of this are known from the north of England. The larva might well have been transported to Cumberland in timber.

In the first survey, it was estimated that the males appeared about a week before the females. This was determined by tabulating the dates when males and females were reported. Out of the large number of records received not many contained both sex and dates. The Eltham Green School Natural History Club continued to send me records in 1961, 1962 and 1963 and I have to thank the members of this club for supplying the bulk of the data that enabled me to make an assessment of the peak periods for the insects. Their records and a few other London records for which sufficient data was given have been tabulated below.

DATES OF RECORDS OF STAG BEETLES

		1961		1962		1963	
		Males	Females	Males	Females	Males	Females
May	1–10	1	—	—	—	—	—
	11–20	—	—	—	—	—	—
	21–31	2	—	—	—	—	—
June	1–10	2	1	1	—	2	—
	11–20	4	5	3	1	3	8
	21–30	—	3	7	5	6	5
July	1–10	1	1	9	5	15	7
	11–20	2	2	—	5	4	5
	21–31	—	1	—	—	—	3
August	1–10	—	—	—	—	—	1
	Totals	12	13	20	16	30	29

The peak dates for records were calculated to be as follows:—

	Males	Females
1961	June 14	June 22
1962	June 28	July 5
1963	July 1	July 3

Peak dates for previous years were:—

1959	June 22	June 29
1960	June 17	June 23

(N.B.—These dates differ slightly from those in the first report due to the receipt of subsequent records.)

The data continues to support the hypothesis that was put forward in the first report i.e. that males appear about one week before the females.

The data for the four years shows that the sexes are seen in roughly equal numbers each year. The following figures relate only to those records which indicated sex and are all from the London area.

	1959	1960	1961	1962	1963
Males	20	46	11	21	33
Females	27	46	14	18	31

The fact that males appear before the females probably gives rise to the idea that they are sometimes more frequent in certain years. It would appear that much depends on the time of year the observer makes his observations.

Mr. Clark of the Colchester Royal Grammar School, who has also been working on the same lines, records the peak dates in the area of North-East Essex for 1963 as July 3 for males and July 11 for females, based on records for 115 males and 108 females.

Summary

The present distribution of the stag beetle as it appears from the records that have reached me can be summarized as follows: South London, from Richmond in the west to Plumstead in the east with the greatest concentration around Eltham, Medway valley to Maidstone; North-west Surrey; along the Thames valley from Tilbury to just above Reading; the original Enfield Chase; between Braintree and Ipswich; the valley of the River Adur; both sides of Southampton Water and the New Forest as far west as Poole; Plymouth; possibly still to be found in Gloucestershire but doubtful if now found in the Midlands. The other records are either historical or isolated cases where the insect has possibly been transported by human activity or by the wind.

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Additions to the List of the Coleoptera of Farningham Wood, Kent

By K. C. Side, F.R.E.S.

An earlier paper on the Coleoptera of Farningham Wood (Side, 1961) listed 248 species which had been recorded for the area up to February 1961. Two of these must now be deleted for reasons given below. Since that date 13 more visits have been made to the wood and many more species have been added to the list of beetles found there.

In cases where the records have been supplied to me by other entomologists the collector's initials have been added in brackets. Mr. Julian Brightman (J.B.) visited the wood several times and allowed me to see his captures and make use of his records. Dr. P. J. L. Roche (P.R.) accompanied me on one field meeting in the area and afterwards sent me a list

of beetles which he collected. Mr. E. W. Groves (E.G.) sent me a short list which he compiled on a field meeting in May, 1957. I also received a specimen from Mr. A. E. Le Gros. To all these gentlemen I tender my sincere thanks for their help and co-operation.

Many of the species recorded in the previous paper were seen again, often in months other than those quoted before. The following list brings the total number of species up to 365, and there are some notes at the end on some of the species recorded previously. The Roman figures refer to the months when the insects were seen.

As before, nomenclature is according to the *Check-List of British Insects* compiled by C. S. Kloet and W. D. Hincks, 1945, except where more recent work has shown the Check-List names to be not valid. The names used in Dr. Norman Joy's *Practical Handbook of British Beetles*, 1932 are added in square brackets where it is thought that these may be more familiar to Coleopterists who make use of that work.

CARABIDAE

Cychrus caraboides (L.) var. *rostratus* (L.) One under a log. xii. (J.B.)
Leistus spinibarbis (Fab.) xii. (J.B.)
Nebria brevicollis (Fab.) xii. (J.B.)
Loricera pilicornis (Fab.) In grass-tuft in a clearing. x.
Trechus quadristriatus (Schrank) In grass-tuft. xii.
Amara communis (Panz.) This species was inadvertently omitted from the previous list. It is common under stones and in grass-tufts. iv, vi, xi.
Pterostichus madidus (Fab.) xi, xii. (A. E. Le Gros and J.B.)
Abax parallelopipedus (Pill. & Mitt.) On the ground, under stones and in grass-tufts. iv, v, ix.
Calathus melanocephalus (L.) In grass-tufts. xi.
Dromius meridionalis Dej. Under bark of dead tree. xii. (J.B.)
D. quadrimaculatus (L.) Under bark of dead tree. xii. (J.B.)
D. quadrinotatus (Panz.) Under bark of dead tree. xii. (J.B.)
Microlestes maurus (Sturm). In grass-tuft. iv.

HYDROPHILIDAE

Cercyon haemorrhoidalis (Fab.) Heap of rotting hay and other vegetable refuse. iv, v.
C. melanocephalus (L.) In heap of rotting hay. v.
C. marinus Thoms. In heap of rotting hay. v.
C. atomarius (Fab.) [*C. impressus* (Sturm)] In heap of rotting hay. v. (P.R.)

SILPHIDAE

Phosphuga atrata (L.) Walking on ground. v.

LEIODIDAE

Agathidium nigrinum Sturm. In the Sulphur-tuft toadstool. x.

SCAPHIDIIDAE

Scaphidium quadrimaculatum Ol. In grass-tuft. iii.

STAPHYLINIDAE

Megarthrus depressus (Payk.) By beating branches at edge of wood. v.
Phloeonomus planus (Payk.) Under bark of chestnut. ix.
Anthobium atrocephalum (Gyll.) [*Lathrimaeum atrocephalum* Gyll.] In fungus growing on rotting tree-stump. x.
Oxytelus inustus Grav. Swept from herbage. vi.
Stenus fuscicornis Er. In grass-tuft. x.
Paederus litoralis Grav. Plentiful in grass-tufts. i, ii, x.
Medon brunneus (Er.) In grass-tuft. iv.
Lathrobium fulvipenne Grav. In grass-tufts. x.
Xantholinus longiventris Heer. In vegetable refuse. iv.
X. fracticornis (Müll.) [*X. punctulatus* (Payk.)] In vegetable refuse. iv, v.
Philonthus cephalotes (Grav.) In a heap of rotting hay. v.
P. debilis (Grav.) In a heap of rotten potatoes and straw. iv.
P. politus (L.) With the previous species. iv.
P. sanguinolentus (Grav.) In a heap of rotting hay. v.
Ontholestes tesselatus (Geoff.) In a heap of rotting hay. v. (J.B.)
Quedius mesomelinus (Marsh.) Very numerous in a heap of rotten potatoes mixed with straw. iv.
Q. nigriceps Kraatz. Under a log. xii. (J.B.)
Q. picipes (Mann.) In a grass-tuft. iv.
Tachinus humeralis Grav. In a heap of rotten hay. v.
Gyrophaena congrua Er. In fungi. ix.
G. minima Er. In a grass-tuft. iii.
Homalota plana (Gyll.) Under bark. ix.
Atheta (*Acrotona*) *subsinuata* (Er.) In vegetable refuse. xii.
Aleochara lanuginosa Grav. In horse-dung and in a heap of rotting hay. iv, v.

PSELAPHIDAE

Euplectus sanguineus Denny. In a heap of rotten potatoes and straw. iv.
Bryaxis curtisii (Leach). In a grass-tuft. iv.

HISTERIDAE

Hister cadaverinus Hoffm. In a heap of rotten potatoes. iv.

CANTHARIDAE

Cantharis nigricans (Müll). On various flowers. v.
C. pellucida Fab. On various flowers. v.
Metacantharis clypeata (Ill.) [*Cantharis haemorrhoidalis* Fab.] On flowers. v.
Malthinus fasciatus (Ol.) By beating at edge of wood. vii.

ELATERIDAE

Melanotus rufipes (Herbst). One swept from mixed herbage at edge of wood. v.
Athous bicolor (Goeze). By sweeping. v. (J.B.)
A. vittatus (Fab.) Taken by sweeping herbage. This species is superficially very similar to *A. haemorrhoidalis* (Fab.) which is very common in the wood, and it may therefore have been overlooked previously. v.

Agriotes obscurus (L.) In grass-tufts. iv.
Adrastus nitidulus (Marsh.) By sweeping herbage. vii.

DERMESTIDAE

Megatoma undata (L.) By beating an old apple tree. v.

NITIDULIDAE

Meligethes viridescens (Fab.) On flowers. v. (E.G.)

CRYPTOPHAGIDAE

Atomaria apicalis Er. In grass-tufts. ii, iii.
A. linearis Steph. In a grass-tuft. iii.

PHALACRIDAE

Phalacrus championi Guill. In grass-tufts. iv. According to Joy (1932) this species is a rare inhabitant of salt-marshes. Fowler (1888) who describes it under the name *brunnipes* Bris. states that it is rare and can be taken by sweeping banks of rivers and also on the coast. The true *brunnipes* has not been proved to occur in Britain. My experience is that *P. championi* is far from rare. I have met with it on numerous occasions from April to November in grass-tufts, usually on chalk grassland, but twice on marshes close to saltings. At Farningham one specimen was taken in April 1962 and four in April 1963.

LATHRIDIIDAE

Enicmus histrio Joy. In grass-tufts. ii, iii, iv, v.
Corticaria impressa (Ol.) In grass-tuft. iii.

ENDOMYCHIDAE

Endomychus coccineus (L.) Under birch bark. ix.

COCCINELLIDAE

Pullus auritus Thun. [*Scymnus auritus* Thun.] By sweeping herbage. v.
Tytthaspis 16-*punctata* (L.) [*Micraspis* 16-*punctata* (L.)] In grass-tufts. ii, vi.
Calvia 14-guttata (L.) v. (E.G.)

SALPINGIDAE

Rhinosimus planirostris (Fab.) Under bark. v. (P.R.)

MORDELLIDAE

Anaspis frontalis (L.) On flowers. v, vii.

MELANDRYIDAE

Orchesia undulata Kraatz. Under bark of a fallen birch. ix.

TENEBRIONIDAE

Cylindronotus laevioctostriatus (Goeze). Under loose bark. x, xi.

SCARABAEIDAE

Phyllopertha horticola (L.). vi. (J.B.)

CERAMBYCIDAE

Grammoptera ruficornis (Fab.), var. *holomelina* Poole. One taken by sweeping. vii. Although sometimes considered a distinct species, Duffy (1952) holds the view that it is no more than a variety. The type, which is very common at Farningham has already been recorded in the Preliminary List.

CHRYSOMELIDAE

Chrysolina hyperici (Forst.) Taken by sweeping a fine stand of St. John's Wort, which grew up when a portion of the wood was cleared. vii.
Lochmaea suturalis (Thoms.) Amongst roots of ling. xi.
Phyllotreta nigripes (Fab.) In a grass-tuft. iii.
P. nodicornis (Marsh.) Taken by sweeping. v.
P. vittula Redt. By beating a heap of dead branches. x.
Haltica brevicollis Foudras. By sweeping in summer and in grass-tufts in winter. i, v, vi.
Hermaeophaga mercurialis (Fab.) By sweeping Dog's Mercury. v.
Chalcoides aurea (Geoff.) By beating young sallows. v, vi.
Mantura rustica (L.) In grass-tufts. ii.
Chaetocnema hortensis (Geoff.) In grass-tufts and by sweeping. iii, vi.

BRUCHIDAE

Bruchus atomarius (L.) Taken by sweeping low herbage. v.
Bruchidius villosus [*Laria villosa* Fab.] Common on broom. v, vi. The synonymy of this genus is difficult to follow in the Check-List and I am uncertain about the correct name to use. *B. fasciatus* (Ol.) was listed in my earlier paper as the species which is common on rock-rose, but I am in some doubt about the correctness of that name. The two insects are quite distinct and both have been found at Farningham.

CURCULIONIDAE

Apion marchicum Herbst. In grass-tufts and by beating broom. v, vii, xi.
A. curtirostre Germ. In grass-tufts and by sweeping. v, xi. Usually associated with *Rumex acetosella* L.
A. rubens Steph. In grass-tufts. iii. Associated with *Rumex* species.
A. reflexum Gyll. In grass-tufts and amongst dead leaves. i.
A. ononicola Bach. In grass-tuft. iv.
A. fuscirostre (Fab.) By beating broom and in grass-tufts under it. iv, v, vii.
A. virens Herbst. Taken by sweeping. v.
Otiorrhynchus ovatus (L.) In grass-tuft. iv.
O. singularis (L.) In grass-tufts. iv.
Trachyphloeus aristatus Gyll. In grass-tufts. xi.
T. bifoveolatus (Beck.) In grass-tuft. v.
T. scabriculus (L.) In grass-tufts. iv, v, xi.
Phyllobius parvulus (Ol.) On young trees, especially birch. v, vi.
P. maculicornis Germ. On young trees. v.
Barypithes pellucidus (Boh.) In grass-tuft. v. (P.R.)
Sitona macularius (Marsh.) [*S. crinitus* Herbst.] In grass-tufts. iii, xi.
Tanymecus palliatus (Fab.) Walking on ground. v.
Tychius pusillus Germ. By sweeping. v. (P.R.)
Curculio nucum L. v. (E.G.)
C. villosus Fab. v. (P.R.)

Ceuthorhynchus rugulosus (Herbst.) In grass-tuft. xi.
C. pollinarius (Forst.) By sweeping nettles. vii.
C. sulcicollis (Payk.) In grass-tufts. iii.
C. erysimi (Fab.) In grass-tuft. xii. (J.B.)
C. quadridens (Pans.) By sweeping. v.
C. hirtulus Germ. By sweeping. vii.
Rhinoncus castor (Fab.) By beating an old apple tree. v.
R. perpendicularius (Reich.) By sweeping. v.
Gymnetron melanarium (Germ.) On Germander speedwell. v. (P.R.)
G. pascuorum (Gyll.) By beating an old apple tree and in grass-tuft. v.
Cionus alauda (Herbst). This and the following species was taken by sweeping a thick stand of Knotted Figwort which grew up in a cleared portion of the wood. v.
C. scrophulariae (L.) v.
Rhynchaenus fagi (L.) [Orchestes fagi L.] Taken by sweeping. v.
R. quercus (L.) [Orchestes quercus L.] By beating oak. v.

SCOLYTIDAE

Hylesinus fraxini (Panz.) Taken by sweeping. v.

Additional notes on some of the species in the Preliminary List

Anaspis garneysi Fowler and *Acalles roboris* Curtis were recorded in error owing to wrong identification, and should now be deleted from the list.

Agonum dorsale (Pont.) [*Anchomenus dorsalis* Pont.] On April 27, 1962 an assemblage of beetles of this species was disturbed when a large flint was turned over at the eastern end of the wood. An exact count could not be made as the beetles ran off into the surrounding grass and other vegetation, but at an estimate about thirty were seen. I have on several occasions seen similar assemblages of this species in other localities, always in the spring. It would appear that gregariousness is a characteristic of the species, at least under some circumstances.

Quedius boops (Grav.) It has been shown (Tottenham, 1948) that this name was used in the older literature and collections to cover a complex of five different species. Tottenham gives a key for the identification of these species, but in practice they are not easy to determine and so to avoid error I have used the name in the old sense; it may cover one or more of the species included in the group.

Apion spp. Eighteen species of this large genus of weevils have now been found at Farningham Wood. It will be noticed that many of them have been taken in grass-tufts rather than by the more usual methods of beating and sweeping. This is because much of the work of collecting material for this list has been done during the winter months. Most, if not all, of the species of *Apion* pass the winter as adults in grass-tufts, in the ground at the roots of plants, in heaps of dead leaves and other litter or under loose bark, etc., usually near the plants on which the beetles and their larvae feed during the spring and summer.

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The Roman Road from Dunmow to London

By V. F. Bignell, M.Sc.(Eng.)

ON the map of Roman Britain published by the Ordnance Survey, some roads of the period are shown as "course uncertain". In 1959 a group of members of the Archaeology Section began an investigation of part of one of these roads, the road from Dunmow in Essex to London. The road has been dealt with elsewhere (Miller Christy, 1926; Margary, 1955) but the maps and ground have been examined afresh, revealing some new evidence. Also one excavation has been made.

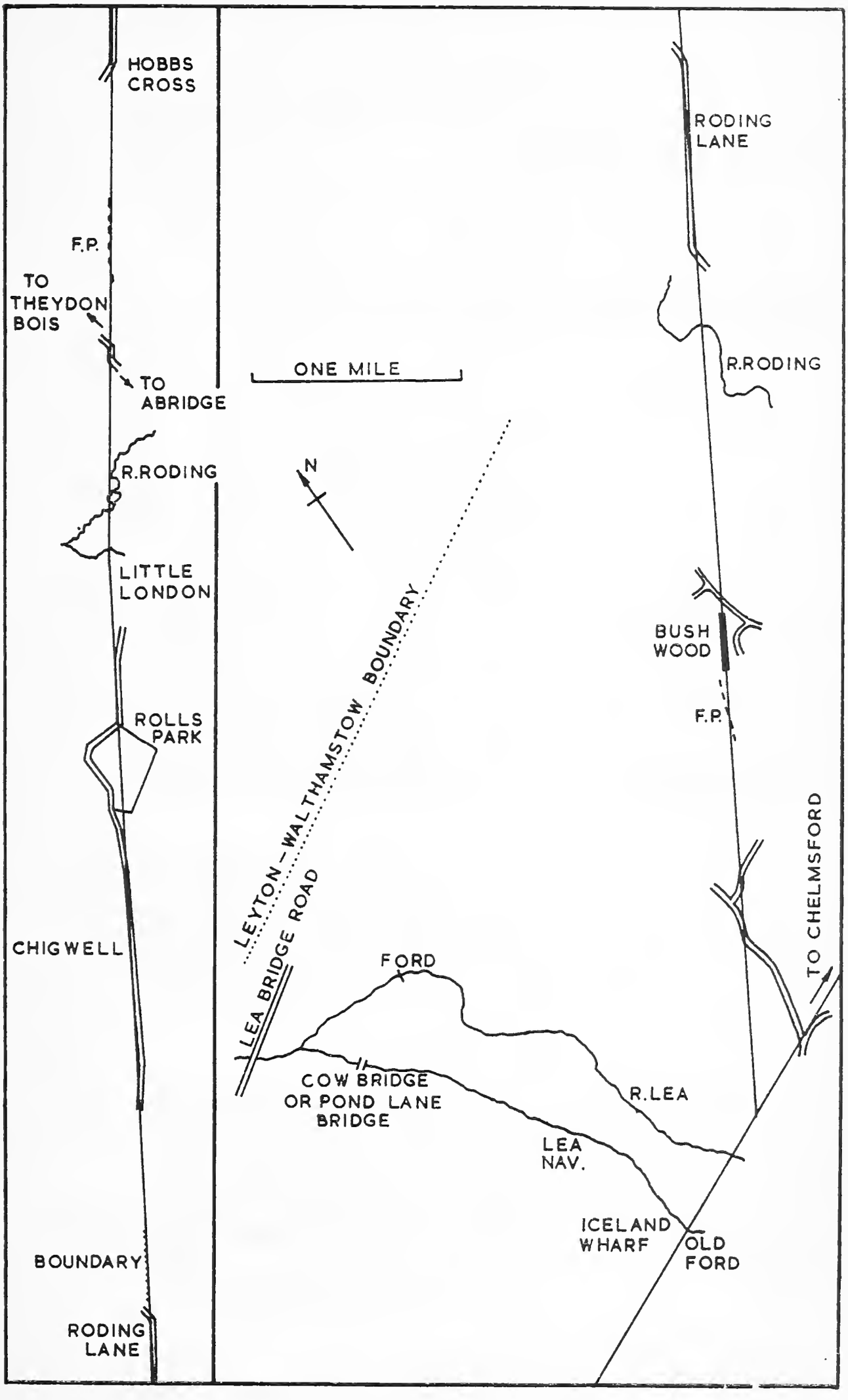
Having regard to the Society's area, the road was studied at its London end only, but to appreciate the characteristics of that stretch better, a brief description of the road in open country will be given first.

From Dunmow the Roman road runs towards London through rural Essex, an alignment six miles long taking it to the River Roding. Beyond, the road takes up a new alignment for London. The usual evidence for a Roman road is available, modern roads, boundaries and hedges disclosing by their alignment the ancient linear feature. At Hobbs Cross (TQ478993) this continuity is disturbed at the southern end of a farm road and from this point fieldwork was undertaken by the group.

Current maps still show footpaths on the same line, but some of these have been ploughed over. A hedgerow still marks the line as far as the Abridge-Theydon Bois road. Here a short straight length of modern road ran along the Roman road for some 150 yards. The sharp bends occasioned by this have since been eased. From this point the line of the road approaches the River Roding across farmland but there is no visible evidence. The river, meandering through flat meadows liable to flooding, will have left no traces of the crossing, but layers of gravel can be seen in the river bank (TQ459967) some two feet above the present river bed. Similarly layered gravel was found in the banks of a stream which turns twice on crossing the alignment (TQ456963). Two hundred yards further south, this Hobbs Cross alignment brings the road to the Little London gravel pits (TQ455962). In the nineteenth century Roman pottery, coins and some structural remains were found during gravel digging. On this basis the site is believed to have been a Roman settlement. No ground plan was obtained and the exact position of the settlement is not known. The small finds from the site have been deposited at Queen Elizabeth's Hunting Lodge in Epping Forest.

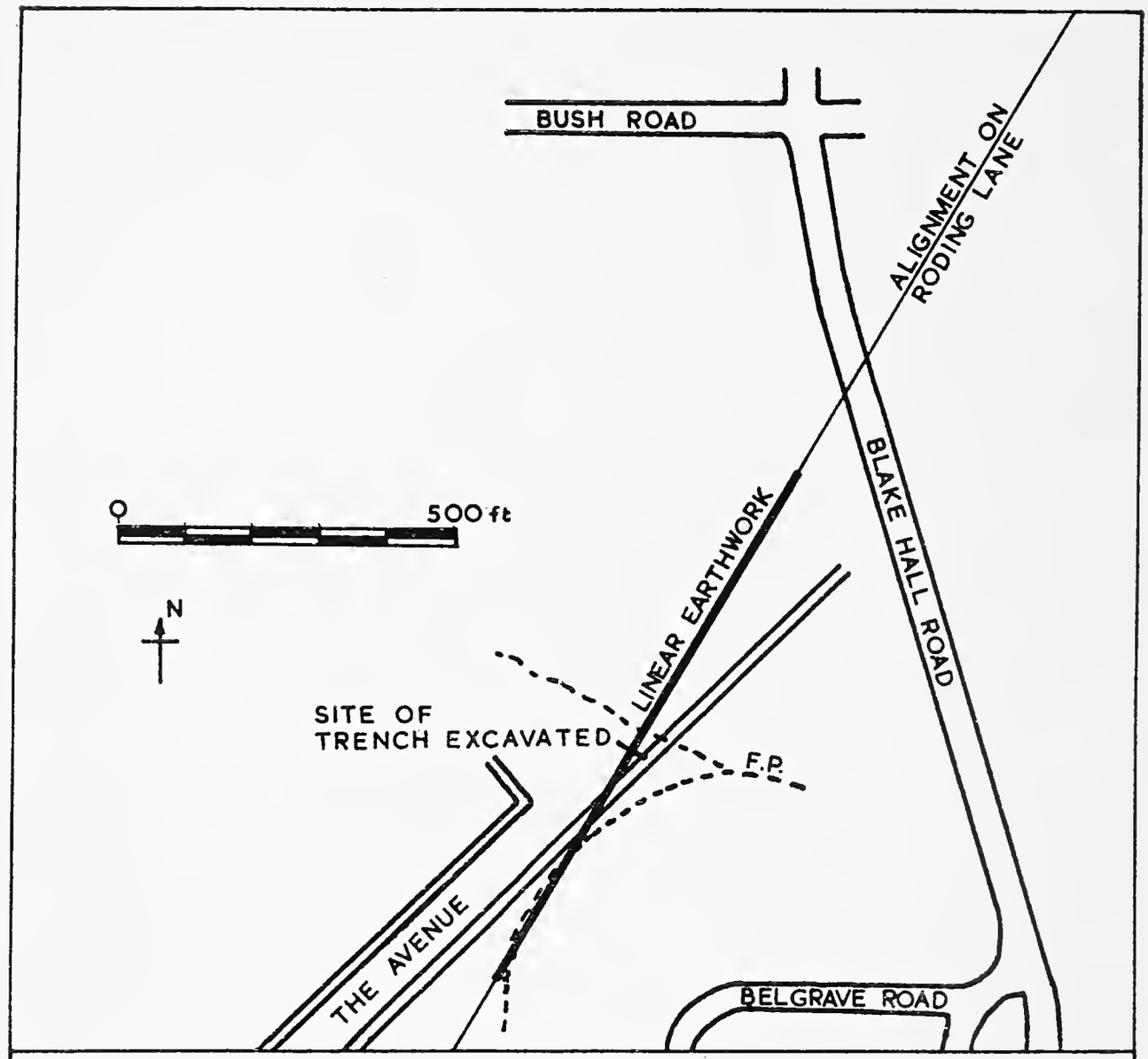
In the vicinity of the settlement the road takes up a new line, well indicated by Chigwell High Road and Roding Lane further south. Near to the Little London settlement the line of the Roman road falls along the Abridge-Chigwell road and accompanies it as far as the boundary of Rolls Park. In 1668 Sir Eliab Harvey, owner of the estate, was given permission to make road diversions for the purpose of extending his grounds. A road diversion is evident on the map and furthermore the old road can still be seen as a shallow depression running up the northern slope of the Rolls Park estate. An agger reported in Rolls Park (Dove, 1960) lies further to the west than the line proposed here.

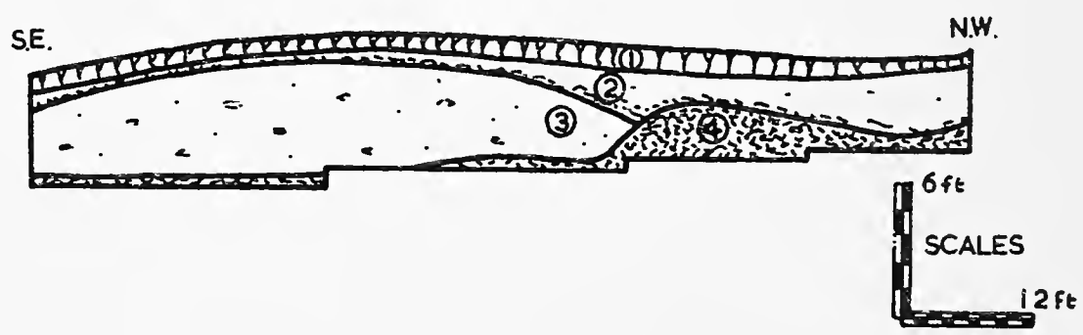
As described above, the line is marked by Chigwell High Road, which becomes Broom Hill as it leaves the line to cross the river Roding at Woodford Bridge. The straight alignment commenced at Little London



The Roman road from Dunmow to London
Evidence for alignments

The Roman road from Dunmow to London
Plan of earthwork and excavation at Bush Wood, Wanstead, E.11





Section of trench at Bush Wood excavation

Layer 1: Humus
Layer 2: Humus, pebbles and sand;
pebbles more numerous over layer 3
Layer 3: Sand stabilized with clay. Few pebbles
Layer 4: Compacted gravel and sand.

continues however as a boundary and as Roding Lane. As Roding Lane South reaches the River Roding it leaves the alignment sharply. The riverside was liable to flooding and its level has been raised by dumped material. At the same time the banks have been concreted, thus obliterating all traces of the crossing. On the south bank, however, Nutter Lane runs along the alignment as it leaves the river.

The area between the Roding and London is now built over, with the exception of Bush Wood, an open space in the care of the Corporation of London as part of Epping Forest. Here a linear earthwork some 350 yards long was found on the alignment. Investigation of the earthwork was indicated and to this end a trench was dug by members of the group (TQ40255 87310).

On the surface was a narrow "agger", the characteristic elevation of a Roman road above its surroundings. The cut section, however, is not typical of a Roman road. It appears that the natural gravel has been scooped to one side and a filling of sand with a little clay inserted. Now Bush Wood was part of the grounds laid out around Wanstead House. The garden plan included in an eighteenth century map (Chapman and André, 1777) shows a feature coincident in part with the earthwork and apparently serving the purpose of collecting and retaining water. It is possible that the remains of the Roman road, preserved by enclosure of the area as a royal forest, were used in this way. The depression in the gravel might be original wear or robbing, and the sandy clay filling "puddling" as used to resist water percolation from canals.

Continuing south, the alignment falls along a footpath in Bush Wood and a short portion of the main road from Leytonstone to Stratford. It meets the streams of the Lea directly opposite Iceland Wharf. At Iceland Wharf (TQ374837) a causeway is on record, aligned on the Roman road (marked by "Roman Road", E.3) from London to Chelmsford and Colchester.

Theories have been advanced involving alternative or subsidiary roads in the area. Firstly an ancient gravel road causeway and ford were found (Clarke, 1868) a little to the south of the Lea Bridge Road, opposite Cow Bridge (now Pond Lane Bridge). The discoveries of Roman burials and structural remains on the side of the Lea valley were thought to indicate a Roman road, the Dunmow road, here. Certainly the slopes would offer suitable sites for villas, and service roads would be required.

Secondly the boundary between Walthamstow and Leyton runs in a straight line for three miles, from Epping Forest to Leyton Marshes opposite Upper Clapton. This line intersects Ermine Street and extended further at one end enters the "Roman Camp" at Barnsbury in Islington. Extended further at the other end it does not, however, connect convincingly with the Dunmow Road in open country.

Finally, far out in Essex a clear alignment is seen on the map from Chelmsford passing through Doddinghurst and Navestock Side but disappearing from the map at Navestock Common. Extension of this alignment, albeit for eleven miles, indicates a river crossing at Old Ford once more.

To conclude then, one must imagine at first the road from London to Chelmsford being built, on either of its alignments but crossing the Lea at Old Ford. Just past the ford a left fork led to Little London and thence with little deviation to Dunmow. Side roads and service roads would link these roads and Ermine Street.

The writer would like to thank the members of the working group and the Section for their valuable assistance at all stages of the project. The Section is grateful to the Superintendent of Epping Forest for permission to carry out the excavation.

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Survey of Bookham Common

TWENTY-SECOND YEAR

Progress Report for 1963

GENERAL (C. P. Castell).

Perhaps the most important management development was the erection of a keeper's cottage at the Isle of Wight and the appointment of a keeper by the National Trust at the end of the year.

The Conservation Corps of the Council of Nature continued their task of clearing scrub in Central Plain, including the cutting back of part of the Clump, a large mass of Blackthorn, which had rendered Central Path almost impassable. It was interesting to note that, in late spring, several plants of *Ophioglossum vulgatum* (Adder's Tongue Fern) were visible on the cleared ground formerly occupied by this dense Blackthorn. About fifty plants were also seen nearby in a small area cleared of scrub.

Two ponds were visited by the Corps. The banks of Bayfield Pond were cleared of dense scrub, leaving the old willows, and the site of South-East Pond was cleared of vegetation and has become a pond once more.

At the end of the year, the National Trust cleared an area of scrub in the south-west part of Central Plain and a triangular area north-east of Bayfield and west of Isle of Wight Road. Here the scrub was uprooted, in contrast with the area dealt with by the Conservation Corps, where it is cut down.

VEGETATION (C. P. Castell)

Some observations were made on the area in Central Plain newly cleared by the Conservation Corps, where an abundance of the fungus *Tubaria furfuracea* Gill. appeared on the ground and *Polystictus versicolor* Fr., *Polyporus adustus* Fr. and *Daedalia* sp. on treated hawthorn stumps. Notes were made on the marginal plants of Bayfield Pond before their clearance. The north bank of the Isle of Wight Pond was examined in connection with a possible future reduction of the increasing mass of willows. On the peaty mud under them, a great abundance of fungi appeared in September, and were kindly determined by Mr. J. B. Evans of the British Museum (Nat. Hist.). *Cortinarius cinnamomeus* Fr. (cf. *C. cinnamomeoluteus* Orton) was very abundant and *Clavaria cinerea* Pers. occupied large patches of ground; also collected were *Lactarius subdulcis* Fr., *Hebeloma crustuliniforme* Quel., *Inocybe napipes* J. Lange, *I. patouillardi* Bres., *Cortinarius brunneus* Fr. and *C. brunneofulvus* Fr.

In October, during a transect along the margin of the Isle of Wight Pond, a moss, *Pseudephemerum nitidum* (Hedw.) Reim., was noted on the mud, a new record for the Common.

Mr. F. C. Reeves has continued his mapping of the distribution of Bracken.

MOLLUSCA (C. P. Castell)

Mr. Reeves collected a slug in Eastern Wood in October, one of three specimens under an old mattress cover; this proved to be *Limax cinereoniger* Wolf, the largest British slug, not previously recorded for Bookham and known in Surrey only from one or two sites. Further specimens were seen at the same site in November.

BIRDS (G. Beven)

Regular censuses were continued in oakwood (Eastern Wood) and on the scrub and grassland during 1963. A report on the feeding sites of birds in grassland with thick scrub will be found on page 86. A summary of the fluctuations in population of some birds in Eastern Wood during the last 15 years was published in *British Birds*, **56,** 307-323, 1963.

Further counts in Eastern Wood confirm earlier work suggesting that Blackbirds remain in the wood throughout the year and, although they are most numerous in the spring, they are still plentiful in the colder months, except perhaps in the very severe conditions such as in early 1963. W. D. Melluish has summarized the counts of Blackbirds on Western, Isle of Wight and Bayfield Plains for the years 1954 to 1959, 1962 and 1963. He finds the autumn population in this scrubland to be about double that in spring. It is believed that some birds leave the woodland in autumn to feed on the fruit crop in the adjacent scrubland. There is only a very poor crop of hawthorn berries in the dense oakwood.

In 1962 Starlings nested in Eastern Wood, apparently for the first time since the survey began (*Lond. Nat.*, **42,** 42, 1963). There were two pairs in that year but in 1963 there were at least five pairs. Thus the Starling seems to be spreading into the oakwood as a breeding species. There were at least three singing male Grasshopper Warblers during 1963. A male Redbacked Shrike was observed by W. D. Melluish on July 20, 1963.

The Effects of the Severe Winter

The year 1963 opened with a prolonged and severe spell of very cold weather, and in January and February there was continuous snow cover for 60 days, the longest period in the South of England for 150 years. December, January and February were the three coldest months in central England since 1740. The spring census of birds in the sample of dense oakwood (Eastern Wood) was repeated. The figures for the numbers of territories of singing males in the 40 acres in 1962 and 1963 were respectively: Robin 32, 21½, Wren 12, 1, Blue Tit 16½, 19, Great Tit, 11, 12, Blackbird 8, 8, Chaffinch 7, 5½, Willow Warbler 1½, 2½, Chiffchaff 1½, 2, Song Thrush 5, 4, Dunnock 4½, 4.

There was thus a very striking reduction in the numbers of Wrens in Eastern Wood. Indeed the one singing male was not discovered until late in May and is believed to have come into the wood in the spring, perhaps from the gardens nearby. All the Wrens which had wintered in the wood were probably exterminated during the severe weather. Elsewhere in the oakwood there were very few Wrens in the spring and these were mainly near the wood edge. They were certainly very drastically reduced in number on the Common as a whole, and there was very little evidence of recovery during the breeding season. Thus the species remained scarce even at the end of the year, when for example only one or perhaps two birds could be found in Eastern Wood. The average number of Wrens present there in December is about 8. W. D. Melluish reports that the number of singing males in the spring, on 61 acres of grassland with thick scrub was reduced from an average of 3 (1957-1959) to 1 in 1963. Wren losses were also severe in many other parts of Britain.

Robins were also reduced in Eastern Wood to about two-thirds of the 1962 figure, to a total population very similar to that occurring in 1947,

after a winter of comparable severity. On the other hand although Blackbirds were fewer than in some years they were not scarcer than in 1962 and Song Thrushes and Chaffinches showed only slight reduction. Great and Blue Tits maintained their numbers. In the scrubland adjacent, the Robins and Chaffinches were not reduced and Dunnocks had actually increased in 1963 (W. D. Melluish). Elsewhere in Britain, Robins and Song Thrushes have also suffered from this severe winter but Blackbirds, Chaffinches and Dunnocks seem to have survived it quite well.

Another species "hard hit" by the cold winter was the Longtailed Tit. The number of pairs occurring in the 40 acres of Eastern Wood in the breeding seasons since 1949 have been as follows:—

1949	1	1954	1–2	1959	nil
1950	1	1955	2	1960	1
1951	2	1956	2	1961	1
1952	2	1957	?	1962	2
1953	1	1958	2	1963	nil

In about 120 acres of grassland with thick scrub and "outskirts" of oakwood, there were the following numbers of pairs of Longtailed Tits in the spring; 1960 4, 1961 7, 1962 7–8, 1963 nil. However, a few birds were seen in the autumn in the woodland and scrubland but far fewer than in 1962.

The Goldcrest has also become scarcer since the frost. Few birds are found on the Common in summer but usually it is fairly numerous in the winter. However, only one bird was recorded by the "team" in the whole of 1963. It is not possible to say whether the woodpeckers were reduced in numbers, as detailed counts have not been made. However, both the Green and Great Spotted Woodpeckers were recorded frequently during 1963, a nest of the latter being found with young in Central Wood in June. Lesser Spotted Woodpeckers were observed in July and August; (they are not often seen on the Common in spring). One Woodcock was "roding" on 2.6.63. Very few Redwings were present in the scrubland in autumn. This was perhaps to be expected after the severe winter, but the poor crop of haws may have discouraged the birds from lingering (in spite of a moderately good sloe and hip harvest).

MAMMALS (G. Beven)

J. Lord has continued his survey of the small mammal population of Central Plain. Grids of Longworth traps were set both in the area cleared by the Conservation Corps and outside it. He reports that the results for 1963 differ little from those for the previous year, except that Bank Voles *Clethrionomys glareolus* became much more numerous on the cleared ground during the autumn.

A Hare *Lepus europaeus* was seen in Central Wood (ref. 299) on January 13, 1963 during the cold weather and prolonged snow. The only previous record of a Hare on Bookham Common appears to be on August 8, 1948 when a newborn leveret was found, without obvious injury except a torn ear, in Hill House Wood (ref. 438). Rabbits *Oryctolagus cuniculus* were still plentiful on the grassland especially on Central Plain. They also occur in the oakwood, close-grazed grass with numerous fresh droppings being noted in a small clearing in Eastern Wood (ref. 388) on February 11, 1962. Grey Squirrels *Sciurus carolinensis* were numerous in the woodland during the spring and summer. A Weasel *Mustela nivalis* was caught in a Longworth trap on July 27, 1963 on Central Plain (ref. 856) and released (J. Lord).

The Feeding Sites of Birds in Grassland with Thick Scrub.

Some Comparisons with Dense Oakwood

By Geoffrey Beven

A PREVIOUS investigation into the feeding sites of birds in dense oakwood on Bookham Common (Beven, 1959) demonstrated that each species had a different feeding ecology. Of special interest was the fact that differences in feeding niche were shown by four species of tits of the genus *Parus*, thus illustrating a principle stated by Charles Darwin (1859; quoted by Hartley, 1953). "As the species of the same genus usually have, though by no means invariably, much similarity in habits and constitution, and always in structure, the struggle will generally be more severe between them, if they come into competition with each other, than between the species of distinct genera". By spending different proportions of their feeding time in various parts of the habitat the species may manage to avoid excessive competition.

Much attention has been given to the feeding ecology of birds in woodland, but there seems to have been very little work done on this aspect in scrubland. A study has now been made on the feeding sites of birds in the grassland with thick scrub which adjoins the oakwood on Bookham Common. In the following report an analysis is made of 2,878 observations recorded by members of the Ecology Section of the London Natural History Society mainly during the four years 1959 to 1963, but including some made in the earlier years of the survey. The results again illustrate how each species has its own feeding niche, and emphasis is placed on differences between species of the same genus or related genera. Some light is also thrown on changes in feeding sites of woodland birds when they move to the open scrub and grassland.

Habitat

To the south and west of the dense oakwood at Bookham Common is the grassland of the low lying plains dominated by Tufted Hair Grass *Deschampsia cespitosa* and bracken *Pteridium aquilinum*. The ground falls from 150 ft. in the south to 98 ft. at Hundred Pound Bridge in the north. Springing up all over the plains are numerous shrubs and small trees. These have become much larger and more dense in recent years and are linking up with scrub spreading from the wood edge. There are many young oaks among the shrubs which represent an intermediate stage leading ultimately, unless checked, to spread of the oakwood on to the plains.

Method

This is essentially the method described by Hartley (1953) and Gibb (1954), and as used in the feeding-site investigation in oakwood (Beven, 1959). A note was made of the station in which a bird was seen feeding or searching for food (even if unsuccessfully). To decide when a bird is searching for food is not always easy; it may be resting or, especially in the shrubs and trees, it may be singing or calling, or it may have flown from the feeding site to a perch to wipe its beak. It is obviously important not to record these birds as feeding. To avoid the complication of the time spent in each niche an arbitrary rule of "one tree—one record" was

adopted as suggested by Hartley (1953). A record was made of the site in which the bird was first seen and it was not recorded again until it had moved to another tree or bush. This method must have produced a slight bias in favour of small bushes as compared with large trees but the error is considered to be small. Each time a bird visited the ground or herb layer it was counted as one "feeding" record. These observations were made at any time of the day, perhaps most frequently in late afternoon or evening, on the regular monthly and other visits to the common.

For our purpose the term "ecological niche" means the place of an animal in a community of plants and animals, especially the mode of feeding. The "feeding niche" includes all the different situations in which the animal feeds, that is all the feeding sites or stations, not only in space but also in time, of day or year.

The feeding sites have been defined as follows:—

(i) Air: Birds noted taking insects during flight whether from bush or herb or in sustained flight were recorded as feeding in the air. Swallows, House Martins and Swifts were commonly seen flying over the area but have not been included in the investigation.

(ii) Trees: A shrub over 15 feet high was counted as a tree. Feeding site records below 15 feet in trees were included with the shrubs.

(iii) Shrubs including isolated shrubs as well as dense thickets.

(iv) Herb layer:
  (*a*) Long grass.
  (*b*) Mixed or rank herbage, dense in places especially along ditches.
  (*c*) Bracken.

(v) Ground:
  (*a*) Open bare ground such as churned up mud on paths or recently cleared spaces, as at the sides of cleaned ditches, or cinder tracks.
  (*b*) Shaded bare ground with some leaf litter under the dense cover of the larger shrubs.
  (*c*) Short grass on footpaths which have been well trampled, occasional areas of grass close-cropped by rabbits including the small patches on the tops of ant-hills.
  (*d*) Ground by water either bare or with a sparse herb layer.

It must be appreciated that these feeding sites may be very dense and overgrown in places, especially in late summer, and that it was sometimes impossible to see what a bird was actually doing when for instance it was in the long grass, rank herbage, bracken or in the thick centre of a bush. Such incomplete observations in shrubs have therefore been excluded from this study. However, in the case of long grass, rank herbage and bracken records were made in some circumstances, when birds were seen entering or leaving the habitat, on the assumption that they fed there even when they were not actually seen feeding. Colquhoun and Morley (1943), from a study of the vertical zonation of birds in woodland, came to the firm conclusion that the relative niche of occurrence in the vegetation is identical with the feeding niche in the non-breeding season. We interpret this to mean that at that season birds when first seen in woodland during daylight will usually be in a feeding site. We are not certain, however, that their generalization covers all habitats in the scrubland; for example when alarmed a bird feeding on the ground may fly up to a twig on a shrub, and may be first seen cleaning its beak or resting. However, that their conclusion for woodland was also applicable to long grass and thick herbage, was repeatedly confirmed when it was possible to watch the birds.

In the non-breeding season the birds were found to be almost always searching for food. Even when it could not be seen, the bird's general behaviour often suggested that it was feeding. Birds which were dropping down into the grass at dusk may have been going to roost there and were not therefore included. In the breeding season, records were also made when birds entered or left the habitat but special care was taken to exclude those which from their behaviour might have been visiting their nests, or displaying to one another. No doubt there were occasional errors, a bird, e.g. a Pheasant might have been resting but we believe that these errors are very small and we consider that the findings from the sample observations in which birds could be seen to be feeding, can be safely applied to all the records for the long grass, rank herbage and bracken. Moreover to have excluded the observations (of birds seen entering or leaving the very dense habitats), because of the difficulty of recording their behaviour there, would have increased the bias towards observations in more open habitats. In any case the relatively small number of records in these dense habitats, considering the large size of the areas, is confirmed by the impression of scarcity of birds disturbed by observers plunging through the "jungles" of long grass, bracken and rank herbage.

The 2,878 records are the result of many hours of patient observation. For some species there are few records but they represent much effort. When there were sufficient observations they have been grouped and studied under seasons. For our purposes these are defined as follows:—

Winter quarter, from January to March. There are then no leaves, no growth in the grass and hardly any fruits.

Spring quarter, from April to June, when there is early growth of vegetation, including leaves and early flowers. The long grass and bracken grow up in late May and June.

Summer quarter, from July to September. There is then maximum growth of vegetation with ripening fruits in shrubs and herb layer.

Autumn quarter, from October to December. The shrub fruits are ripe, the leaves begin to fall, the grass shrivels up or lies down flat, the bracken dies down.

Sometimes there are insufficient observations for analysis into quarters and then the records may simply be classified under Summer half-year from April to September and Winter half-year from October to March.

The Feeding Habitats and the use of these by Birds

1. Air: These are included in the tables but are not discussed further.

2. Trees: These are relatively few and scattered at present but are increasing. The most important species are oak *Quercus robur*, birches *Betula* spp., Willows *Salix* spp. and ash *Fraxinus excelsior*. In addition the larger hawthorns *Crataegus monogyna* and hollies *Ilex aquifolium* are regarded as trees if they are over 15 feet in height. To avoid repetition the birds of this habitat are discussed with the shrubs.

3. Shrubs: These are abundant and increasing. Hawthorn, Blackthorn *Prunus spinosa*, Roses *Rosa* spp. and Bramble *Rubus fruticosus* (agg.) are the most numerous. Some idea of the rate of increase is indicated by a census of shrubs on a 4 acre sample made in 1951 and repeated in 1955 and again in 1959 (Castell, 1960). Individual plants of each species were counted and a note made of any over eight feet high. The hawthorn and rose scrub increased in number perhaps five or six times between 1951 and 1959, and there were more than ten times as many hawthorn

Photo by G. Beven.

FIG. 1. Western and Isle of Wight Plains, Bookham Common, ref. 467 showing a footpath through grassland with thick scrub. There is a sapling oak to the right and elm trees of the Isle of Wight in centre distance. May, 1963.

Photo by G. Beven.

FIG. 2. Western Plain, Bookham Common, ref. 425, showing footpath through dense mixed scrub, including hawthorn and elder. In the foreground to right of footpath is Rosebay willow herb, a small elder bush and "flattened" bracken, and to left of path is bramble. May, 1963.

Photo by G. Beven.

FIG. 3. Bayfield and Isle of Wight Plains, Bookham Common, showing "flattened" grass chiefly Tufted Hair Grass, with willow scrub in the foreground. In the background there is hawthorn scrub and the edge of the oakwood beyond. April, 1963.

Photo by G. Beven.

FIG. 4. Central Plain, Bookham Common, showing tall grasses, including Tufted Hair Grass and some rank herbage, notably Angelica in centre. Hawthorn scrub beyond. August, 1963.

shrubs over eight feet high in 1959 as in 1951. In other samples (15,600 sq. ft.) the extent of ground covered by hawthorn and rose shrubs was measured and was found to have increased from 9% of the sample area in 1952 to at least 25% by 1956. Marked increase was also noted in bramble, blackthorn and oak. In places there are dense inpenetrable thickets of hawthorn and blackthorn. As these shrubs increase in area and density and height there is a "shading out" of the long grass immediately below them, producing a patch of bare ground with a little leaf litter and perhaps a few herbs (Castell, 1963). Some sample measurements of fifteen hawthorn bushes in 1959-60 by Miss E. M. Hillman and the writer suggested that, when the spread of canopy of the shrub reached about ten feet in diameter there was usually some bare ground underneath. The size of the bare patch was larger with increased density of growth of the hawthorn and also when the lowest branches came down to within a foot of the ground. The presence of other shrubs within 5-10 yards on the south or south western aspects increased the likelihood of bare ground presumably by reducing the light to below a critical level. Thus the presence of shrubs introduces a new habitat, numerous small areas of bare ground with leaf litter, and this may be a factor encouraging ground feeding woodland birds, such as Robins, Blackbirds, Dunnocks and even Great Tits, to spread out on to the plains with the developing scrub.

Table I clearly demonstrates the enormous importance of the shrubs as a feeding niche, particularly in the autumn when the fruit is ripe and there must also be a large reservoir of insect food at this time. A great variety of birds feed in the shrubs but as indicated in table II the species most commonly found feeding there in the spring quarter are Willow Warblers, Blue Tits, Great Tits and Whitethroats. During the summer the Bullfinch, Longtailed Tit and the Willow Tit also become more evident.

TABLE I

THE USE OF THE HABITATS

Percentage distribution of feeding sites of birds in the different zones in grassland with thick scrub

	Spring (337)*		Summer (739)		Autumn (1063)		Winter (719)		Total (2878)	
Ground—Bare	10		9		4		16		9	
—Short Grass	15	27	5	16	4	9	7	28	6	17
—By water	2		2		1		5		2	
Herb—Long Grass	23		11		6		7		10	
—Mixed Herbage	3	28	17	31	13	20	4	14	11	22
—Bracken	2		3		1		3		2	
Shrubs	33		42		61		49		49	
Trees	8		6		9		8		8	
Air	5		5		0		1		2**	
Total %	101		100		99		100		99	

The figures are expressed as a percentage of the total records, or of the total records for each season.

Total number of records is in brackets under each season. Apart from these figures in brackets all the figures are percentages.

** There were also unknown numbers of Swallows, House Martins and Swifts.

* The reason for the relatively small number of feeding records in the spring quarter is probably partly because the increased day length spreads out the feeding incidence, and also partly because much of the feeding occurs soon after the dawn and some in the evening. Sufficient observations have not been made at these times. The birds spent much time singing and displaying. In the summer quarter the length of daylight is also prolonged but thcre are more birds about and there seems to be more feeding during the middle of the day.

TABLE II

Relative Abundance in the Zones

The numerically dominant birds in each habitat in grassland with thick scrub

The total observations in each habitat are analysed to show the *percentage* of records of different species feeding there. The figure in brackets under the name of the habitat is the total number of records for that habitat. Each column lists the most numerous species in the habitat in order of frequency of their feeding there. At the foot of each column is the number of the remaining species recorded as feeding in this habitat, and the percentage of the feeding records made up by these. All other figures are percentages.

GROUND			HERB			SHRUBS		TREES	AIR
Bare Summer ½-year April–Sept. (100)	Short Grass Summer ½-year April–Sept. (92)	By Water Summer ½-year April–Sept. (18)	Long Grass Summer ½-year April–Sept. (164)	Mixed Herb Summer ½-year April–Sept. (138)	Bracken Summer ½-year April–Sept. (27)	Spring Quarter April–June (117)	Summer Quarter July–Sept. (314)	Summer ½-year April–Sept. (73)	Summer ½-yea April–Sept. (53)
Blackbird 34	Blackbird 40		Starling 17	Goldfinch 29	Wren 26	'Willow Warbler' 43	Blue Tit 33	Blue Tit 41	'Willow Warbler
Chaffinch 19	Robin 17		Whitethroat 16	Whitethroat 16	Whitethroat 22	Blue Tit 20	'Willow Warbler' 18	'Willow Warbler' 25	Blue Tit
Robin 12	Song Thrush 10		Reed Bunting 13	Blue Tit 16	Blackbird 22	Great Tit 14	Whitethroat 14	Great Tit 15	Whitethroat
Song Thrush 9	Starling 5		Robin 8	Bullfinch 12	Dunnock 11	Whitethroat 11	Bullfinch 8	Whitethroa 5	Chaffinch
Great Tit 6	Chaffinch 4		Pheasant 8	Marsh Tit 7			Longtailed Tit 7		Robin
Goldfinch 4			Blue Tit 6	Willow Tit 7			Willow Tit 4		
			'Willow Warbler' 6	Redpoll 4					(Also unknown
			Goldfinch 6						numbers of Sw
			Blackbird 4						lows, House Ma
									tins and Swifts).
12 other species 16	12 other species 23		13 other species 16	7 other species 9	4 other species 19	6 other species 12	17 other species 16	7 other species 14	2 other species
Winter ½-year Oct.–Mar. (160)	Winter ½-year Oct.–Mar. (90)	Winter ½-year Oct.–Mar. (50)	Winter ½-year Oct.–Mar. (111)	Winter ½-year Oct.–Mar. (168)	Winter ½-year Oct.–Mar. (35)	Autumn quarter Oct.–Dec. (654)	Winter quarter Jan.–Mar. (350)	Winter ½-year Oct.–Mar. (157)	Winter ½-year Oct.–Mar. (7)
Blackbird 27	Robin 24	Waxwing 24	Reed Bunting 31	Goldfinch 29	Wren 54	Long-tailed Tit 21	Longtailed Tit 30	Blue Tit 38	
Robin 25	Dunnock 22	Jack Snipe 18	Wren 16	Blue Tit 27	Blackbird 20	Redwing 18	Blue Tit 21	Redpoll 25	
Dunnock ,17	Blackbird 21	Blackbird 16	Blackbird 13	Bullfinch 11	Dunnock 6	Blue Tit 14	Bullfinch 8	Great Tit 8	
Chaffinch 8	Chaffinch 8	Bullfinch 10	Robin 9	Wren 7		Blackbird 11	Great Tit 7	Longtailed Tit 8	
Great Tit 6	Great Tit 5	Reed Bunting 6	Dunnock 7	Redpoll 5		Wren 8	Waxwing 5	Bullfinch 6	
Jay 4	Wren 3	Robin 4	Blue Tit 6	Robin 5		Fieldfare 6	Greenfinch 5	Waxwing 4	
Marsh Tit 4	Song Thrush 3	Dunnock 4		Dunnock 5		Great Tit 4	Fieldfare 4	Goldcrest 4	
	Magpie 3	Song Thrush 4				Goldcrest 3	Wren 4		
							Blackbird 4		
9 other species 9	6 other species 11	5 other species 14	11 other species 18	8 other species 11	7 other species 20	13 other species 15	9 other species 12	10 other species 7	

By autumn the Willow Warblers have departed and the Thrushes, Redwings, Fieldfares and Blackbirds come into the shrubs to feed on the fruit. Longtailed Tits are still present on the twigs presumably taking insects while Blue Tits take both insects and fruit. By the winter quarter the fruits are mainly gone and with them many of the immigrant thrushes, but the insect feeding tits remain while in the latter part of this "quarter" the Bullfinch arrives to eat the early leaf buds. The use of the shrubs is least in the spring when there are no fruits and presumably relatively few insects.

Table III indicates the preference of the birds for the different kinds of trees and shrubs. The hawthorn is very much the dominant species, comprising, probably, over half the total number of shrubs on the grassland, and most shrub-feeding birds might be expected to spend much of their time in it. Of all the feeding records in trees and shrubs, 63% were in hawthorn, so it is not surprising that most of the important shrub-feeding birds showed a preference for this species. The only exceptions were Redpoll, which fed more frequently on birch (catkins) and Greenfinch which fed more on rose (hips). Fieldfares and Blackbirds also searched the Blackthorn for sloes while Blue Tits and Willow Warblers showed additional interest in willows. It is also interesting that the three woodland species, Great and Blue Tits and Goldcrest, which in woodland showed marked preference for oak trees, should still frequently feed on these trees in the scrubland, although the oak makes up only about 1% of the total trees and shrubs there.

Hawthorn berries. Table IV illustrates the use of the fruit crops and shows the actual numbers of records of birds seen eating the fruit. Many species eat haws and the season is a long one, starting in August and continuing sometimes to March. Often however most of the crop has been taken by January. The peak of the harvest appears to be December and usually the immigrant Redwing flocks eat most of the haws but the resident thrushes and Blackbirds take a good many. At this season the ground near the hawthorns may be littered with pellets, which are believed to have been regurgitated by the thrushes. These pellets are very soft and black and contain several unbroken hawthorn nuts. On occasion, we have noted a curious preference of the Blackbirds, Redwings and Fieldfares for certain hawthorn bushes, neglecting others or at least leaving them until the last. They would take berries from the favoured hawthorns again and again, even when other bushes nearby still had far more berries, perhaps brighter in colour and more conspicuous. Possibly these berries were not quite ripe, but, to us, they certainly seemed as advanced as the others! No doubt birds normally select their fruit very carefully and this was well illustrated by a Waxwing on March 27, 1959. This bird selected the haws with great discrimination, first picking one and feeling it in its bill. A good many were rejected and dropped, while only about one in four was swallowed. It should be mentioned however that the haws were very dried up and withered by this date. The whole berry is swallowed by the thrushes, the kernels being regurgitated in pellets. Waxwings also swallow the haws whole, but according to F. Meaden (in litt.), who has had extensive experience of feeding these birds with haws in captivity, they do not produce pellets. The Hawfinch and Greenfinch crack the kernels and leave the flesh whereas tits peck and eat the flesh only, as also does the Bullfinch which is apparently unable to crack the kernels (Newton 1960).

TABLE III

Preference for the Different Trees and Shrubs

Table showing the percentage of feeding records in different trees and shrubs throughout the whole year

	Fieldfare	Blackbird	Redwing	Wren	Dunnock	Great Tit	Blue Tit	Marsh Tit	Willow Tit	Longtailed Tit	Greenfinch	Redpoll	Bullfinch	Chaffinch	Whitethroat	"Willow Warbler"	Goldcrest	Waxwing
	(50)	(90)	(186)	(65)	(22)	(95)	(376)	(29)	(29)	(282)	(34)	(41)	(82)	(18)	(60)	(121)	(28)	(25)
Hawthorn	76	75	97	66	86	61	46	55	59	75	32	0	74	78	63	51	53	52
Rose	2	1	2	10	0	4	6	24	13	2	68	0	6	5	13	3	0	12
Blackthorn	20	20	1	10	0	3	9	3	11	10	0	0	12	5	7	9	14	0
Willow	0	2	1	3	0	3	14	0	0	7	0	10	4	5	7	20	4	20
Birch	0	0	0	2	5	0	2	0	0	1	0	90	0	0	0	1	0	0
Oak	0	0	0	0	0	19	18	0	0	6	0	0	1	5	7	7	21	0
Other Species	2	1	1	8	9	9	6	17	17	1	0	0	2	0	3	10	7	16
Total	100	99	101	99	100	99	101	99	100	100	100	100	99	98	100	101	99	100

The figures in brackets denote the number of records being analysed.

N.B.—The hawthorn is very much the dominant species among the trees and shrubs. A census made on a sample of 4 acres in 1959 showed that out of a total of 1,120 shrubs, 55% were hawthorn, 24% rose, 15% bramble, 3% blackthorn, 1½% ash and 1% oak (from data given by Castell, 1960). Thus most shrub feeding birds might be expected to spend a large proportion of their time in the hawthorn. Of all the feeding records in trees and shrubs, 63% were in hawthorn, 9% in blackthorn, 8% in willow, 7% in oak, 6% in birch and 4% in other shrubs.

Sloes, the fruit of the *Blackthorn*, seem to be taken mainly from October to December (Table IV). After this the sloes begin to dry and become wrinkled. Blackbirds and Fieldfares are the birds most commonly seen taking them but as these berries often occur in dense thickets it is difficult to obtain definite feeding records and probably Song Thrushes and Redwings also take them frequently, these birds being often seen visiting the thickets at this season.

Rose hips were eaten by birds at any time between September and March (Table IV). The Greenfinch ate them more frequently than other birds, removing and crushing the seeds and leaving the pulp; these birds certainly show a preference for hips over haws. Thrushes and Waxwings frequently swallow hips whole. The thrushes often regurgitate the seeds in pellets which may sometimes be found lying on the paths or ant hills especially in December and January. These pellets are soft, pale reddish and about $1\frac{1}{4}$ inches long; they contain the seeds and sometimes the red

TABLE IV

THE USE OF THE FRUIT CROPS

(*a*) *Hawthorn berries*

The number of records of birds feeding on haws in each month

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Great Tit								1	1
Blue Tit			3	5		2			10
Willow Tit			2						2
Mistle Thrush			1			2			3
Fieldfare				17	8	12	4		41
Song Thrush			3	1	1				5
Redwing				10	127		6		143
Blackbird			5	8	30	1	8	1	53
Robin			1	1			2		4
Blackcap	1								1
Waxwing								13	13
Hawfinch							2		2
Greenfinch		4			2	3			9
Bullfinch						1			1
Monthly Totals	1	4	15	42	168	21	22	15	288

(*b*) *Blackthorn-Sloes*

The number of records of birds feeding on sloes in each month

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Jay					1			1
Fieldfare				10				10
Song Thrush				1				1
Blackbird		16			1			17
Robin			1					1
Monthly Totals		16	1	11	2			30

(*c*) *Rose hips*

The number of records of birds feeding on hips in each month.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Blue Tit		2			1	1		4
Marsh Tit			1		3			4
Fieldfare			1					1
Redwing				4				4
Blackbird					1			1
Waxwing							3	3
Greenfinch			2	9		6	1	18
Bullfinch	2							2
Monthly Totals	2	2	4	13	5	7	4	37

outer wall of the rose hips. When dried the seeds remain and are often found empty, having been opened, no doubt, by small rodents. Waxwings, however, appear to pass the seeds in their faeces (Gibb, 1948; Gibb & Gibb, 1951). Tits remove and swallow the seeds, the Marsh Tit carrying off the hip to do so. Birds do not seem to use up the supply of rose hips as quickly as they do haws and often the bushes still have many hips as late as March.

4. Herb Layer: (*a*) *Long grass*. The low-lying plains are dominated by Tufted Hair Grass *Deschampsia cespitosa*, a tall grass growing from tussocks up to about 5 feet or so. Jones (1954) states that its only competitors are bracken and scrub. There are numerous other grasses present, the most important being:–Purple Moor Grass *Molinia caerulea*, Smooth Meadow Grass *Poa pratensis*, Cocksfoot *Dactylis glomerata*, Meadow Barley *Hordeum secalinum*, False Oat *Arrhenatherum elatius*, Tufted Soft Grass *Holcus lanatus*, Meadow Foxtail *Alopecurus pratensis*, Sweet Vernal Grass *Anthoxanthum odoratum*.

Although the long grass must produce vast quantities of seed, this is not easily accessible to birds, owing to the difficulty they have in walking on the ground among the tussocks and close-set long grass stems when they are tall. Chaffinches and Reed Buntings are able to reach out and take a few seeds from nearby grassheads when they perch on the lower branches of shrubs or stout stems of tall herbs such as *Angelica sylvestris*. Later in the year from December to May the grasses lie down and become flattened and some remaining seeds are taken from the grass head by the birds perched on the ground or tussock. Otherwise much of the grass fruit crop must be blown by the wind and drop to the ground at the foot of the grasses and be eaten, if at all, by animals other than birds. There is also a large supply of animal food in the long grass. Insects are numerous at certain seasons and include grasshoppers and caterpillars while plant-bugs (Stenodemini, Heteroptera) may be found in enormous numbers (Leston, 1952). Snails and slugs are certainly present but perhaps available only in damp weather.

Some indication of the large quantity of food present on the ground at the foot of the grasses was obtained when an area of the plains was burnt in August, 1959. The ground was charred and black; there were stumps of burnt *Deschampsia* and a few other herbs not entirely burnt. The shrubs had all their leaves scorched brown. At the next visit to the area, about one month after the burning, birds were seen to be concentrating in this area to feed during the late afternoon and in $1\frac{1}{2}$ hours ten species were seen feeding. Of 55 feeding records, 46 were on the ground (84%). It might be expected that most feeding would be on the ground as most food in the higher levels may have been destroyed by the fire. The most frequent visitors were Great Tit, Blackbird, Robin, Dunnock and Chaffinch, but other species feeding on the ground included Turtle Dove, Blue Tit, Song Thrush, Chiffchaff and Redpoll. It was very noticeable how easily birds found food among the charred particles on the ground; Robins and Dunnocks would repeatedly pick up small objects in quick succession. A Song Thrush was seen carrying off a snail, although most of the snails on the ground were merely empty shells, perhaps having been roasted. Great Tits then and during the next three or four months seemed to find quite a lot of food on the twigs and branches of the shrubs, as well as on the ground. G. R. Conway collected objects which were clearly visible to him on the blackened ground and these included many

unburnt seeds of grasses and other herbs, and also some living millepedes, snails and insects such as yellow ants, which survived inside the ant-hills, besides dead insects including beetles and snail shells. No doubt much of this food would have remained hidden even from the birds, but for the fire.

Birds feed in the long grass relatively seldom (10% of the total records, table I) presumably because of the difficulty of access. The most important species feeding here are shown in table II. In the summer half-year Starlings feed here most often but almost always in early spring when the grass is still lying flattened and shrivelled and birds run easily on the area and it is at this season that birds are most frequently seen feeding in the long grass (table I). It must be admitted however, that birds are more easily seen then and a few may perhaps be missed at other seasons. Later in the summer half-year Whitethroats and Willow Warblers drop down to take insects while Reed Buntings feed on the grass seeds. In the winter half-year the Reed Bunting is again the most frequent visitor for the grass seed but Wrens, Blackbirds and Robins also frequently feed there at that season.

(*b*) *Mixed Herbage.* This includes clumps or patches of the larger herbaceous plants of many different species (Jones, 1954). They are an important source of food supply to birds by means of their fruits and also their abundant insect fauna. These herbs are particularly dense in the damper areas especially along the ditches. The mixed herbage is most popular with birds in summer and autumn (table I) when the many seeds and fruits are ripe and insects abundant. As shown in table II, the habitat is frequented by seed eaters notably Goldfinches (taking thistle fruits), Bullfinches (various seeds), and Redpolls taking the fruits of the Great Hairy Willowherb *Epilobium hirsutum.* Whitethroats and Wrens no doubt take many insects there and the Blue, Marsh and Willow Tits eat the insects as well as many herb fruits.

(*c*) *Bracken.* There are wide belts on the higher ground covered by bracken *Pteridium aquilinum* and in places where bracken is thick little else will grow. As a feeding site dense bracken is not popular with birds, attracting only about 2% of the feeding-site records. The Wren is perhaps the most regular inhabitant especially in winter (table II) but Blackbirds and Dunnocks also feed there regularly. In summer the Whitethroat obviously finds enough insects to justify fairly frequent visits; Parmenter (1950) points out that a number of species of flies (Diptera) occur in the bracken canopy, some in abundance. The bracken grows up in May and June to about 5 feet going higher perhaps to 11 feet among the branches of the shrubs. From May onwards therefore it is very difficult to observe any bird behaviour in this habitat but a walk through the bracken disturbs very few birds and we do not think that many are missed. Observation becomes easier by autumn when the fronds turn brown, and by the end of December they become flattened down.

5. GROUND: (*a*) *Open bare ground* and (*b*) *Shaded bare ground.* The bare ground is most extensive in winter, so it is not surprising that it is used most then and least in the autumn when much of it may be covered by vegetation and also when the shrubs and herbs offer other attractions (table I). This niche is dominated by the Blackbird, Robin and Chaffinch in summer and winter although the Dunnock also comes down to it frequently in winter (table II). It is interesting to note how often Great

Tits may be found feeding on the ground. After strong wind and heavy rain the cinder tracks have been observed to be thickly covered with grass seed in places and Chaffinches and other finches were busily eating them.

(*c*) *Short Grass.* The grass of the paths is kept short by trampling, allowing the growth of species such as Annual Meadow Grass *Poa annua.* Both these paths and areas where the turf has been grazed short by rabbits offer popular feeding sites for many birds. Not only are insects, earthworms and probably snails and slugs taken here but this type of habitat is doubtless frequently covered with seeds blown from the herbs and long grass; on the short grass these fruits may be more readily seen by birds and picked up. The niche is used rather less than the bare ground (table I) and mostly in spring. It is dominated by Robin and Blackbird, associated with Song Thrush, Starling and Chaffinch in summer, and with Dunnock, Chaffinch and Great Tit in winter (table II). For the size of the area available this habitat is probably used more frequently by birds for feeding than is the long grass but of course the areas of long grass are very much larger.

(*d*) *Ground by water* either bare or with a sparse herb layer. This is probably an important habitat but it is difficult to get accurate records as the exact site is often hidden by lush herbage and there are thus relatively few feeding records from here (table I). No doubt many of the birds have been down to drink and this certainly was the case with the Waxwings, which although rare visitors to the area were seen to drink from puddles on 12 occasions, more often than any other species. Sometimes birds may be taking small seeds or animals from the mud at the edge of ditches. Jack Snipe regularly feed in the very wet marsh but this species may have sometimes been resting and not feeding when disturbed.

The Number of Species of Birds in the Different Habitats

Shown below is the number of species which feed regularly in these different habitats, i.e. those species which formed 2·5% or more of the total feeding records for the whole year and for the summer or winter half-year. They are compared with figures obtained by the same method in dense oakwood (Beven, 1959):—

	Grassland with thick scrub	*Dense Oakwood*
Trees	11	10
Shrubs	13	11
Long Grass	16	—
Mixed herbage	11	5
Bracken	7	—
Ground—bare	10	5
Ground—short grass	11	
Ground—by water	9	—

Long grass and bracken do not form separate distinct habitats in the dense oakwood in Eastern wood and there is little permanent water there.

It is interesting to note that in spite of the increased yield of fruit in the shrubs the number of species regularly feeding in the shrubs and trees is very similar in both scrub-grassland and oakwood. There is however a more varied bird population feeding in the mixed herbage in the grassland, presumably because the fruit and seed crop there is much greater than in woodland and the insect population may also be greater. The most surprising finding however is that long grass contains the highest figure for regular feeding species (although the number of feeding records there

is only 10% of the total). As already suggested the food content of the long grass is no doubt considerable but the difficulty of access probably keeps birds in other habitats during much of the year. Bare ground and short grass attract more species than the corresponding area in woodland. This may be partly because in the grassland with scrub there are more seeds lying on the surface, windblown from nearby grass or herbage, and partly because these open areas are more easily discovered by passing birds and thus may attract birds such as Goldfinches and Starlings in addition to the true woodland species.

The Feeding Sites of the Birds

(i) The percentage distribution of *feeding sites of Thrushes, Wren and Dunnock* is shown in Table V.

The few records of the Song Thrush indicate that it feeds largely on the ground and to a lesser extent in the herb layer where it finds earthworms, insects, snails and slugs. It has been seen eating snails such as *Cepaea hortensis* and *Cepaea nemoralis*, which are fond of sheltering in clumps of tall growing herbage, especially nettles and willow herb; 17 species of snails and slugs have been recorded from Central plain (Ellis, 1948). In late summer and autumn it feeds on the fruits of the shrubs including elderberries in August, and hawthorn berries, sloes and ivy berries up to December.

Blackbirds also feed largely on the ground and in the herb layer. But in the latter they were found mainly in long grass and bracken, so were probably still feeding on the ground where they no doubt eat earthworms, insects and the seeds of many plants. On the ground they commonly frequent the short grass, the open bare ground and the bare ground under shrubs. In the autumn the Blackbirds feed largely in the shrubs where they are frequently seen taking hawthorn berries from October to January or even as late as March. They often eat sloes and rose-hips between October and January, and ivy berries were taken even in April. Fallen crab apples attract them from August onwards. By way of contrast, in the dense oakwood, Blackbirds feed almost entirely on the ground, by turning over the leaf litter. The hawthorn bushes in the wood have very few (if any) berries presumably because of the dense shade (Tansley, 1949 p. 77).

Fieldfares and Redwings arrive on the plains in time to gorge on the fruit harvest of the shrubs and spend almost all their time doing this. They pick the hawthorn berries (November to February) and may also be seen taking sloes and occasionally digging into fallen apples in December. Redwings have been observed eating rose-hips in November and December. Mistle Thrushes also feed on the plains but there are very few records.

Of the four species of *Turdus*, Fieldfares and Redwings come into the area in autumn and winter and compete with the resident Blackbirds and Song Thrushes for the crop of berries in the shrubs. Thus the difference in feeding niche between these thrushes becomes less marked at this season. When the crop is abundant there is presumably enough food for all these species but when it is poor (as it was for example in 1961) the winter visitors soon pass on elsewhere. While they are there, however, the Fieldfares and Redwings are remarkably specialized in their diet; they feed almost entirely on the shrub fruits and have rarely been observed on

the ground, although of course they may sometimes fly to adjacent farmland where they do feed on the ploughed fields and pasture. On the other hand the Blackbirds, although they take many haws and other berries at this season, feed frequently on the ground among the shrubs. The feeding sites for Blackbird and Song Thrush appear much the same in Table V, but direct competition for food is probably not as great as might appear. Blackbirds regularly turn over leaf litter and take more fruits and seeds than Song Thrushes which, although they do not dig among the leaves, take rather more animal food especially snails and even slugs which are not regularly eaten by Blackbirds (Bannerman, 1954; Witherby *et al.*, 1941).

TABLE V

PERCENTAGE DISTRIBUTION OF FEEDING SITES OF THRUSHES, ROBINS, WREN AND DUNNOCK, IN GRASSLAND WITH THICK SCRUB (COMPARED WITH DENSE OAKWOOD AND AREAS OF BURNT SCRUB).

(*a*) Total figures for the whole year

	Field-fare	Song Thrush	Red-wing	Blackbird		Robin			Wren		Dunnock	
	scrub (53)	scrub (40)	scrub (188)	scrub (279)	oak-wood (133)	scrub (150)	burnt* scrub (16)	oak-wood (128)	scrub (131)	oak-wood (60)	scrub (96)	burnt* scrub (31)
Ground	4	68	0	55	92	63	100	54	5	13	54	100
Herb	0	10	1	14	0	23	0	5	42	36	22	0
Shrub	96	22	98	30	2	13	0	32	53	43	23	0
Tree	0	0	1	1	6	0	0	7	0	8	0	0
Air	0	0	0	0	0	1	0	0	0	0	0	0

(*b*) Seasonal variations of feeding sites in scrubland and grass

	Spring April–June	Summer July–Sept.	Autumn Oct.–Dec.	Winter Jan.–March
BLACKBIRD	(42)	(59)	(99)	(79)
Ground	79	83	24	61
Herb	21	12	6	22
Shrub	0	5	69	17
Tree	0	0	1	0
ROBIN	(38)	(15)	(41)	(56)
Ground	58		47	79
Herb	37		25	18
Shrub	0		29	3
Tree	0		0	0
Air	5		0	0

	Summer ½-year Apr.-Sept.	Winter ½-year Oct.-Mar.
WREN	(17)	(114)
Ground	17	3
Herb	41	43
Shrub	41	53
Tree	0	0
DUNNOCK	(10)	(86)
Ground		54
Herb		20
Shrub		25
Tree		0

Figures in brackets denote number of records on which percentage is based: otherwise all figures are percentages. In some cases the number of records is too small to break down into percentages.

*Burnt scrub refers to an area of scrubland which was burnt in 1959.

NOTES:—

Song Thrush: 68% on ground comprises 8% by water, 30% on short grass and 30% on bare ground. The latter is made up of 8% on bare ground under shrubs and 22% on open bare ground on paths or mud.

Blackbird: 55% on ground comprises 7% by water, 20% on short grass and 28% on bare ground. The latter is made up of 14% on bare ground with leaf litter under shrubs and 14% on open bare ground.

Robin: 63% on ground comprises 3% by water, 25% on short grass and 35% on bare ground. The latter is made up of 14% on bare ground under shrubs and 21% on open bare ground.

Wren: 43% in herb layer comprises 15% in long grass, 8% in mixed herbage and 20% in bracken.

Dunnock: 54% on ground comprises 3% by water, 23% on short grass and 28% on bare ground. The latter is made up of 12% on bare ground under shrubs and 16% on open bare ground.

The Robin is largely a ground feeder, particularly in the winter and there it finds earthworms, insects including moths, small snails and probably numerous small seeds; many of the feeding records were on short grass chiefly on paths and on bare ground, not only on the open paths and mud by ditches but also frequently under the dense shade of the shrubs. They also feed quite extensively in the herb layer but the long grass is most often visited when it is flattened down in the winter and early spring and not entered much at other seasons when it is tall. However one bird was seen to take the fruits of *Deschampsia cespitosa* from the grass heads, while perched on a stem of Angelica. That food is really plentiful in this long grass was well shown in 1959 when an area of central plain was burnt and Robins were observed feeding on ground originally occupied by long grass and other herbaceous plants. They seemed to find food extremely easily, one bird picking up 24 objects in quick succession from the burnt ground. Of 16 feeding records on the burnt area, all were on the ground. It may be, of course, that the food suitable for Robins in other parts of the habitat had been largely destroyed by fire, but other birds such as Great Tits still fed extensively in the charred shrubs. Robins also partake of the berry harvest in the autumn, eating the hawthorn berries and even the sloes, and may be seen daintily sipping the hanging raindrops on the hawthorn twigs in December. In dense oakwood by comparison, although Robins also feed largely on the ground, they feed more in the shrubs than in the herb layer which is rather sparse there.

The Wren is a bird of the herb layer and lower shrubs where no doubt they find many insects and spiders but we have no records of actual food taken. Their feeding niche is similar in both scrubland with grass and dense oakwood.

The Dunnock feeds very much on the ground, many of the records being on short grass and on bare ground including that under the dense shade of the shrubs. This species also feeds quite extensively in the herb and shrub layers. It has not been possible to detect what food was taken even when one was seen feeding on Teazel heads, but presumably small arthropods and seeds are included. Here again some observations on the burnt area of the plains in 1959 showed that there the Dunnocks were feeding entirely on the ground and found food easily among the charred remains of the long grass and herbage.

(ii) In Table VI is shown the percentage distribution of *the feeding sites of the Tits*. Great Tits feed chiefly in the shrubs, especially in the autumn, and also go freely up into the trees where they must take many insects, having been observed taking larvae of moths and flies, including Trypetidae (Parmenter, 1960). In the autumn and winter however they eat elder, hawthorn and holly berries and will attack the galls on the oaks in search of the insect larvae in them. In spring they peck at the unopened leaf buds of Sycamore and oak. They take fruits of plants in the herb layer, and the larger ones such as those of Agrimony *Agrimonia odorata* and *Agrimonia eupatorium* are carried to a branch on a nearby hawthorn bush, held down with one foot and eaten piecemeal. In winter and early spring they spend much time on the ground and are especially fond of digging in the leaf litter under the dense hawthorn shrubs. From August onwards they may be seen eating the fallen crab-apples. When in 1959 an area of the plains was burnt the Great Tits fed very much on the ground (table VI). Presumably they do not feed

more often in the unburnt grass because of the difficulty in finding food once it has fallen down among the long grass and rank herbage. Curiously enough they also found quite a lot of food on the charred branches and twigs of the shrubs. In general the Great Tits feed rather more on the ground and in the herb layer on the grassland with scrub than in the dense oakwood, and of course less in trees as these are much more scarce.

Blue Tits also feed mainly in the shrubs throughout the year, but ascend to the trees especially in winter and early spring, when they search the lichen-covered branches of the oaks and peck the leaf buds of oak, hawthorn and hazel, and also eat the seeds from the catkins of birch and willow. In autumn and winter they frequently peck and eat the flesh of hawthorn berries and presumably take many insects and spiders. They also feed quite extensively among the herbaceous plants, especially in summer and autumn, searching for insects and seeds. They then cling to the stems and seed heads of Angelica picking off the aphis or swallowing the fruits whether green or brown. They also take the fruits of sorrel *Rumex* sp., White Bryony *Bryonia dioica* and Woody Nightshade *Solanum dulcamara*. One pecked at a gall of *Diastropus rubi* on bramble, probably taking the larvae. They have been observed taking small objects from the tall stems of the long grass sometimes opening the stems, presumably to extract insect larvae. When compared with dense oakwood Blue Tits feed much less in trees and more in shrubs and herb layer.

TABLE VI

PERCENTAGE DISTRIBUTION OF FEEDING SITES OF TITS IN GRASSLAND WITH THICK SCRUB (COMPARED WITH DENSE OAKWOOD AND BURNT SCRUB).

(*a*) Total figures for whole year

	Great Tit			Blue Tit		Marsh Tit		Willow Tit		Longtailed Tit	
	scrub (134)	burnt scrub (26)	oak-wood (157)	scrub (487)	oak-wood (640)	scrub (55)	oak-wood (112)	scrub (41)	oak-wood (14)	scrub (290)	oak-wood (444)
Ground	15	73	3	1	1	13	2	0	0	1	0
Herb	9	4	3	17	0	34	2	29	0	1	0
Shrub	57	23	47	59	22	53	46	71	36	93	38
Tree	17	0	47	20	77	0	50	0	64	4	62
Air	1	0	0	4	0	0	0	0	0	2	0

NOTES:—
Marsh Tit: 34% in herb layer comprises 9% in long grass and 25% in mixed herbage.
Willow Tit: 29% in herb layer comprises 27% in mixed herbage and 2% in bracken.

(*b*) Seasonal variation in feeding sites in scrubland with grass.

	Great Tit				Blue Tit				Longtailed Tit			
	Spring April–June (25)	Sum. July–Sept. (23)	Aut. Oct.–Dec. (36)	Winter Jan.–Mar. (50)	Spring April–June (40)	Sum. July–Sept. (169)	Aut. Oct.–Dec. (163)	Winter Jan.–Mar. (115)	Spring April–June (2)	Sum. July–Sept. (24)	Aut. Oct.–Dec. (151)	Winter Jan.–Mar. (113)
Ground	16	9	3	26	5	0	1	2		0	0	1
Herb	8	9	9	8	5	18	28	6		0	0	1
Shrub	64	43	78	50	57	62	56	62		92	93	92
Tree	12	35	10	16	32	10	15	30		8	7	1
Air	0	4	0	0	0	10	0	0		0	0	5

Figures in brackets denote number of records on which percentage is based, otherwise all figures are percentages.
Burnt scrub refers to an area of scrubland which was burnt in 1959.
In some cases the number of records is too small to break down into percentages.

There are relatively few feeding-site records of Marsh and Willow Tits but the results indicate that both species feed at a lower level here than in the oakwood, spending much of their time in the shrub and herb layers. Both birds eat insects including small moths taken in flight, and a good deal of vegetable matter. Willow Tits take fruits from thistle and other plants and peck at hawthorn berries. Marsh Tits have a well marked habit of carrying a seed or fruit to a nearby hawthorn branch and demolishing it while holding it down with a foot, and have treated in this manner the fruits of Marsh Thistle *Cirsium palustre*, both species of Agrimony and rosehips. They also feed on the fruits of the Tufted Hair Grass, Honeysuckle *Lonicera periclymenum*, berries of Black Bryony *Tamus communis* and unripe blackberries. They peck the leaf buds of the shrub birch in April. Marsh Tits also descend to the ground to feed on fallen crab apples (December to February).

In the oakwood Longtailed Tits are birds of the twigs feeding entirely in the trees and shrubs. In the scrubland they searched for food exclusively on the twigs of the shrubs rarely coming down into the herb layer or on to the ground. It was never possible to see what food they took, although it always seems very small—sometimes they make little sallies from the twigs to catch flying insects.

Although the various species of tits compete for certain foods and all feed largely in the shrubs (or trees) yet they spend different proportions of the rest of their feeding time in different habitats; thus Great Tits also feed largely on the ground, Blue Tits in the trees and herb layer, Marsh and Willow Tits much more frequently in the herb layer and Marsh Tits also more on the ground. Longtailed Tits feed almost wholly in the shrubs. In addition the different beak-size in the various species indicates different size of food taken. For instance it has been shown that in woodland Great Tits selected larger insect prey than Blue Tits and even when feeding on the same prey species on the same dates and in same plantations, Great Tits invariably selected larger specimens (Gibb and Betts, 1963). The Longtailed Tits breed in the scrub at Bookham but the other species do not seem to nest far from the wood edge.

(iii) Table VII shows the percentage distribution of *feeding sites of the finches and buntings*. Greenfinches probably do not breed on the Common but may do so in the gardens around. They are most frequently seen in the shrubs during the autumn and winter, when they take the rosehips and hawthorn berries. There were 13 feeding records on the burnt area in 1959; of these 9 were on bare ground and short grass, thus indicating that these birds will feed on the ground when the food there becomes accessible.

Goldfinches probably breed in the gardens adjoining the Common and visit the scrubland areas in summer and autumn to feed mainly in the herb layer where they chiefly take the seeds of thistles especially Marsh Thistle *Cirsium palustre* and sometimes fruits of Teazel *Dipsacus fullonum*, Hairy Willowherb *Epilobium hirsutum*, Hoary Ragwort *Senecio erucifolius*, Knapweed *Centaurea* sp. and occasionally seed from the heads of the tall grasses.

Redpolls arrive in the autumn to feed on the catkins in the birches but they also spend much of their time in the rank herbage where they take seeds particularly from Hairy Willowherb.

Bullfinches are resident in the grassland with scrub and spend about

half their feeding time in the shrubs but it is often impossible to see what they eat. They certainly take rosehips and peck the flesh of hawthorn berries, and pick the fruits of the Sallow *Salix* sp in summer and autumn, while in early spring they eat large quantities of the early leaf buds on hawthorn and blackthorn. In summer and autumn they also visit the herb layer after seeds, e.g. fruits of umbelliferous plants and Sorrel *Rumex* sp. and are often found among the Meadowsweet *Spiraea ulmaria* no doubt eating the fruits, of which they are very fond (Newton, 1960). They also drink from small puddles.

Chaffinches breed in the scrub and although many birds leave in summer (Beven, 1956) some remain throughout the year. They feed mainly on the bare ground or short grass of paths where they seem to pick up many small fruits including grass seed. They also feed in the shrubs, taking some insects there and sometimes making short fly-catching sallies. In May they collect green caterpillars for their young.

The Reed Bunting is a resident species in the scrubland, feeding very largely in the long grass on the grass seed. It seems to be one of the few birds able to make abundant use of the food in this habitat. It takes grass seed in summer and autumn, notably *Deschampsia cespitosa* but also *Molinia caerulea*. When the grass is tall the Buntings will perch on a

TABLE VII

PERCENTAGE DISTRIBUTION OF FEEDING SITES OF FINCHES AND BUNTINGS IN GRASSLAND WITH THICK SCRUB

a) Total figures for whole year.

	Greenfinch	Goldfinch	Redpoll	Bullfinch	Chaffinch	Reed Bunting
	scrub (39)	scrub (108)	scrub (55)	scrub (128)	scrub (73)	scrub (71)
Ground	5	5	0	5	63	7
Herb	8	89	25	32	8	87
Shrub	87	5	2	54	21	6
Tree	0	0	73	9	4	0
Air	0	0	0	0	4	0

NOTES:—

Goldfinch: 89% in herb layer comprises 81% in mixed herbage and 8% in long grass.

Reed Bunting: 87% in herb layer comprises 11% in mixed herbage and 76% in long grass.

Chaffinch: 62% on ground comprises 45% on bare ground, 16% on short grass and 1% by water.

Bullfinch: 32% in herb layer comprises 27% in mixed herbage and 5% in long grass.

(*b*) Seasonal variation in Feeding Sites in grassland with thick scrub.

	Goldfinch		Chaffinch		Bullfinch		Reed Bunting	
	Summer ½-year April–Sept. (44)	Winter ½-year Oct.–Mar. (45)	Summer ½-year April–Sept. (34)	Winter ½-year Oct.–Mar. (39)	Summer ½-year April–Sept. (51)	Winter ½-year Oct.–Mar. (77)	Summer ½-year April–Sept. (26)	Winter ½-year Oct.–Mar. (45)
Ground	10	2	73	54	2	8	3	9
Herb	88	90	9	8	39	28	94	84
Shrub	2	8	9	31	57	51	3	7
Tree	0	0	0	8	2	13	0	0
Air	0	0	9	0	0	0	0	0

Figures in brackets denotes number of records on which percentage is based; otherwise all figures are percentages.

twig of bramble or hawthorn, or the stem of *Angelica* and reach out to seize the fruits from the nearby grass heads. The birds are sometimes able to perch on the grass stems but these attempts appear less successful. Thus it seems likely that the presence of shrubs helps the Reed Bunting to feed more extensively in the long grass in summer. By December the long grass has become much flattened and the birds can then pick the seed from the prostrate grass heads much more easily. They also take other seeds such as those of Hairy Willowherb, and insects such as craneflies (Tipulidae) which may be captured in short aerial sallies from perches in the shrubs.

Thus, while in the scrub and grassland, the finches and buntings feed largely in different parts of the habitat and therefore do not compete greatly with one another. Goldfinches feed mainly in the rank herbage, Reed Buntings in the long grass, Greenfinches in the shrubs and Chaffinches on the ground. Redpolls feed mostly in the trees but also in the rank herbage and Bullfinches in shrubs and herbs. The size and shape of the beaks of these various species differ and also indicate a different diet.

(iv) Table VIII indicates the percentage distribution of *feeding sites of Warblers, Goldcrest and Starlings.*

These figures show clearly that the Whitethroat feeds about equally in the shrubs and herb layer and little elsewhere. From its liking for rank herbage it has earned the name of "Nettle-creeper", and it may be seen taking green caterpillars and grubs from tangles of nettles and thistles in May, June and July; insects are picked from the flowers of Angelica and the berries of Woody Nightshade are swallowed in August. During its frequent disappearances down among the tall grasses, it is no doubt searching for insects, which it also does for much of the time in shrubs, sometimes flying out and taking them on the wing. In August it will turn aside and eat elder berries. On warm days in summer it may be seen bathing in a ditch.

Unless they are singing, Willow Warblers and Chiffchaffs are difficult to distinguish in the field. When the exact species was uncertain, observations were noted under *Phylloscopus* sp. However although a few Chiffchaffs are observed on the plains especially in autumn, there is little doubt that most of the feeding records refer to the Willow Warbler, a summer visitor which nests in the grassland with thick scrub. For the sake of simplicity therefore the figures in the tables are grouped under the heading of "Willow Warbler". These two species of *Phylloscopus* while in the scrubland keep very largely to the shrubs for feeding and make frequent brief flycatching sallies from the twigs. From time to time they do make visits to the herb layer particularly the long grass. As far as the shrubs are concerned both Whitethroat and "Willow Warbler" have a marked preference for Hawthorn which is by far the commonest shrub. Second choice for "Willow Warbler" is willow, and for Whitethroat is rose. Thus these warblers show a definite difference in feeding level, the Whitethroat feeding at a lower level than the "Willow Warbler".

The few feeding site records for Goldcrests show clearly their preference for shrubs and trees, especially shrubs, and their feeding niche is thus very similar to that in dense oakwood. The Goldcrest spends most of its time diligently searching the leaves and twigs for insects, making frequent littls flights after them, often hovering. In January one was noted flying into a small swarm of winter gnats (*Trichocera*) and eating them. This bird is only a winter visitor to the scrub.

Starlings do not feed very much in this scrubland and most records were in April and May. These were either on short grass on paths or on long grass which lies flat at this season, thus enabling birds to walk on it with relative ease. They have been observed feeding on fallen apples and also taking St. Mark's Fly *Bibio marci* in May (Parmenter, 1960).

In March and April 1959 hips and haws were still abundant and a party of Waxwings stayed to feed. Of 38 feeding records, 18 were of birds feeding in the shrubs taking haws (13) and hips (3) and pecking at hazel catkins (2), while of seven records in trees, 5 were of birds eating young leaves and buds of willow and 2 of pecking at twigs of Horse Chestnut *Aesculus hippocastanum*. There were 12 records of them drinking from puddles. This need for frequent drinking is curious, as other birds feeding much on hawthorn berries and rosehips, such as Redwings, have not been observed to come down to water there, although Blackbirds do visit ditches quite frequently. One possible explanation, that hips and haws by March have become very dry and wrinkled, cannot be the true one, as Waxwings drink regularly even when feeding on haws and hips in November and also when they eat apples in February (Gibb, 1948; Bagnall-Oakley, 1961). It appears that Waxwings seldom, if ever, regurgitate pellets (F. Meaden in litt.) and perhaps the indigestible fibrous coverings of the various nuts in the food makes the intestinal contents rather dry. Extra water might then act as a lubricant.

TABLE VIII

PERCENTAGE DISTRIBUTION OF FEEDING SITES OF WARBLERS, GOLDCREST AND STARLING IN GRASSLAND WITH THICK SCRUB (AND COMPARISON WITH DENSE OAKWOOD)

(*a*) Total figures for whole year

	Whitethroat	"Willow Warbler"	Goldcrest		Starling
	scrub (123)	scrub (160)	scrub (28)	oakwood (84)	scrub (35)
Ground	1	1	0	2	17
Herb	43	8	0	5	77
Shrub	46	66	79	57	6
Tree	3	12	21	36	0
Air	6	13	0	0	0

NOTES:—

Whitethroat: 43% in herb layer comprises 20% in long grass and 18% in mixed herbage and 5% in bracken.

Starling: 77% in herb layer comprises 74% in flattened long grass and 3% in upright long grass.

(*b*) Seasonal variation in Feeding Sites in grassland with thick scrub

	Whitethroat		"Willow Warbler"	
	Spring April–June (28)	Summer July–Sept. (95)	Spring April–June (75)	Summer July–Sept. (85)
Ground	0	2	1	1
Herb	47	42	1	14
Shrub	47	46	66	66
Tree	6	2	12	12
Air	0	7	20	7

Figures in brackets denotes number of records on which percentage is based; otherwise all figures are percentages.

General Conclusions

(i) *Feeding Niche in relation to habitats*

The dense thickets of hawthorn, rose and bramble are spreading across the grassy plains at Bookham Common and linking up with the scrub from the edge of the oakwood. Young birches, oaks and ash trees are springing up among the shrubs and unless this growth is checked the plains will ultimately be covered with oakwood. Some woodland birds have already invaded the scrub for food and have adapted their feeding niche accordingly, thus Great, Blue, Marsh and Willow tits, Bullfinch and Chaffinch all feed at a lower level than in dense oakwood. Blackbirds on the other hand feed not only on the ground as in dense oakwood, but at higher levels in the shrubs because of the greater crop of fruit there. The Pheasant, Song Thrush and Robin, being mainly ground feeders, have kept to the same feeding niche in scrub as in oakwood. The Wren, Whitethroat, Willow Warbler and Dunnock may perhaps be regarded as birds of the scrub which have penetrated the woodland with the shrub layer. They appear to keep very much to the same feeding niche in both habitats. The Longtailed Tit, perhaps also a shrubland bird, has changed its feeding niche, taking food at a higher level in oakwood.

In addition the following species feed regularly in the scrub and grassland but do not commonly do so in dense oakwood: Greenfinches, attracted by the fruits on the shrubs, Goldfinches by the fruits in the rank herbage, Redpolls by the tree fruits and the seeds in the herb layer and Reed Buntings by the grass and herb seeds. The Redwings and Fieldfares arrive to feed on the shrub fruit crop.

Grassland with thick scrub produces a great deal of food suitable for birds. Shrubs are highly important as a source of food supply, with the fruit crop and the larger quantity of insect life produced on them. In addition, by their dense shade they kill some of the long grass and create many small areas of bare ground with leaf litter, thus making another feeding site available for the birds and perhaps encouraging the spread into the scrub of woodland species such as Great Tits, Blackbirds, Robins and Chaffinches.

Melluish (1960) has studied the changes in population in this grassland with thick scrub and he concluded that, with the advance of scrub vegetation across the plains, the number of species of birds found there had increased by about 15% between 1950 and 1960, and the number of individuals counted during the whole year had nearly doubled between 1954 and 1960. It seems probable that this increase in bird population was largely due to the increase in scrub. The ground-feeding species notably Chaffinch and Tree Pipit have declined in numbers, the Tree Pipit in fact having disappeared completely, probably because the increased density of the long grass and bracken prevented the bird from finding adequate food on the ground. The decline of the Chaffinch may be due to more general causes as it has decreased elsewhere. On the other hand the Willow Warbler, which seeks its food in the foliage of shrubs and trees and on the herbage, has maintained its numbers.

The mixed herbs produce an abundant supply of seeds and insects thus attracting both seed-eating birds such as Goldfinches, Redpolls and Bullfinches, and those species which take insects as well, such as Blue and Marsh Tits, and the more insectivorous species such as Whitethroats.

The long grass also produces a large amount of food particularly seeds,

but also insects and some molluscs. Birds however find it difficult to move freely about in it when it is tall and they have difficulty in taking the seeds from the grass heads. When these seeds drop most must become inaccessible to birds. Those grass seeds which are windblown on to bare patches of ground or short grass paths are no doubt eagerly snapped up by birds, but this must be a very small proportion. When the grass is flattened in winter and early spring birds can search more easily and no doubt find grass seed, insects and molluscs then. The lower branches of the shrubs, by their use as perches, allow seed-eating birds to take seed from grass heads although sometimes stout herb stems are used for this purpose.

(ii) *Conservation Policy*

The spread of scrub on formerly-grazed common land has become a national problem. In 1959 the Conservation Corps of the Council for Nature started removing some of the shrubs as part of a pilot scheme of experimental and controlled scrub clearance (Castell, 1960). This work has been continued but only during the winter months so as not to interfere with the nesting of birds.

From this investigation it is clear that any policy in which large numbers of shrubs are removed will reduce the total numbers of birds feeding on these plains and probably also the numbers breeding there. But of course if the scrub is not cleared, the area will ultimately be covered with oakwood and then the numbers of birds will probably decrease again. It is not merely the total numbers of birds which is important, but also the variety, and this will depend on variations in the habitat. Rarer birds like Grasshopper Warblers and Lesser Whitethroats, as well as the more common Goldfinches, Reed Buntings and others will disappear when oakwood covers the plains. Therefore some scrub clearance is essential to preserve the habitat, and now that there is no significant grazing the clearance must be frequently repeated. Nevertheless, as we have shown, it is important to leave some larger shrubs and trees to produce more variety of habitat, for use as shelter and nesting sites, and also to increase the quantity of food available for birds. However, much work will be necessary to prevent the plains from becoming overgrown.

There are other aspects of conservation which should be considered. Footpaths should be kept open, by clearing of scrub and rank herbage, so that the grass is kept short by regular trampling. Ditches need periodic cleaning to keep areas partly drained and also to maintain the ditch-side flora and an accessible water supply. In this connection small areas might be left as permanent undrained marshes to form an additional habitat.

Bracken is least useful as a feeding habitat for birds and if allowed to spread further must decrease their numbers and variety. Control of bracken would appear to be important and merits careful attention.

It is also clear that the long grass is a difficult habitat for birds to use, now that the small amount of grazing by rabbits produces very little overall effect. It is perhaps a pity that rabbits are not more numerous, although they have increased since they were almost exterminated by myxomatosis in 1954 and are now close-grazing some small areas especially anthills. Nevertheless some additional control of long grass is needed, and is being considered by the Conservation Corps which hopes to discourage the coarse tussock grasses by mowing at certain seasons (Ing, 1960).

Summary

1. A study of the feeding sites of birds in grassland with thick scrub is reported and 2,878 observations analysed.

2. Shrubs are highly important as a feeding niche not only because of their fruit crop and insect fauna but also because by their dense shade they may prevent the growth of thick vegetation beneath, thus producing another useful feeding site for birds. Shrubs also enable seed-eating birds to feed more easily on grassheads by acting as perches for them. The preference of birds for different trees and shrubs is indicated. A large quantity of suitable food is probably produced in the long grass, but when this is tall much of the food becomes inaccessible to birds. Birds feed very little in dense bracken.

3. It is demonstrated how, in the grassland with thick scrub, each species may have a different feeding ecology:—

(i) The Song Thrush feeds mostly on the ground, the Blackbird rather more in the shrubs, and the Redwings and Fieldfares almost entirely in the shrubs, in this habitat.

(ii) Robins and Dunnocks feed much on the ground whereas Wrens feed mainly in herb and shrub layers.

(iii) All the tits feed largely in the shrubs, but during the rest of their feeding time Great Tits prefer the ground and trees, Blue Tits the herb layer and trees, Marsh and Willow Tits much more frequently feed in the herb layer and the Marsh Tit often visits the ground. Longtailed Tits feed almost wholly in the shrubs.

(iv) While in this scrubland the finches and buntings feed mostly in different parts of the habitat. Goldfinches prefer the fruits in the rank herbage, Reed Buntings the seeds in long grass, Greenfinches the fruits of the shrubs, Chaffinches frequent the ground, Redpolls eat fruits in the trees and seeds in the rank herbage and Bullfinches feed in the shrubs and herbs.

(v) Whitethroats feed mainly in the shrubs and herbs, "Willow Warblers" in the shrubs and trees.

4. It is suggested that when the feeding niche of birds in grassland with scrub is compared with that in dense oakwood, the Great, Blue, Marsh, Willow and Longtailed Tits, Bullfinch and Chaffinch all feed at a lower level in the scrubland; Blackbirds feed much at a higher level and the Pheasant, Wren, Song Thrush, Robin, Whitethroat, Willow Warbler and Dunnock all occupy the same feeding niche in both habitats.

5. In considering any policy of conservation, especially for producing the maximum food supply for the greatest variety of birds, it is important that, although there should be scrub clearance, some of the larger trees and shrubs are allowed to remain. Areas of bracken should be kept to a minimum and some stretches of long grass might be cut shorter at regular intervals.

Scientific Names of the Birds mentioned

Pheasant *Phasianus colchicus*
Jack Snipe *Lymnocryptes minimus*
Turtle Dove *Streptopelia turtur*
Swift *Apus apus*
Swallow *Hirundo rustica*
House Martin *Delichon urbica*
Magpie *Pica pica*
Jay *Garrulus glandarius*
Great Tit *Parus major*
Blue Tit *Parus coeruleus*
Marsh Tit *Parus palustris*
Willow Tit *Parus atricapillus*
Longtailed Tit *Aegithalos caudatus*
Wren *Troglodytes troglodytes*
Mistle Thrush *Turdus viscivorus*
Fieldfare *Turdus pilaris*
Song Thrush *Turdus ericetorum*
Redwing *Turdus musicus*
Blackbird *Turdus merula*
Robin *Erithacus rubecula*
Grasshopper Warbler *Locustella naevia*
Blackcap *Sylvia atricapilla*
Whitethroat *Sylvia communis*
Lesser Whitethroat *Sylvia curruca*
Willow Warbler *Phylloscopus trochilus*
Chiffchaff *Phylloscopus collybita*
Goldcrest *Regulus regulus*
Dunnock *Prunella modularis*
Waxwing *Bombycilla garrulus*
Starling *Sturnus vulgaris*
Hawfinch *Coccothraustes coccothraustes*
Greenfinch *Chloris chloris*
Goldfinch *Carduelis carduelis*
Redpoll *Carduelis flammea*
Bullfinch *Pyrrhula pyrrhula*
Chaffinch *Fringilla coelebs*
Reed Bunting *Emberiza schoeniclus*

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"Winterkill" in a Mill Hill Pond

By David Marlborough

ONE of the most depressing occurrences of recent years has been the heavy mortality of wild life during the unusually severe winter of 1962-1963. Fish in the area were as badly affected as other animals, particularly in still waters. Winter mortality of fish in small ponds and lakes is not due to cold or starvation, but to suffocation under a long-standing layer of ice, which prevents gaseous interchange at the surface. Well-known in the U.S.A., where it is called "winterkill", this phenomenon is found in Britain only during exceptionally severe winters.

The effects were observed closely by the Recorder upon a mixed population of fishes in a small pond in Mill Hill (Moat Mount Open Space: Grid. Ref. O.S. Sheet 160, 213941). This pond is tree-lined, which delays ice clearance (Welch, 1952). The normal temperature behaviour of the water is discussed in Marlborough (1963a).

The cold spell began in the Mill Hill area on December 26, 1962, with snowfall and a drop in air temperature. Ice formed on all waters in the district during the early weeks of January 1963: Moat Mount was completely covered on January 28, 1963, when 7-9 inches of ice were measured in an area of the pond usually free of cover in normal winters.

A further visit on March 2, 1963, showed the pond still covered with six inches of ice overall. Dead fish were seen under the ice and retrieved. Further visits in March saw warm weather melting the ice, and the removal of more dead fish. The observations are summarized in the table.

Date of Visit	*Days after December 26, 1962*	*Ice Cover*	*Dead fish reported*	*Dead fish collected and preserved*
January 28, 1963	33	Total	—	—
March 2	66	Total	—	3
March 10	74	Half	"about 50"	—
March 17	81	Clear	"about 100"	9
Totals	81	—	approx. 150	12

The species of dead fish recovered fall into a pattern. The three fish taken on March 2 were all Common Carp (*Cyprinus carpio* L.). Those retrieved on March 10 were collected by the keeper and helpers, who noted only six Crucian Carp (*Carassius carassius* (L.)) and one Tench (*Tinca tinca* (L.)) amongst about fifty fish. The great majority were again Common Carp. Similar ratios were reported by the keeper and his helpers among the fish removed on March 17. This was confirmed by the author while inspecting corpses in the water or on the bank. All the fish taken for preservation were Common Carp.

Three conclusions are possible from these reports:

(*a*) that these ratios reflect the species' resistance to "winterkill";
(*b*) that these ratios reflect the numbers of each species in the water, the resistance to "winterkill" being about the same;
(*c*) that differences in size or habit rather than metabolism are reflected in the ratios.

Conclusion (*c*) may be rejected by past experience of the fish in the water, and by the sizes of dead fish retrieved. Most of the dead Common and Crucian Carp were about the average size for the water, in both cases one to one-and-a-half pounds weight. The lone Tench was about three

pounds weight, the same as the largest of the Common Carp killed. So average Common Carp are identical in size with the Crucians, and the largest Common Carp identical with the Tench. It is true that one cannot assess how many fish died buried in the mud bottom and never floated to the surface. But in this water the Crucian were if anything more active than the Common Carp during normal winters; if killed they would have been *more* likely to float up. The number of Tench taken may well have been entirely misleading, as this species does bury itself in the mud throughout the winter.

Conclusion (*b*) may be rejected on the results of a tag-and-recapture survey conducted by the author during 1961-1962 at this water. Certain reservations may be made (Marlborough, 1963b), but the survey showed a probable population of 300+ Common Carp and about 100 Crucian. No figures exist for other species. Plainly the Common have suffered far harder than the Crucians, about half their estimated former population being found dead.

Conclusion (*a*) seems the most likely. Crucian Carp and Tench are well-known to resist oxygen starvation or carbon dioxide/methane asphyxia in summer, much better than Common Carp do. And in this water the Crucian tend to be eurythermic, while the Common are warm stenotherms. Similar mortalities were seen at Cheshunt Reservoirs and some of the Epping Forest ponds with similar heavy loss amongst Common Carp (P. Grundel, pers. comm.). Finally, anglers fishing Moat Mount during the summer of 1963 report catches of Crucian and Tench, but very few Common Carp. Such evidence leads to accepting conclusion (*a*).

Other species were not affected at all by winterkill. No corpses of Roach (*Rutilus rutilus* (L.)), Rudd (*Scardinius erythrophthalmus* (L.)) or Perch (*Perca fluviatilis* L.) were found, and sport with them was reported as good by anglers during summer 1963.

An interesting observation was made while preserving a Common Carp taken on March 17. On slitting the belly to let formalin in, ova were seen to spill out from the contents of the partially-autolysed peritoneal cavity. Evidently seasonal maturation of the gonads continued under the ice, until stopped by the death of the fish. This parallels the fact that 33-66 days of continuous ice-cover were required to kill Common Carp, the *least* resistant species in the pond. Both observations show remarkable physiological resistance to such adverse conditions.

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Some Water-Snails in the Ruislip Local Nature Reserve

By D. C. Seel

Summary

1. The Ruislip Local Nature Reserve contains two ponds and several small streams.

2. In the summer of 1962 the relative frequencies of the water-snails in the different regions of the aquatic habitats were assessed. Excluding occasional occurrences, one species was confined to the streams, nine to the ponds and only two species lived in both habitats. While *Lymnaea peregra* was the most widespread snail, occurring in most parts of the ponds and streams, *Potamopyrgus jenkinsi* was the most numerous animal within one major habitat type.

Introduction

In July-September, 1962, fourteen visits were made to the Ruislip Local Nature Reserve, Middlesex, to assess the summertime distribution of the water-snails (*Gastropoda*). This article is an account of the observations made.[1]

Ruislip Local Nature Reserve

The Ruislip Reservoir was created *ca.* 1810 by the damming of a tributary of the River Pinn. The Reservoir lies on Reading Beds but receives water also from London Clay and Plateau Gravel. In the catchment area are large areas of deciduous woodland (semi-natural) and grassland (mostly golf-courses); suburban development also occurs.

At the Reservoir itself swamp, fen and carr have developed at the shallow north end; the Ruislip Reserve was declared to include these and the fringes of the grassland.[2]

The Aquatic Habitats in the Reserve

The aquatic habitats in the Reserve fall roughly into two main categories: streams and ponds (Fig. 1). These are now described.[3] (The divisions of the streams into "sections" and "parts" are those given in the fuller account—see footnote 3).

The streams consist of the East and West Streams and two derivatives, the Middle and Cross Channels. All are small streams. The water depths and speeds mentioned here in relation to the various regions of the channels are those occurring in dryish weather; in wet weather the water levels and speed rise everywhere. Flowering plants are scarce in the streams but provide heavy shade from the banks.

The East Stream as far as the Middle Channel (section 1 of the East Stream) consists of alternating pools and shallows which differ in the following ways: in the speed of the water—slow and fast respectively; in

1 This study was made as part of a general ecological survey being conducted by the Ruislip N.H.S. Participants from the L.N.H.S. would be welcome; for further information please contact the Chairman of the Nature Reserve Management Committee, Ruislip N.H.S., c/o Battle of Britain House, Northwood, Middlesex.

2 For general accounts of various aspects of the Reserve, its surroundings and the history of the Reservoir, see the Journals of the Ruislip N.H.S. for 1951, 1953, 1954, 1958 and 1960.

3 For a fuller account of the streams with channel dimensions and water speeds see Seel, D.C., 1962, "The water-courses in the Ruislip Local Nature Reserve: a hydrographical report". MS deposited in the library of The Nature Conservancy, London.

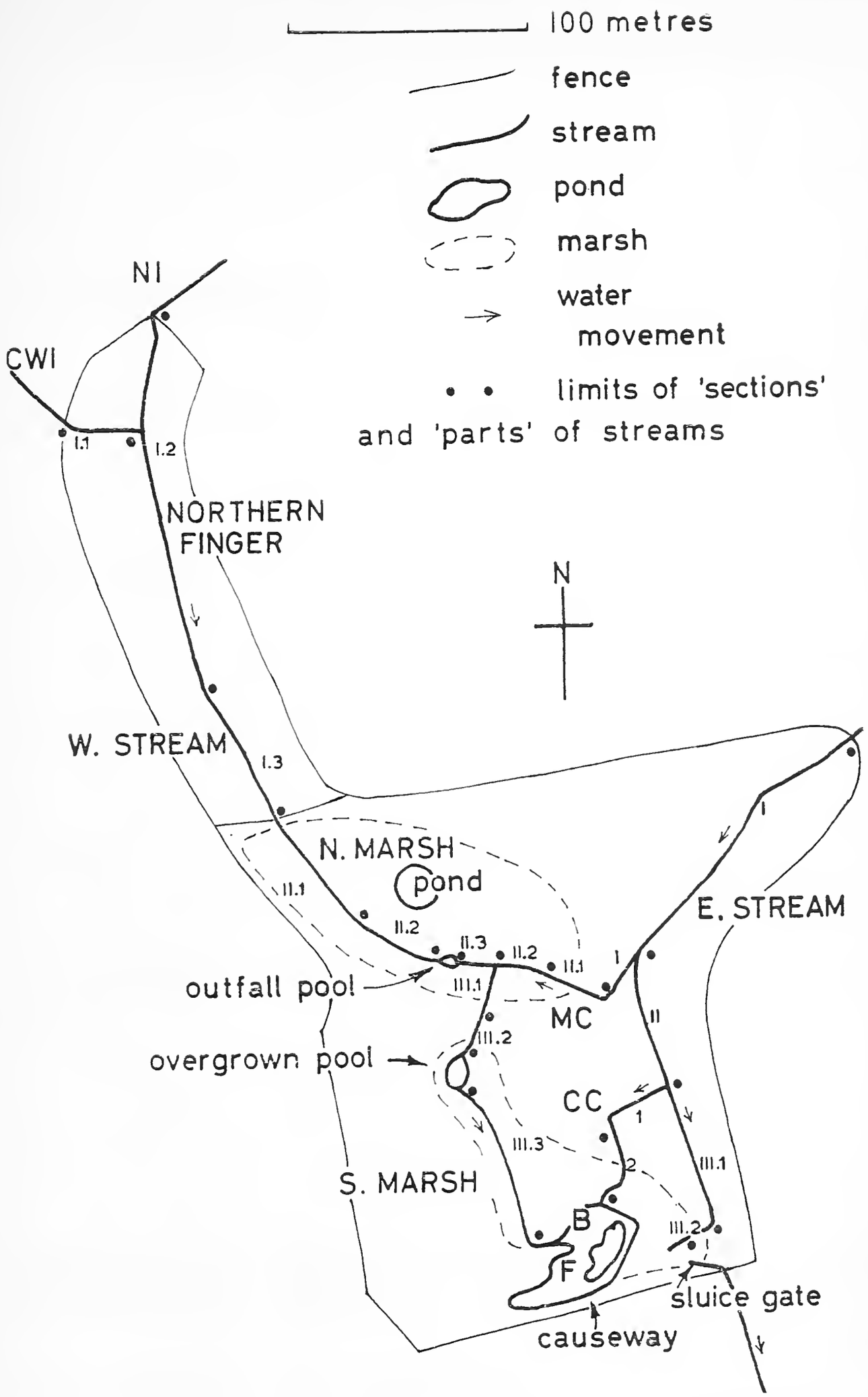

FIG. 1. The streams and ponds in the Ruislip Local Nature Reserve. (B—Back Pool, CC—Cross Channel, CWI—Copse Wood Inflow, F—Front Pool, MC—Middle Channel, NI—Northwood Inflow. The numerals refer to the "sections" and "parts" of the streams—see text).

the depth of the water—at least 5 ins. deep in the pools compared with a maximum of 2 ins. in the shallows; and in the nature of the bottom—gravel, clay and silt in the pools but only gravel in the shallows. From the Middle Channel to the Cross Channel the East Stream (section II) has a silt bottom and contains slowly moving water. From the Cross Channel to the South Marsh the bottom of the East Stream (section III) is mostly silt but the water flow here is irregular, movement occurring only after recent rain. In dry conditions the water shrinks to stationary pools and may disappear from the surface altogether.

The Middle Channel has a bottom of clay and silt; the water is of moderate depth and flows only slowly. The upper part of the Cross Channel bears some resemblance to the Middle Channel; the lower part in the margin of the South Marsh is heavily silted.

The West Stream in the Northern Finger (section I of the West Stream) has a bottom of sandy silt. The short part from the entry of the Copse Wood Inflow is usually dry, but shallow water generally flows in via the Northwood Inflow to disappear in dry weather into the bed of the channel about halfway down the Finger. From the Northern Finger to the Middle Channel the West Stream (section II) has a bottom of silt and plant debris with stationary water in the lower parts. The third and lowermost section of the West Stream—between the Middle Channel and the South Marsh—contains slowly moving water but varies enormously in width, depth and bottom material. The bottom is silt, clay and plant debris, the debris occurring mostly in the final part entering the South Marsh.

The North Marsh pond is about half an acre in extent. It contains a "large" pool about 25 yards in diameter with a maximum depth of about $1\frac{1}{2}$ feet, a small L-shaped pool about 15 feet long and 2 feet deep, and around these two a network of tiny, very shallow pools. All the pools are floored with plant debris on silt. The vegetation forms a fen-carr. The large pool is filled with an almost pure community of Carnation Sedge (*Carex flacca*). Elsewhere Reed-grass (*Phalaris arundinacea*) and rushes (*Juncus* spp.) with some Yellow Flag (*Iris pseudacorus*) grow between the lesser pools. Willows (*Salix* spp.) occur here and there.

The South Marsh pond is about one acre in extent and is mostly shallow (much is less than two feet deep). The bottom consists of a soft, dark mixture of silt and plant matter. Swamp-fen plant communities occupy about two-thirds of the area of the pond, leaving the rest as open water. The open water is in two parts, both irregular in shape: the Front Pool contains much Canadian Pondweed (*Elodea canadensis*); the Back Pool contains much green alga. Starwort (*Callitriche* sp.) and a few small beds of Broad-leaved Pondweed (*Potamogeton natans*) and Water Pepper (*Polygonum hydropiper*) grow in both Pools. The swamp-fen plants are almost entirely Reed-grass and Reedmace (*Typha latifolia*)

The Water-Snails in the Reserve

In the summer of 1962 I found twelve species of water-snails in the Ruislip Reserve. Their numbers were assessed according to the following broad relative frequency scale:—

rare—only one or two specimens seen on only a few of the visits to a particular place (R in Tables I and II);

occasional—a few specimens (up to, say, 5) seen on practically every

visit(0);
common—specimens seen frequently on every visit (C);
abundant—specimens very numerous within a small space, say, one to be measured only in inches (A).
(A dash in the tables indicates that the species was not recorded).

The body of this article consists of a series of brief broad accounts of the observed distribution and relative frequencies of each species. For more detail see Tables I and II. The nomenclature is that given by Ellis (1951).

Acroloxus lacustris. Seemingly confined to the South Marsh, *Acroloxus* was common on the submerged parts of the swamp-fen plants everywhere. It was noted on the undersides of approximately one third of 75 floating leaves of the Broad-leaved Pondweed in the Front Pool. Of those leaves having *Acroloxus*, three-quarters had only one each, a few had two per leaf and odd ones had up to five. Where there were more than one per leaf, they were usually small (i.e. young ones)—possibly one adult *Acroloxus* needs at least one whole leaf to itself.

Lymnaea peregra. This was found to be the most widespread snail, occurring in almost every part of the aquatic habitats in the Reserve. A notable exception to this generalization was the periodically dry third section of the East Stream. In the places where it did occur, *L. peregra* was mostly common.

Lymnaea stagnalis. *L. stagnalis* and *Planorbis corneus* were the largest and most obvious water-snails in the Reserve—a point which had to be borne in mind when the relative frequencies of these animals were being estimated (cf. *Planorbis crista*). It was found that *L. stagnalis* was only occasional in the Reedgrass-Reedmace swamp of the South Marsh and was sometimes to be seen floating at the surface of the open water.

TABLE I

THE WATER-SNAILS IN THE "POND" HABITATS

North Marsh:	(a) *Carex* pool	(b) *Juncus-Phalaris*	(c) Outfall pool	Overgrown pool on W. Stream	W. Stream, section III, part 3
Acroloxus	—	—	—	—	C
L. peregra	C	C	C	C	C
P. corneus	—	—	—	—	O
P. crista	—	—	—	—	O
P. planorbis	—	—	—	R	C
P. vortex	—	R	R	—	C
Potamopyrgus	—	—	C	O	R
Segmentina	—	—	—	—	R

South Marsh:	(*a*) *Phalaris-Typha*	(*b*) Front Pool *Elodea*	(*c*) Back Pool alga	(*d*) Floating freely at surface
Acroloxus	C	R	—	—
L. peregra	C	C	O	—
L. stagnalis	O	—	—	R
P. carinatus	R	—	—	—
P. corneus	O	—	—	R
P. crista	O	C	—	—
P. planorbis	C	R	—	—
P. vortex	C	—	—	—
Potamopyrgus	—/A	R	—	—
Segmentina	R	R	—	—

Physa sp. (of the *acuta-heterostropha* group). This, one of several closely allied alien species, was the one snail found only in the streams. It was common in sections I and II of the East Stream; was occasional in the Cross Channel; and down the Middle Channel showed a decrease in numbers with increasing distance from the East Stream. These gradations, and the general scarcity of this snail in the West Stream compared with the East Stream, seem noteworthy.

Planorbis carinatus. This animal was rare, occurring in the swamp-fen of the South Marsh.

Planorbis corneus. P. corneus was occasional in the swamp-fen vegetation of the South Marsh. Relatively rare specimens were to be seen creeping over the bottom of the South Marsh pond or free-floating at the surface.

Planorbis crista. The small size of this snail, rather than any real absence of numbers, is the probable reason for the lack of records of it. Washing a mass of Canadian Pondweed from the Front Pool revealed it to be common on this plant, and occasional specimens were found by inspection on the swamp vegetation in most other parts of the South Marsh.

Planorbis leucostoma. After the investigation had been made, this snail was observed by Mr. C. P. Castell amongst some specimens of *P. vortex.* However, in view of further observations by myself and the observations of another worker on the snails in the Ruislip Reserve, Mr. W. F. Snow, who has not so far recorded *P. leucostoma*, the results given here for these two snails are considered to be valid. Thus it may be tentatively stated that *P. leucostoma* was rare; it probably occurred in the swamp-fen of the South Marsh.

Planorbis planorbis and *Planorbis vortex.* Both these snails were common in the swamp-fen of the South Marsh. *P. vortex* was the only

TABLE II

THE WATER-SNAILS IN THE STREAM HABITATS

	Lymnaea peregra	*Physa*	*Planorbis vortex*	*Potamopyrgus*
East Stream:				
section I—				
pools	C	C	—	A
shallows	C	C	—	C/A
section II	C	C	—	A
section III—				
part 1	—	—	—	C/A
part 2	—	—	R	C
Middle Channel:				
section I	O	C	—	A
section II—				
part 1	O	O	—	A
part 2	O	R	—	A
Cross Channel:				
part 1	O	O	—	A
part 2	C	O	—	A
West Stream:				
section I—				
part 1	—	—	—	—
part 2	C	R	—	—
part 3	C	R	—	—
section II—				
part 1	O	—	—	—
part 2	O	—	R	—
part 3	C	O	R	C
section III—				
part 1	C	O	—	C
part 2	O	—	—	—

Planorbid found in the North Marsh and immediate regions of the West Stream; it was rare in these places.

Potamopyrgus jenkinsi. In the water-courses *Potamopyrgus* was mostly abundant throughout the East Stream and in the two Channels arising from this Stream, but in the West Stream was seemingly absent from the upper half (i.e. upstream from the outfall of the North Marsh pond), though dead shells were found in part 2 of section I; and it was never more than common in the lower half. Where *Potamopyrgus* was abundant in the streams, it tended to be dotted closely over the bottom and clustered on debris in the water. In a few places (e.g. at about G7e7 on the revised grid reference map in the J. of the Ruislip N.H.S., No. 12, 1963) in the shallows of the first section of the East Stream it was so abundant that black handfuls consisting almost entirely of live snails could be picked up. In part 1 of section III of the East Stream, a region notable for the periodic absence of surface water, *Potamopyrgus* was the only snail which could be found. Alone among the twelve species of water-snails found in the Reserve, *Potamopyrgus* possesses an operculum; in enabling it to resist dessication, this feature possibly accounts for the unaccompanied existence of this snail in this place. *Potamopyrgus* was left stranded on the mud on the occasions when this region dried out; some had buried themselves, but others had remained on the surface. Shading by bankside vegetation seemed to have little effect on the other two principal stream-dwellers, *Lymnaea peregra* and *Physa* sp., but seemed to influence *Potamopyrgus*. Thus in July-September *Potamopyrgus* seemingly preferred the shade because it was less common in the few places where the water in the channels was unshaded, and in such places it occurred mostly clustered on the undersides of objects in the water, e.g. floating wood.

Potamopyrgus was not found in the North Marsh and was absent, or rare, in most parts of the South Marsh. Striking exceptions in the South Marsh were the swamp around the outfall of the Cross Channel, where it was abundant, the swamp in the vicinity of the sluice-gate, where it was common, and the swamp in the apex of the S.W. corner of the Front Pool, where it was common to abundant. A feature shared by all three sites is water-movement, a feature of the animal's habitats elsewhere in the Reserve. Water-movement is not immediately apparent in the S.W. corner of the Front Pool, but during the severe weather of January-February, 1963, I noticed that the very last part of the surface of the Front and Back Pools to freeze was a spot in the S.W. corner of the Front Pool. Disturbance of the bottom material here revealed a slight passage of water towards the base of the causeway.

Segmentina complanata. This snail was seen only rarely; it was found in the South Marsh in the swamp as a whole and in the Canadian Pondweed in the Front Pool in particular.

Some General Observations

In the East Stream numerous empty shells of *L. peregra*, *Physa* and *Potamopyrgus* were found accumulated with other debris in still waters in the angles of sticks in the channels. In the Back Pool in particular of the South Marsh, disturbance of the bottom brought empty shells floating to the surface. Among these shells, those of *L. peregra* were the most frequent and those of *L. stagnalis* slightly less so. The cases of caddis-fly

larvae in the South Marsh as a whole were often seen to be built of snail shells—in these cases *P. planorbis* and *Potamopyrgus* were frequent.

In the South Marsh the larger Planorbids (i.e. all but *P. crista*, for which there is an insufficiency of records to decide one way or the other) seemed not to be evenly distributed through the swamp-fen vegetation but to occur in groups, leaving patches in, say, the same Reedgrass-Reedmace bed apparently without such snails.

Discussion

From the water-snail's point of view there appear to be important differences between the ponds and streams. This is suggested by, for example, the fact that the flat, disc-like species (i.e. the Planorbids) are almost entirely absent from the streams. One might easily suppose that the reason is a purely mechanical one—the streams were mostly moving and therefore seemingly unsuited to snails with disc-like shells, whereas the pond-waters were stationary—but for the fact that there was a marked difference in Planorbid populations between the still waters of the North and South Marshes (they contained one and five species respectively). Both areas were once parts of the same Ruislip Reservoir. A possible solution might be that the Planorbids still living in the South Marsh once lived in the area of the North Marsh, too, but largely died out there as a consequence of drying out at some time. Digging in the floor of the North Marsh might show whether they had once been there. If this latter supposition is true, then the former one concerning the confinement of the Planorbids to the ponds on mechanical grounds might be true also. According to Boycott (1936) *Planorbis vortex*—the only Planorbid found in the streams at Ruislip—is a species of running water containing plenty of plants. The general absence of plants from the Reserve streams may be the cause of its scarcity in these habitats.

Drying out seems to be an important factor in determining the snail fauna of the streams. Thus, only one snail, *Potamopyrgus*, was found in the lowermost section of the East Stream. *Lymnaea peregra* and *Physa* would presumably occur here if the water were a permanent feature. Also, drying out may account for the patchy distribution of *Physa* in the West Stream. Alternatively, the fineness of the bottom material in parts of the West Stream may possibly be the factor precluding *Physa* from these places.

Finally, it will be clear from Tables I and II that, according to its snail fauna, that region described by Seel (1962—see footnote 3, p. 112) as part 3 of section III of the West Stream is more akin to a pond than a stream.

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Mammals in the London Area 1961

By W. G. Teagle

MANY members have responded splendidly to appeals for records, and it is hoped that still more may be persuaded to report on even the common wild mammals and traces of mammals they may see in and around London. It is really very difficult to go for a country walk anywhere *without* noting something of interest to the Recorder, and although the mammals themselves may not be sighted, evidence of their presence, e.g. droppings in the case of the Rabbit, can often be easily recognised.

Casual records of this sort are always very welcome, but it is by deliberately searching for mammals that the best results are obtained. It is significant that two observers who do this, P. A. Morris and D. W. Yalden, were responsible for nearly 20 per cent of the records received for 1961. Members who are school teachers can also collect a good deal of information on the distribution of easily recognised mammals like the Grey Squirrel and the Hedgehog from their pupils.

Those reporting mammals should give the date of each observation and the precise locality. This latter information is needed so that distribution maps may be produced, and it would be most helpful if six-figure National Grid references were given whenever possible. In the case of an observation made in the built-up area the name of the road should be stated.

It is an unfortunate fact that there is still (1964) very little known of the mammals in the Hertfordshire and Essex sectors of the Area, and most surprising that practically nothing is ever submitted for that much frequented Essex locality, Epping Forest!

Members needing guidance are referred to the recently published *Handbook of British Mammals*, edited for the Mammal Society of the British Isles by H. N. Southern. This will be the standard textbook on the subject for many years to come. A few notes have been inserted into this 1961 report which may also help observers to know where to look for certain species and what signs to expect. D. W. Yalden and J. A. Burton have also referred to some of these signs in their appeal for records on p. 133.

Records for 1964 should be sent to the new Recorder of Mammals, J. A. Burton, c/o the British Museum (Natural History), Cromwell Road, London, S.W.7. Records for the years up to and including 1963 should go to W. G. Teagle, 41 Bell Street, Herston, Swanage, Dorset.

The initials appearing in the margin of the systematic list stand for the counties within the Society's Area: B = Bucks., E = Essex, H = Herts., K = Kent, M = Middlesex, and S = Surrey. The County of Greater London is not recognised for recording purposes. Other abbreviations used are: G.C. = Golf Course, G.P. = Gravel Pit, L.N.R. = Local Nature Reserve, m.o. = many observers, R. = River, Res. = Reservoir, and S.F. = Sewage Farm. Observers' initials appear in brackets.

The check list numbers and scientific names used are taken from Corbet (in press) and it will be noticed that from the Carnivora onwards the numbers in the present report differ by one unit from those given in the last (Teagle, 1963). This serious discrepancy arose because an

additional species, the Grey Long-eared Bat, *Plecotus austriacus* (Fischer) was added to Dr. Corbet's list at the eleventh hour, and after the L.N.H.S. report had gone to press.

I wish to thank all those members and non-members who sent in records in 1961, and I am again especially grateful to Bryan Pickess of the Ruislip N.H.S., Ken White and Peter Tinning of the Lewisham N.H.S., D. M. Edwards of the Sidcup N.H.S., and the students of Morley College and Maria Grey College for their help. I must also thank the General Secretary, Mrs. Small for appealing for records on my behalf at the many L.N.H.S. meetings I have failed to attend.

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SYSTEMATIC LIST

INSECTIVORA

1. HEDGEHOG. *Erinaceus europaeus* L.

This, the easiest of British mammals to identify, is a visitor to many gardens in the London area and a casualty on many London roads. Over 50 road deaths were reported in 1961.

As stated in the last report, Hedgehogs are found in parts of Inner London in such numbers that it seems highly improbable that they can *all* be escaped pets. The most interesting 1961 record was of an animal reported by MW from Sloane Court East, Chelsea, which is close to Ranelagh Gardens and the grounds of the Royal Hospital. The species may well be living there, since it is quite common in Battersea Park on the opposite bank of the Thames. It is less easy to explain the activities of the Hedgehog which eluded the security staff of the Admiralty and remained at large in that Department for a week, before being finally captured in a corridor of the foreign mail section (*The Times*, 26.v.61).

There were no January records, and only one for February. The general reawakening seems to have taken place from March 11 onwards, and some garden Hedgehogs remained active until well into December. One was seen eating bread and milk in DMH's garden at Epsom, Surrey on Christmas Day and Boxing Day.

A Hedgehog skin was found in Sidmouth Wood, Richmond Park, Surrey on June 25 by RHK. Badgers inhabit this plantation and it is known that they can open rolled-up Hedgehogs and eat them, leaving the prickly skin.

Although more records are received for Hedgehogs than for any other mammal, we still (1964) have very few dated, pin-pointed records for many parts of the Society's Area, e.g. Hertfordshire, between Rickmansworth and Hertford; the Lea Valley; Essex, between Epping and Romford, between Stanstead Abbots and Chingford, and between Romford and Grays Thurrock; Kent, between Barnehurst and Swanscombe and between Orpington and Westerham; Surrey, between Leatherhead and Limpsfield; and Middlesex, for the Colne Valley. At present there are no records at all for the Bucks. sector.

Reported in 1961 from the following localities:—

E Nr. Epping and at Harold Wood (DCo, ES, RBW).

K Barnehurst, Beckenham, Belvedere, Brockley, Catford, Chelsfield, Eltham, Green Street Green, Grove Park, Lee, New Eltham, Orpington, Otford, St. Mary Cray, Sidcup, and West Wickham (m.o.).

M Acton, Ashford, Bedford Park, Brentford, Bushy Park, Chelsea, Chiswick, Ealing, East Bedfont, East Finchley, Edgware, Finchley, Golder's Green, Gunnersbury Park, Hampstead, Hampton, Hampton Hill, Hanworth, Highgate, Honor Oak, Isleworth, Kempton Park, Kingsbury, Lower Halliford, Mill Hill, Northolt, Pinner, Poyle, Ruislip, Staines, Stanwell, Sudbury, Sunbury, Tottenham, Twickenham, Wembley, West Drayton, Westminster (see above), Winchmore Hill, Wood Green and Yiewsley (m.o.).

S Ashtead, Balham, Brixton, Cheam, Chessington, Claygate, Coulsdon, Croydon, Dulwich, Earlsfield, East Sheen, Epsom, Epsom Downs, Esher, Ewell, Hersham, Hinchley Wood, Hook, Kennington, Leatherhead, Lower Green, Merstham, Mitcham, New Malden, Purley,

Putney, Richmond Park, St. George's Hill, South Croydon, Streatham, Surbiton, Sutton, Thorpe, Walton upon Thames, Wandsworth, Weybridge, Weybridge Heath, Wimbledon and Worcester Park (m.o.).

2. MOLE. *Talpa europaea* L.

Most records received are based on the presence of molehills, many of which were again found in woodland. In open habitats care should be taken not to confuse molehills with anthills, which are often a feature of rough grassland and are normally covered with vegetation.

E Aveley, molehills in oakwood south of Somers Heath. Rainham, molehills near Berwick Pond (PAF, WGT).

H Molehills at Cheshunt (Turnershill Marsh), Northaw (Cuffley Great Wood), Rickmansworth (Garrett Wood) and West Hyde (PAF, WEM, BPP, BLS, WGT).

K Molehills at Chelsfield (Well Hill), Cudham, Farningham Wood, Halstead, Lullingstone Park, Ruxley, Swanley and near Swanley Village (Ram's Wood) (m.o.). A live Mole found at Crockenhill on June 11 and another found at Farningham on that date (KW). One found dead in Lullingstone Park on April 16; two found dead and one alive there on June 10 (VG). One found dead also on June 10 at Swanscombe (AFM).

M There was a welcome increase in the number of records for this county, and of special interest were those of molehills on two parts of Hampstead Heath, between Viaduct Pond and Hampstead Ponds (JHL) and near Millfield Lane (NAM). Molehills were also recorded from Ashford (north bank of Queen Mary Res.), Bushy Park, Ickenham, Ruislip/Northwood (Poor's Field and Ruislip L.N.R.), and Staines Moor (m.o.). A Mole was seen on the surface at the edge of Mad Bess Wood, Ruislip/Northwood on June 6 (KC, PM). A dead Mole was found on Staines Moor on March 12 (WGT, *et al.*).

S Molehills seen at Addlestone, Banstead, Byfleet, Chaldon, Claygate, Cobham, Downside, Epsom Common, Epsom Downs, Esher, Hersham, Hersham S.F., Hinchley Wood, Littleworth Common, Molesey S.F., Selsdon, South Croydon, Surbiton G.C., Thorpe, Titsey, Tolworth, Walton upon Thames, West Molesey, Weybridge, Whiteley Village and Wimbledon Common (m.o.).

SHREWS

Relatively few records of shrews were received except from areas which were systematically examined for small mammals. Live shrews can often be found under sheets of corrugated iron and similar litter, and dead ones are likely to be seen in the course of a country walk, especially in late summer. The present Recorder of Mammals, the Ecological Section's Curator, or the author would be pleased to receive for identification any bodies which are posted. Shrews deteriorate rapidly, but if wrapped in paper and packed in a well-sealed tin they need cause the postal authorities no embarrassment.

3. COMMON SHREW. *Sorex araneus* L.

B Nr. Denham, one found dead on April 23 (LMPS).

H Brookman's Park, caught in Longworth traps at edge of Gobion's Wood (on Middlesex/Herts. boundary) between January and April (PJF, PAJ).

K Ruxley G.P., one found dead on September 30 (EMH). Shoreham, one found dead on August 5 (KW).

M Single specimens found dead as follows: Mill Hill Golf Links, October 14 (DMy), Perry Oaks S.F., November 18 (PAM, BPP, DWY), Ruislip, September 16 (BPP). Osterley Park, remains found in Barn Owl pellets collected by TJG (WGT).

S An unexpected record was that of a dying Common Shrew which GHG took from a cat in Archbishop's Park, Lambeth on October 12. It is perhaps too much to expect that shrews might still inhabit such an unlikely corner of Inner London, and the cat's victim may well have been accidentally introduced with turves or plants. Common Shrews were also noted at the following localities: Bookham Common, one trapped in April, eight in July and seven in December (JCL). Esher, one under waste paper at Weston Green on March 26; one in Longworth trap at Littleworth Common on March 29 (PAM). Farleigh, one found dead on September 23 (AMH). Hersham (two localities), found under corrugated iron, etc. as follows: one on January 3, three on March 26, two on April 4, one on April 9, one on April 15, one on April 22 (PAM, WGT, DWY). Hersham S.F., one found dead on October 21 (GHG). Mickleham Downs, one on May 24 (PAM). Nutfield, a black animal caught in garden shed on January 11 (BAK). Oxshott, "numerous" in Prince's Coverts (DP); one caught at claypit on April 25 and one on June 17 (DWY). Thorpe, one found dead at a gravel pit on June 10 (GHG). West Molesey, one caught on allotments on April 11 (PAM). Remains found in Barn Owl pellets from Beddington S.F. (AMH), Cobham (DWY), and Esher (CK, PAM, WGT, DWY).

4. PYGMY SHREW. *Sorex minutus* L.

M Mill Hill, one found dead on golf links on November 26 (DMy). Osterley Park, remains found in Barn Owl pellets collected by TJG (WGT). Ruislip/Northwood, one caught in Longworth trap in Ruislip L.N.R. in August, and another on September 16 (BPP).

S Bookham Common, one trapped in April, two in July and five in December (JCL). Esher, remains found in Barn Owl pellets (CK, WGT, DWY). Hersham, one caught on March 26 (PAM). Nutfield, single animals trapped in garden shed in January, on February 9 and April 9 (BAK).

5. WATER SHREW. *Neomys fodiens* Schreber

M Harefield, one swimming in stream between Grand Union Canal and R. Colne on May 27 (TLB, EG, WGT, BJW).

S Bookham Common, single animals caught on Central Plain on April 9, July 6, December 26 and December 27 (JCL). Esher, remains of two found in Barn Owl pellets from Claremont (CK, PAM, WGT, DWY). Nutfield, recorded from stream through fields between Redhill and Nutfield Marsh (BAK).

CHIROPTERA

Except for some notes on unidentified species no fresh information for 1961 has been received since the detailed records for that year were published by Hancock (1963). The species recorded in 1961 are briefly

listed below with localities and observers' initials. The difficulties of identifying bats in flight has already been stressed (Teagle, 1963), but it is perhaps worth repeating that small bats are not necessarily Pipistrelles, nor need all large bats be Noctules. All the records which follow relate to bats which were examined in the hand.

11. Whiskered Bat. *Myotis mystacinus* (Kuhl)

K Westerham (JAB, AMH, PCT).
S Godstone (BDH).

14. Daubenton's Bat. *Myotis daubentoni* (Kuhl)

K Westerham (JAB, AMH, PCT).

16. Serotine. *Eptesicus serotinus* (Schreber)

S Bletchingley (BDH). Weybridge (GHG).

19. Pipistrelle. *Pipistrellus pipistrellus* (Schreber)

E Epping Forest (PAM, DWY).
H Boreham Wood (AM).

21. Long-Eared Bat. *Plecotus auritus* (L.)

K Westerham (JAB, PCT).

CARNIVORA

24. Fox. *Vulpes vulpes* (L.)

This highly successful and remarkably adaptable animal continues to make itself at home in the London suburbs, penetrating in the Kent sector to within about five miles of St. Paul's Cathedral, and in Middlesex to within four and a half miles. The Fox will be the subject of a special paper in a future issue of the *London Naturalist*, and any information on its distribution and any press cuttings (particularly from local newspapers) would be welcomed.

27. Stoat. *Mustela erminea* L.

K Nr. Kemsing, one just within the Society's Area on April 15 (DJB, BP).
M Perry Oaks S.F., one on May 11 (DMy), and one near the S.F. on June 21 (GHG).
S Walton upon Thames, one on February 26, and one carrying a small rodent on April 1. Weybridge, one disturbed by dogs from a wood pile on December 26 (GHG).

28. Weasel. *Mustela nivalis* L.

E Walthamstow Res., one on September 12 which swam across the R. Lea by Lockwood Res. (DAW).
H Wormley Wood, one on August 25 (AV).
K Ruxley G.P., one on July 22 (Mr. Furness), and one on September 16 which came to within 8 ft. of FJH, carrying a small mammal. Shoreham, one seen *c.* 10 ft. up in a tree on December 16. Swanscombe, one seen stalking an *alba* wagtail on a bare expanse of mud on open part of the marsh on August 19 (VG).
M Frogmore Green (near), one found dead on July 29. Harefield, one at Weybeards on April 12. Harlington, one on August 30 (JM). Harrow Weald, one in ditch near golf course at Old Redding (EV). Perry Oaks S.F., one on April 29 (LMPS) and one on August 7 (VG).

Ruislip (near), one near rubbish tip at New Year's Green on August 13 (IGJ). Ruislip L.N.R., one on June 23 and one on July 29 (BPP).

S Esher, one caught in Longworth trap on Littleworth Common on March 28 (PAM). Hersham S.F., one on September 2, and a maimed animal which was put down on October 21 (LM, DP). Leatherhead, seen "two or three times" at watercress beds. One animal, which was corned and caught by a cat, escaped when observer intervened (MJC); one seen near St. John's School in late December (PG). Thames Ditton, one seen crossing the A307 on March 23 (DWY). Walton upon Thames, one disturbed from base of a straw bale at Foxwarren Farm on March 25, and one on April 29 (GHG). Worcester Park, one seen entering garden on March 1 (EMC).

31. BADGER. *Meles meles* (L.)

It is hoped to publish the results of the L.N.H.S. enquiry into the distribution of the Badger in the London Area in the next *London Naturalist*. Information is still needed for those parts of Buckinghamshire and Hertfordshire which lie within the Area, particularly the district to the south of St. Alban's. Badger setts are easy to recognise, and any large hole with a broad, terrace-like mound outside it is worth examining for the characteristic black and white hairs of this mammal. Other signs are well-marked paths, which pass under obstructions, e.g. fences or very low branches, and bedding, claw-scratched trees and dung pits. Badger setts may be sought as near to the centre of London as Wimbledon Common, and the animals are regular visitors to a number of suburban gardens. The most profitable areas to search for setts are the edges of woodland on chalky or sandy slopes, particularly south of the Thames.

32. OTTER. *Lutra lutra* (L.)

No first-hand sight records of this species were received, but DP was informed by men who had been working on the Queen Elizabeth II Reservoir, Walton upon Thames, Surrey, that they found two Otters there when cleaning out a ditch.

ARTIODACTYLA

DEER

There is scope for a good deal of field work on the deer of the London Area, not only the wild deer but also those in captivity or semi-captivity in the London parks and other enclosures. A great many changes have taken place since Whitehead (1950) published his survey, e.g. the Parks Department of the London County Council has been replacing its herds of Red Deer *Cervus elephas* (L.), with smaller species.

Observers are recommended to use the Mammal Society's Field Guide (Page, 1957), and to examine suitable localities in the rural areas for such signs as tracks, fraying stocks and fewmets (droppings). More information would be welcome concerning the Fallow Deer *Dama dama* (L.) in Epping Forest, the muntjac *Muntiacus* sp. of the Hertfordshire woodlands, and the Roe *Capreolus capreolus* (L.) in the Surrey sector. When deer *are* seen the observer usually has a view of a retreating rump. Some species of deer have very distinctive rump patterns, however, and a note of this and the size of the animal may help the Recorder to identify the species.

The following records were received for 1961:—

DEER (spp.)

E Bentley, an animal reported in the *Evening Standard* of 27.x.61, which jumped a gate into the Ongar road on that date, may well have been a Fallow Deer, despite the use of the term "stag" which implies Red Deer or Sika *Cervus nippon* (Temminck).

H Northaw, small fewmets which were found on August 23 in various parts of Cuffley Great Wood, particularly on paths, and in large quantities in clearings and on a grassy area south of the Cuffley Brook, were considered to be very probably those of muntjac. They were non-adherent, non-faceted, mainly ovoid (some pyriform), 11-13 mm. long, and darker and wetter than the fibrous Rabbit droppings found in the same areas (BLS, WGT). There are undated records of muntjac for this wood. Wormley Wood, a small deer, showing "a very large amount of white . . . on the rear", was seen on August 25, and considered likely to have been a muntjac (AV).

K Lullingstone Park, seven or more on April 16 (VG). There have been subsequent (post-1961) reports of about seven deer being seen here, but the species is still not known.

44. FALLOW DEER. *Dama dama* (L.)

E Epping Forest, the annual deer count on December 31 organised by the Epping Forest Committee gave a total of 75 (AQ).

46/47. MUNTJAC sp. ? *Muntiacus reevesi* (Ogilby)

H Northaw, a buck was killed on the road by Cuffley Great Wood in April (GH).

LAGOMORPHA

53. BROWN HARE. *Lepus capensis* L. (*L. europaeus* Pallas)

E Waltham Abbey (near), one on June 17 (WGS).

H Broxbourne, one on January 22 (RHK). Shenley, a leveret found by a greyhound and brought to a child on February 15, was kept at a school for three weeks before it finally escaped into Barnet (AM).

K Biggin Hill (near), one on September 11 (DT). Stone, one on Littlebrook Marsh on August 19 (VG).

M Enfield, one in Trent Park on August 27 (PAMy). Hampstead, one reported in Gainsborough Gardens, N.W.3 on July 27 (*The Field*, 10.viii.61). London Airport, two on a runway, seen from aircraft on February 14 (JBT); five on a runway on June 21 (GHG). Pinner, single animals at Pinner Park on January 1 and 22 (PAMy). Ruislip/Northwood, one on Poor's Field on May 28 (TLB, WGT); four in Mad Bess Wood on June 13 (MC, SH).

S Bookham Common, one on April 9 (FCR). Hersham, one on March 26. Walton upon Thames, two chasing one another at Foxwarren Farm (on boundary of Society's Area) on March 25 (GHG).

55. RABBIT. *Oryctolagus cuniculus* (L.)

No cases of myxomatosis were reported, but this does not necessarily mean that there was none. The general impression gained, however, was that Rabbits were flourishing again in many districts. They were frequently seen on railway embankments, particularly in Kent and Surrey, and there were several reports of Rabbits in suburban gardens. One

which lived for some weeks in Roehampton Lane, Roehampton, Surrey, devoured young lupins, crocuses and "anything else it could find" (LJW). One was seen by KSB swimming across the Beverley Brook in Richmond Park, Surrey (*The Field*, 31.viii.61). At Gatton, Surrey, chalk lumps found outside burrows on the slopes of Kingswood Hill on August 27 showed the marks of incisor teeth which exactly fitted those of a Rabbit, suggesting that the animals had been using their teeth as well as their feet in the work of excavation (PAF, WGT).

Records, many of which were based on the presence of droppings, were received from the localities listed below. There is still very little information from Essex and Hertfordshire.

B Colnbrook, observed at Richings (LMPS).

E Bobbingworth (ES), Coopersale Common (DCo), Hainault Forest (PAF, WGT), Havering-atte-Bower (MEP, WGT) and Stanford Rivers (ES). RBW noted Rabbits in Weald Park, South Weald, to the north of Upminster Common, and south of Foxburrow Wood, Warley, and saw a black animal south of Navestock Common.

H Five localities only! Hadley Woods (GCG), Cuffley Great Wood, Northaw (BLS, WGT), Radlett (AM) and West Hyde (DCI).

K Beckenham, Bromley, Chelsfield (Well Hill), Chislehurst, Cudham, Dartford Heath, Downe, Dunton Green, Elmstead Woods, Eltham Park, Farningham, Halstead, Knockholt, Lullingstone Park, Maplescombe, Orpington, Otford, Petts Wood, Plumstead (near Bostall Woods), Ruxley, St. Mary Cray, Shoreham, Sidcup, Swanley and Westerham (m.o.).

M Bushy Park, Enfield (Trent Park), Greenford (Horsenden Hill), Hampstead Heath, Mill Hill, Northwood/Ruislip (Poor's Field and neighbourhood of Battle of Britain House), Osterley Park, Perivale Wood, Pinner Park and Staines Moor (m.o.).

S Addlestone, Banstead Downs, Banstead Heath, Beddington S.F., Betchworth, Bookham Common, Chipstead, Cobham, Epsom Downs, Esher, Gatton, Hersham S.F., Kingsworth, Leatherhead, Merstham, Oxshott, Richmond Park, Roehampton, Selsdon, South Croydon (Croham Hurst), Surbiton G.C., Sutton, Thames Ditton, Thorpe, Titsey, Walton upon Thames, West Molesey, Weybridge, Wimbledon Common and Wimbledon Park (m.o.).

RODENTIA

57. Grey Squirrel. *Sciurus carolinensis* Gmelin

Although this mammal is one of the easiest to recognise, it is not generally realised that juvenile Grey Squirrels and adults in summer coat can look distinctly reddish. This may sometimes give rise to a report of a Red Squirrel *Sciurus vulgaris* L. being seen. Such reports must, however, be treated with extreme caution, and observers seeing an animal which they suspect of being a Red Squirrel and not a rust-coloured Grey should take particular note of its size and the colour of its tail.

Grey Squirrels, firmly established in the suburban garden belt, continue to advance towards the centre of London. In the Surrey sector in 1961 they were noted in Ruskin Park, Denmark Hill during March and April (MH), and two were seen on November 26 (ML). One was recorded on the south side of Clapham Common in September (JC) , and one near the refreshment house in Peckham Rye Park on May 16 (WGT). In Kent

the innermost limit still appeared to be Greenwich Park, but numbers had greatly increased there. On January 1 at least 15 were noted in the Wilderness and Flower Garden alone, recalling scenes in the Broad Walk of Regent's Park in the 1920's (WGT). North of the Thames, Hampstead Heath and the residential district and open spaces of Highgate (including Waterlow Park, Highgate Wood and Queen's Wood) were apparently the southernmost limits of penetration into the built-up area. The invasion of Regent's Park had apparently yet to take place.

More records for the inner suburban and urban areas are wanted, to help to complete the picture of distribution, and information is still needed for the Essex sector, for Kent east of the Darent Valley, for the Colne Valley in Middlesex, Herts. and Bucks., and in Surrey for the North Downs east of Mickleham.

The boldness of London squirrels has already been noted (Teagle, 1963). Feeding these officially unwelcome animals has become a popular pastime in a number of suburban parks, and in 1961 squirrels were seen coming to visitors for peanuts and other delicacies in Greenwich Park, Kent, and in Dulwich Park and Ruskin Park, Surrey (PMBB, PAF, ML, WGT, MJW). At Valentine's Park, Ilford, Essex on July 16 one attempted to climb on to WGT, but was defeated by the smooth surface of Wellington boots. At Teddington, Middlesex two squirrel nests were removed from the roof space inside a house, in order that the animals should not interfere with breeding Swifts when these arrived (EMG, NG). On October 21 GHG saw a squirrel on the platform of Hersham railway station, Surrey.

Some reports of damage were received. At Teddington, Middlesex squirrels removed rough cast from a wall (EMG, NG). At Nutfield, Surrey BAK was told by G.P.O. engineers that squirrels had "eaten" (!) lead cable, thereby causing a telephone breakdown. At Cobham, Surrey a resident on the Heywood estate complained that they dug up bulbs, and in Greenwich Park, WGT was informed that they entered the greenhouses in the nursery. At Bookham Common, Surrey squirrels stripped the bark from at least 37 birch trees and a hazel in Eastern Wood in the spring (Beven, 1962). On April 2 GHG saw a squirrel jump seven feet across a pond in his garden at Weybridge, Surrey, carrying a nestling Song Thrush in its mouth.

A white squirrel was seen occasionally in Park Hill, Wallington, Surrey (WEH), and one was again reported from near Trinity Church, Bromley Common, Kent, on November 14 and 15 (Lew).

The species was reported from the following localities:—

E Buckhurst Hill, Childerditch Street, Coopersale Common, Epping Forest, Ilford (Valentine's Park), Loughton, Navestock Park, Noak Hill, South Weald, Theydon Bois and Warley (PAF, PAM, ES, JFS, WGT, RBW, DWY).

H Hadley Woods (GCG), Northaw, Cuffley Great Wood (BLS, WGT), Watford, Cassiobury Park (B.B.C., South-East Regional News), and Wormley Wood (AV).

K Beckenham, Bexley, Biggin Hill, Bromley, Chislehurst, Chislehurst Common, Crystal Palace, Cudham, Downe, Eltham district (Oxleas Wood, Jack Wood, Castle Wood, Eltham Common and Shooters Hill), Eynsford, Falconwood, Farningham, near Green Street Green, Greenwich Park, Halstead, Hayes, Hayes Common, Keston Common, Lullingstone Park, Pratt's Bottom, Shortlands and Westerham (m.o.).

M Bushy Park, Ealing (Ealing Common and Walpole Park), East Finchley,

Enfield (Trent Park), Greenford (Horsenden Hill), Hampstead, Hampstead Garden Suburb, Hampstead Heath, Harrow, Harrow Weald, Hatch End, Highgate (see above), Ickenham, Osterley Park, Page Street, Pinner, Pinner Green, Pinner Hill, Pinner Park, Potter's Bar, Ruislip/Northwood, Southgate (Broomfield Park), South Harrow, Stanmore, Sunbury, Teddington, Twickenham, Wembley and Winchmore Hill (m.o.).

S Addlestone, Ashtead, Barnes, Barnes Common, Belmont, Bookham Common, Brockwell Park, Caterham, Cheam (Nonsuch Park), Chessington, Clapham Common, Claygate, Cobham, Coulsdon, Denmark Hill, Dulwich, Dulwich Park, East Sheen, Epsom, Epsom Downs, Esher, Hersham, Leatherhead, Mickleham, Morden, Nutfield, Oxshott, Oxshott Heath, Peckham Rye Park, Putney Heath, Richmond Park, Roehampton, Selsdon, South Croydon, Streatham, Surbiton, Sydenham Hill, Thames Ditton, Tolworth, Tooting Bec and Tooting Graveney Commons, Upper Norwood, Wallington, Walton upon Thames, Wandsworth, Weybridge, Wimbledon Common and Worcester Park (m.o.).

SMALL RODENTS

Small rodents are not easy to observe in the field. The Harvest Mouse *Micromys minutus* (Pallas) may best be located by searching for its nest in tall vegetation in hedgerows, ditches, marsh and other wet localities. The mice can also be found at corn ricks, particularly in winter, and may be seen at threshing time. Their remains may also be found in bird of prey pellets, although not as frequently as those of other mice and voles. Most of the records of small rodents (other than Harvest Mice) given here have been obtained through the use of Longworth small mammal traps, by searching under sheets of corrugated iron, asbestos and other dumped material, and by examining bottles jettisoned by litter-louts. Bottles trap surprisingly large numbers of small mammals and invertebrates. Small rodents are, of course, also found dead on the roads, and are frequently brought in by domestic cats to their usually unappreciative owners. These casualties are usually identifiable even in an advanced state of decomposition, provided the skull is reasonably undamaged, and the Recorder is willing to receive corpses for identification even when they are in a somewhat nauseating condition!

61. Harvest Mouse. *Micromys minutus* (Pallas)

A full account of the rediscovery of this mammal and its distribution in the London Area as known at present appears on pp. 136-149. During 1961 it was recorded at the following localities:—

K Two places between Chelsfield and Shoreham, and at Horton Kirby (NA, WHB, PAF, WGT, PCT, *et al.*).

M Ruislip L.N.R. (CF, PAM, BPP, WGT).

S Cobham, Esher (two localities) and Hersham S.F. (AF, PAM, DP, WGT, DWY).

62. Wood Mouse (Long-tailed Field Mouse). *Apodemus sylvaticus* (L.)

This is probably the commonest of all British mammals, and is almost certainly found in all the rural parts of the Society's Area. The fact that few records are published for Hertfordshire and Essex does not mean that the animal is uncommon in these counties; these were the only records

received. Only in part of Middlesex and the south-west sector of the Society's Area has any serious effort been made to look for it. Records are especially wanted for the suburbs so that the innermost limits of the animal's range can be more accurately determined.

E Havering-atte-Bower, one caught in Longworth trap on night of August 5/6 (MEP.)

H Brookman's Park, a total of 72 (47 bucks, 25 does) trapped on edge of Gobion's Wood (near Middlesex boundary) between January and April, and another 15 (8 bucks, 7 does) trapped there in first half of May (PJF, PAJ).

K Chelsfield, a nest with four young in a garden on June 6 (VG); one seen at a nest built in an old Blackbird's nest in a hedge at Well Hill on September 9 (PCT, AET). Also recorded between Cudham and Green Street Green and at Ruxley G.P. (AA, DME, EMH, PCT, DT, AET).

M Caught in Longworth traps at Hatch End and Pinner Park (PAMy), Perry Oaks S.F. (PAM, DWY), Ruislip/Northwood (near Battle of Britain House and in Ruislip L.N.R.) (MGC, PAMy, BPP, WGT). Found dead at Poyle (WGT) and Staines Res. (PAM, DWY). Winchmore Hill, frequented a garden rockery, using same entrance holes as Bank Vole. On certain days in summer was active above ground almost continuously (AV). Wood Mice are normally nocturnal, but this animal was watched at close quarters, and the observer was in no doubt that it was of the present species.

S Caught in Longworth traps at Esher, Hersham, Oxshott, Thames Ditton and Walton upon Thames (PD, PAM, DWY), and in a garage and garden shed at Coulsdon where they had been eating narcissus bulbs and stored apples (LP, PAF). Found under litter etc. at Addlestone (sacking), Esher and Thames Ditton (corrugated iron), and Weybridge (wood pile) (GHG, PAM, WGT, DWY). Found dead at Bookham Common (in milk bottle), Esher, Surbiton and Worcester Park (IDC, JBH, DR, DWY). At Esher on May 7 a doe was found behind the loose bark of an elm stump, presumably a site selected for a nest (GHG, *et al.*). At Weybridge on April 14 a nest with four naked young was found in a dry wall (GHG).

63. YELLOW-NECKED MOUSE. *Apodemus flavicollis* (Melchior).

The distribution of this animal in Britain is still imperfectly known. In the London Area most of the records received to date (1964) have been from Surrey, but this may be merely an indication of the distribution of keen mammalogists. The Yellow-necked Mouse is noticeably larger than the Wood Mouse, is brighter in colour and has (in Britain) an obvious yellow band across the chest between the forelegs, sometimes extended towards the throat and belly to form a cross. It should be noted that the Wood Mouse usually has a yellow chest spot.

H Brookman's Park, two does caught on edge of Gobion's Wood during period January to April, and two immature bucks, three adult bucks and an adult doe caught there on the night of May 7/8 (PJF, PAJ).

62/63. *Apodemus* sp.

The following are records of animals not examined critically or of remains found in owl pellets. The skulls of *A. sylvaticus* and *A. flavicollis* cannot always be distinguished with certainty.

E Theydon Bois, three on July 9 (DEW).

K Chislehurst Common, remains found in owl pellet (EMH).
M Osterley Park, remains found in Barn Owl pellets collected by TJG (WGT).
S Skulls found in owl pellet material from Beddington S.F. (AMH, WGT), Cobham (DWY) and Esher (CK, PAM, WGT, DWY).

64. HOUSE MOUSE. *Mus musculus* (L.)

This species, almost certainly ubiquitous in the built-up area at one time, should now be of rather more local distribution. Its status must have been affected by the clearance of old property, improvements in methods of rodent control and the fact that people are less likely to tolerate mouse-infested premises than formerly. Records of its occurrence away from buildings are of some interest.

In 1961 remains of House Mice were found in owl pellets from two Surrey localities; Beddington S.F. (AMH, WGT) and Esher (PAM, WGT, DWY)

66. COMMON (BROWN) RAT. *Rattus norvegicus* (Berkenhout)

S Hersham S.F., one seen dragging a dead Woodpigeon on September 10 (GHG).

67. BANK VOLE. *Clethrionomys glareolus* Schreber

Information on this species in the London Area is at present so scanty that no worthwhile comment can be made on its distribution. It is to be sought mainly in scrub, woodland and in hedgerows, and is frequently seen abroad in daylight.

H Brookman's Park, trapped on edge of Gobion's Wood (PJF, PAJ). Maple Cross G.P., one on August 27. West Hyde G.P., one on August 22 (BPP).
K Chelsfield, a male caught by a cat on January 14 and a nest found in a coal box in a garden shed (CL, VG). Keston Common, on June 4 one seen to unearth a large acorn and carry it into a hole (JB, WGT). At least six seen near Shoreham on May 25 (JH).
M Osterley Park, one skull found in a collection of 39 Barn Owl pellets, as compared with the remains of 104 *Microtus* skulls (TJG, WGT). Ruislip/Northwood, caught during the year in Longworth traps set in Copse Wood, Mad Bess Wood, at edge of Poor's Field and in Ruislip L.N.R. (MGC, PAMy, BPP, WGT); one brought into Battle of Britain House by a cat on May 30 (VS). Winchmore Hill, resident in a garden rockery, coming to feed within a few feet of windows of observer's house (AV).
S Caught by hand or trapped at Esher, Hersham, Littleworth Common, Oxshott and Walton upon Thames. Esher captures included one on a bomb site in Esher High Street (CK, PAM, DWY). One found dead at Gravelly Hill, Caterham on April 1 (PAF, WGT). Remains found in Barn Owl pellets from Cobham and Esher (CK, PAM, WGT, DWY).

68. WATER VOLE. *Arvicola terrestris* (L.)

Relatively few records of this mammal are received although it probably occurs in most of the streams or ponds in the Area which have lush waterside vegetation and suitable banks for burrowing. Patient watching on a bridge can often reward one with the sight of a Water Vole, and Ryder (1962) recommends using a sweet apple as an attractant, throwing small pieces down for the voles and eating the rest oneself.

Reported from the following localities:—

E Buckhurst Hill, two in May at a pond at Knighton Wood (DCo).

H Rye Meads, one on June 18 and three on July 8 (TWG, RHK, AV). The animal is reported to be common at this locality, but more information would be welcome.

K Dartford Marshes, one on saltmarsh on August 19 (VG). Erith Marshes, one found dead in drainage ditch on August 12. Skull in L.N.H.S. collection (JC). Darent Valley, at least two in a tributary of R. Darent at Otford on April 23 (DK, PCT), and at least two in R. Darent near Shoreham on October 21 (JH).

S Chessington, "always present" in Hogsmill River (DP). Cobham, one on banks of R. Mole below Downside Bridge on April 9 (PAM, WGT, *et al.*); abundant and frequently observed on June 10 along R. Mole downstream from Painshill Farm (GHG). Esher, one at The Ledges on February 19 (PAM, DWY); one in a small wood (!) near West End recreation ground on April 1 and one in stream near here on April 15 (PAM). Hersham, one seen on March 23 in R. Mole near South Weylands Farm (PAM, DWY); tame and common on the humus beds at Hersham S.F. (GHG, DP). Two single animals in streams near edge of Little Bookham Common on April 16 (HDD, CEM).

69. SHORT-TAILED VOLE (FIELD VOLE). *Microtus agrestis* (L.)

This is a common mammal of rough grassland, although occasionally found in woodland (see Herts. record below). In the London Area the Short-tailed Vole has proved to be the species most commonly found in Barn Owl pellets. It seems to be rather more reluctant to enter Longworth traps than Bank Voles and Wood Mice, and can best be found by looking under sheets of corrugated iron, etc., where its runs can also be easily seen. Recorded from the following localities:—

E Havering-atte-Bower, one caught in Longworth trap on night of August 6/7 (MEP).

H Brookman's Park, one trapped in Gobion's Wood (PJF, PAJ).

K Barnehurst, one brought in by cat on May 16 (WIB). Chelsfield, two caught on February 12 (CL, AT) and one brought in by cat on April 8 (VG). Crystal Palace, several brought by cat into winter quarters of L.C.C. Children's Zoo during November and December (JFT). New Eltham, one in Montbelle Road, S.E.9 on September 27 (DME).

M Bushy Park, one caught on March 26 and another on April 15 (PAM, MO). Harrow, one brought in by a cat on January 18 (EMC). Mill Hill, one found dead on golf links on December 16 (DMy). Osterley Park, remains of 104 animals found in 39 Barn Owl pellets collected by TJG (WGT). Perry Oaks S.F., one under a stone on January 5 (PAM, RW, DWY). Ruislip/Northwood, one caught in Longworth trap at edge of Poor's Field on June 15 (WGT) and one caught in Ruislip L.N.R. in August (BPP).

S Addlestone, one under a log on May 14 (GHG). Beddington S.F., *c.* 15 caught under corrugated iron in gravel pit on July 23 and others seen elsewhere on the farm. Remains also found in owl pellets (AMH). Bookham Common, one on Central Plain on April 9 (JCL). Chessington, one caught by cat on March 12 (AP). Cobham, remains found in owl pellet material (DWY). Esher, caught or found dead at a number of localities and found in Barn Owl pellets at Claremont (CK, PAM, WGT, DWY). Hersham, caught at a number of localities including Hersham S.F. where "a very large colony" existed until the

area was sprayed with weed-killer (PAM, DP, DWY). Mitcham Common, one found on January 13 (JMP). Thames Ditton, six found under corrugated iron, etc. at Palace Estate on January 4, 16 on January 28, and one on February 5 (PAM, MO, DWY). Walton upon Thames, two under fibre-board on June 10. Weybridge, one under a log on May 13 (GHG).

72. COYPU. *Myocastor coypus* Molina

E Brentwood S.F., one on September 16, described as about three feet long and looking "like a gigantic guinea pig", was seen by RBW to dive into a lagoon and swim under water, emerging into thick cover. The observer, who had seen Coypu before, in Suffolk where they are well established, made enquiries in the neighbourhood and found that there was a fur farm about half a mile away which had been breeding "Nutria" until nine months previously.

CETACEA

77. LESSER RORQUAL (PIKE WHALE). *Balaenoptera acutorostrata* Lacépède

M/S An immature female was stranded alive on the banks of the R. Thames at Kew, on the Surrey side, on July 12. The dying whale was refloated by the police and the R.S.P.C.A., but was soon stranded again. By 6 p.m. the body had sunk, but was located again and towed ashore near Kew Bridge where it was seen by WGT on July 13. It was measured (15 ft. 3 ins., and not 17 ft. as stated by the Press), the flippers, flukes and internal organs were removed by members of the Zoological Society staff and the head was taken for preservation by the British Museum (Natural History). The rest of the animal was buried in the Thames mud at low tide.

This appears to be the first Lesser Rorqual recorded in the London Area. Its reference number in the British Museum (Natural History) records is SW 1961.11.

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An Appeal for Records

Requests for information are perhaps all too common a feature of Natural History journals, and every check list or report on the fauna or flora of an area contains either explicitly or implicitly some such request (see e.g. Teagle, 1963, p. 42; Marlborough, 1963, p. 70).

It is therefore with some apology that we submit this note to the *London Naturalist*, since it is a combination of an appeal for information with an indication of what one might hope to learn from it; it concerns

the information required about mammals, reptiles and amphibians, these being the groups for which we are personally collating information.

Obviously the basic requirement for each species is a general distribution map, preferably obtained by blocking in one-kilometre grid squares, as was done by Beven (1957) for the Grey Squirrel. Information for this can be acquired from a number of sources—larger animals may be readily recorded by the occurrence of their holes (Fox earths, Badger setts), while medium sized mammals frequently occur as road casualties (Grey Squirrel, Hedgehog). Molehills provide a ready means of plotting the occurrence of that animal, while droppings and tracks are valuable for assessing deer distribution. Small mammals can be more difficult—trapping is most systematic and informative, but rather time-consuming for gathering distribution data. More satisfactory are searching under corrugated iron (especially for Field Voles and shrews) owl pellet analysis, and the examination of discarded bottles. The value of this latter technique for the purposes of recording general occurrence cannot be overemphasised—in just one year's searching we have recorded some twenty occurrences of "bottles with mammals" referring to over fifty individual mammals from the London Area, compared with only one collection of owl pellets. The skulls occurring in bottles or owl pellets can be readily identified with practice (see Southern, 1964) and either author would be pleased to help anyone with this, or analyse remains sent to them.

A special request might be made here for information on bat roosts. Eleven of the fourteen British species have been identified in the London Area, but this identification depends generally on handling the animal. Information on bats is particularly wanted at the present, since, like the Badger, they are the object of a national distribution survey being carried out by the Mammal Society of the British Isles.

Perhaps the most difficult is the recording of reptiles. Grass Snake and Slow-worm can often be found under corrugated iron, but the only way to record the occurrence of Common Lizard and especially Adder is to search for them on sunny days when they might be seen sun-bathing. Obviously this takes considerable time, and it is here that chance observations are of real value. There are far too few records of reptiles to give satisfactory distribution maps; for instance, there are no recent records of Common Lizard and Slow-worm on Hampstead Heath and similar inner areas, though it is likely that they persist there.

Perhaps more important than recording distribution in the London Area should be the reporting of disappearances or spreading of species in the area. It is here that regular recording by a number of scattered observers would be of real value; a number of instances may be given. Thus Roe-deer are spreading eastwards along the North Downs, and have been reported sporadically in the Society's area, e.g. at Weybridge (Teagle, 1963) but do not yet appear to have crossed the River Mole; obviously a watch should be kept for this species in the Box Hill area. Equally, Muntjac appear to be spreading into the north of the Society's area, but again there is as yet little precise information. On a smaller scale, Teagle (op. cit.) reports the re-occurrence of Grey Squirrel in Regent's Park; presumably, as he says, they had spread from the vicinity of Hampstead Heath, but there was no information from the intervening area (though it is understood he has now a few records from these localities). Disappearance is perhaps more difficult to record than a new appearance, but some instances can be cited. Fitter (1949) listed only one Badger

sett (Sandown Park) for the Esher-Weybridge-Chertsey Urban Districts. Systematic searching during the last three years has revealed twenty more, but during the same period, two of the "new" setts, one at Esher, the other at Claygate have been built on. Badgers, presumably, can move elsewhere. More unfortunate is the status of the Common Frog. Many of its breeding ponds have been filled in, and at others the threat from small children collecting spawn and tadpoles is serious; yet there are very few records of declining numbers or of colonies now extinct. Information on these points would be very welcome, as would information of occurrences in the frog's "new habitat", the small garden pond.

The value of follow-up visits might perhaps be stressed in this connection. For instance, Edible Frogs were reported by Fitter (1949, 1959) in Highgate Ponds, but there is no information as to whether they still occur there—they may have spread, or they may have died out. Equally Dormice and Smooth Snake were reported from the Croydon and Godstone areas respectively (Fitter, 1949) but there is no subsequent information.

Furthermore regular recording and follow-up visits can give information on the fluctuation in numbers of species. In the Esher area we have tried to collect the road casualty occurrences of, especially, Grey Squirrel and Hedgehog. The large numbers of these animals which are killed on the roads must be replaced if the species are to maintain themselves. Regular recording should show whether in fact there is a decline in the numbers of these species. Unfortunately, recording of this more intensive kind is very susceptible to variations in intensity, for instance during holiday periods. Participation by a large number of observers would smooth out such fluctuations. One point which must be stressed is the necessity of giving a date and a six-figure map reference. This applies to all records, but particularly in this case, where a road casualty Hedgehog can remain visible for up to four weeks, and could be recorded by several observers during this time. Only an exact temporal and spatial pin-point can avoid such duplication.

Finally, perhaps, a special plea might be put to those members who live near railways. It seems very likely that railway embankments have provided a reservoir habitat for several species and also a route into parks and other open spaces which are otherwise surrounded by urban sprawl. The Fox certainly seems to have spread into the suburbs by such routes, but there seems to be little information on other species occurring on railway banks. Lizards might well be common on such a habitat. So might Field Voles, shrews and perhaps Wood Mice.

Records, please, to be sent to:—

J. A. Burton, Recorder for Mammals, c/o Exhibition Section, British Museum (Nat. Hist.), Cromwell Road, S.W.7.

D. W. Yalden, B.Sc., Recorder for Reptiles and Amphibians, 40 Molesey Road, Hersham, Walton-on-Thames, Surrey.

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The Harvest Mouse in the London Area

By W. G. Teagle

Introduction

It is generally considered that the Harvest Mouse *Micromys minutus* (Pallas) became much less common in Britain with the advent of the mechanical reaper, although, as Matthews (1952) points out, we have "no definite information on this point". Fitter (1949) feared that the animal had little or no claim still to be counted amongst the mammals of the London Natural History Society's Area (a 20-mile radius of St. Paul's Cathedral), and the only authentic record he could trace for this century was that of a mouse found dead in a swimming pool in September 1947 at Haileybury, Hertfordshire (Brown, 1949).

From 1954 onwards records of Harvest Mice were received from over twenty localities scattered throughout the Society's Area, suggesting that the species may perhaps be recovering its numbers or that it has been overlooked. Several of the new records indicate that it occurs in habitats which have not been regarded as typical of Harvest Mice. In describing the vegetation in these and other places where the mice have been found I have followed the botanical nomenclature of Dandy (1958).

Rediscovery in the London Area

The first suggestion that Harvest Mice might still be living around London came from Kent, when, in 1952, the remains of eight animals believed to have been of this species were found in the pellets of a Tawny Owl (*Strix aluco*) from Lullingstone Park (D. M. Edwards *in litt.*). It is interesting to note that the presence of Harvest Mice within a quarter of a mile of the Park was confirmed in 1961. Details of this discovery are given later.

The first *certain* records are from north of the Thames, however, from the county of Middlesex (Pickess, 1955 and *in litt.*). On September 2, 1954 B. P. Pickess, then working at Knightscote Farm, Harefield, came across three nests in standing oat stooks. The field had been cut around August 28/29, and the nests had been built in the growing corn. The discovery prompted Mr. Pickess to search all the stooks in the field and in a neighbouring wheat field, and resulted in his finding over 30 nests! One nest found in a wheat stook on September 22 contained three dead, fully-coated young.

It seems likely that several more nests could have been found, for one was also noticed in a third field, of oats, whilst it was being cut with a combine harvester, and others could have been easily missed. On November 28, 1954 an adult buck was picked up dead in the rickyard, half a mile from the cornfields where the nests were seen.

In the nine years which followed, Harvest Mice were reported from a number of places in the London Area, and for the sake of convenience these records will be considered county by county.

Records of Harvest Mice since 1954

Middlesex

B. P. Pickess continued to record this species at Knightscote Farm, Harefield, during the years 1955–1958 (Anon., 1956 and Pickess, 1957,

1958 and 1959). In 1955 two were caught there by a cat, one on January 17 and one on January 20, and further evidence of the mice was obtained during the course of farm work later in the year. One was caught on August 10 and three hedge nests were found on an unrecorded date. Nests were also located in grass at the edge of Bayhurst Wood, Harefield, in 1955, one by J. W. Donovan in January, and four on December 26 by Messrs. Donovan and Pickess.

No nests were recorded from Harefield in 1956, but at Knightscote Farm on December 27 J. Fairweather and B. P. Pickess disturbed a young animal from under a bale which had been left lying in a field. In 1957 Mr. Pickess discovered a nest in an orchard at the farm on March 29, and recorded several old nests and one new one elsewhere on the farm during the first week in May. The new nest had been built in rushes (*Juncus* sp.). Several nests were also found in grass under growing kale between November and December.

Mr. Pickess saw only one nest at Knightscote Farm in 1958, in the autumn, and a change of employment brought an end to his interesting observations there.

Meanwhile Harvest Mice had been seen in two other Middlesex localities. Fitter (1960) quotes a record of one found dead by Bruce Coleman in a garden at Hayes on May 30, 1956. Mr. Coleman has confirmed (*in litt.*) that this was no ordinary suburban garden, but one with an area of about two and a half acres. In the summer of 1957 a cat brought a live Harvest Mouse to the house of Mrs. K. J. Davies in Riverside Close, off Wheatsheaf Lane, Staines. It was kept for a few days as a pet.

On August 16, 1961, B. P. Pickess and I came across a Harvest Mouse nest at the edge of the marsh which forms an important part of the Ruislip Local Nature Reserve, just to the north of Ruislip Lido. Subsequently other nests were found in 1961, one by Mr. Pickess and P. A. Moxey on September 30, one by Mr. Pickess on October 7, and one on October 21 by Mr. Pickess and C. Field.

Searches for nests in the Reserve in the summer of 1962 proved unrewarding, but four were found in the same area in the autumn, three of them in an incomplete condition. Three nests were seen in another part of the Reserve marsh in 1963, and three more in a marsh to the north of the Reserve.

The presence of Harvest Mice in the Ruislip Local Nature Reserve had not been suspected before August 1961. The use of Longworth small mammal traps has only resulted in the capture of Wood Mouse (*Apodemus sylvaticus*), Bank Vole (*Clethrionomys glareolus*), Short-tailed Vole (*Microtus agrestis*), Common Shrew (*Sorex araneus*) and Pygmy Shrew (*S. minutus*) (Pickess, 1962 and *in litt.*).

A sixth Middlesex locality became known in 1962, when G. H. Gush discovered a nest on April 28 at Perry Oaks Sewage Disposal Works, near London Airport.

Essex

At present little seems to be known of the occurrence of Harvest Mice in south-west Essex, but this is not surprising in view of the fact that very little information even on the commoner and more obvious mammals of this sector of the London Area has been submitted for publication.

Romford Sewage Farm provides the only records of Harvest Mice so far received. Robert Spencer reported that one was accidentally killed

there on February 15, 1959, and that another was caught alive in November of that year. The skin of the former is in my collection.

HERTFORDSHIRE

Here again very little information is available. Gladwin (1963) stated that Harvest Mice were "particularly abundant" on waste ground at Rye Meads Sewage Purification Works, situated at the confluence of the Rivers Lea and Stort. Dr. L. Lloyd-Evans has informed me that the first mouse was caught and identified at Rye Meads on November 25, 1962, on recently ploughed grassland, and that animals were subsequently seen on rough grassland by other members of the Rye Meads Ringing Group.

In 1963 Dr. Lloyd-Evans kindly sent me the body of a buck which had been recovered from a Weasel (*Mustela nivalis*) at Rye Meads on January 26. Another mouse was recorded on November 24, 1963, and in the early weeks of 1964 mice were seen by members of the Ringing Group in a relatively open plant community of docks (*Rumex* sp.), goosefoot (*Chenopodium* sp.) and *Polygonum* sp. on old dried out sludge. It was assumed that they were collecting seed. One mouse, found dead in a stream, was examined by Dr. Lloyd-Evans and considered to be a first winter animal, the cusps of its molars being unworn and the russet colouring of the dorsal surface being confined to the rump.

SURREY

The Harvest Mouse was discovered at Bookham Common in the autumn of 1955, when one was caught in a break-back trap on Central Plain during the first small mammal survey to be made there (Harrison, 1956). Four Harvest Mice were amongst the mammals captured in Longworth traps set on the Common by Lord (1961) when he made his six surveys during University vacations between September 24, 1958, and January 2, 1960. The mice were all caught in 1959; two on the night of January 1/2, one on January 9/10, and one on September 23/24 (J. C. Lord *in litt.*). Mr. Lord trapped again at Bookham in 1962, and four, possibly five individual mice were caught between March 18 and 25 on a part of Central Plain which had been cleared of scrub by the Conservation Corps of the Council for Nature (Beven, 1963).

It is remarkable that no nests were found on the Common until April 8, 1962, when three were located on Central Plain (Beven, *op. cit.*). The site is shown in the photograph facing page 145.

A second Surrey locality became known in 1955 when two Harvest Mice were caught in the course of trapping in ricks and hedgerows at Stoke D'Abernon between September 28 and December 9 (Davis, 1956).

In 1958 Harvest Mice were found to be included in the diet of the Barn Owl (*Tyto alba*) when a collection of pellets from Reigate Heath was examined. The details of the pellet analysis are unfortunately not available to the Society at present, but the writer, who helped with the work, recalls that the species was represented by only a few specimens.

On April 5, 1959, A. M. Hutson saw a Harvest Mouse and a nest at Titsey, near Limpsfield, and in February 1962 F. P. Rowe found Harvest Mice in corn ricks at Banstead and Epsom. Two were caught at one rick (three-quarters wheat and one-quarter oats) at Banstead on February 1, and four oat ricks at West Park, Epsom, produced a total of 22 between February 5 and 8.

The remaining Surrey records are all for the south-western sector of the Society's Area. The first is somewhat nebulous, but in view of other

occurrences in the neighbourhood it would seem to refer to *Micromys;* in June 1957 A. Powell of Breakspear Road, Chessington, informed D. W. Yalden that his cat had brought in a number of "very small yellow, white-fronted mice". An old Harvest Mouse nest was shown to me in 1960 by P. A. Morris, who had found it at Oxshott clay pit on an unrecorded date in 1959, and the same observer collected some Barn Owl pellets at Cobham on October 1, 1960, in which he and D. W. Yalden subsequently found a Harvest Mouse skull and four dentaries. Barn Owl pellets from near Claremont, Esher, found in 1961 also contained Harvest Mouse remains (Teagle, 1963), and a single dentary was found in one of a number of pellets collected from the same site in April 1962. Another Esher record was obtained in 1961 when, on February 21, Mr. Morris saw a Harvest Mouse in a hedge in West End Lane.

On May 28, 1961, a nest was found by D. Parr and A. Fielder in scythed vegetation at the edge of a humus tank at Weylands Sewage Works, Hersham. It contained three dead young, thought to have been only a day or two old. Mr. Parr saw a Harvest Mouse at the same spot on October 15, 1961, climbing amongst *Atriplex* and *Chenopodium* spp. No animals were seen at the works in 1962, although disused nests were found on January 7 and February 4.

KENT

The first certain records for the Kent sector were obtained by Davis (1956) when trapping for small mammals to the south of West Wickham at a granary and in hedgerows and ricks between September 28, 1955, and January 1956. Ten Harvest Mice were caught.

A live mouse was seen by W. H. Brown in his garden at Horton Kirby, in the Darent Valley, in the spring of 1961, and later in the year remarkable numbers of nests were found to the east of Chelsfield (but in the parish of Shoreham) along a road leading to a more southerly part of the same valley. The initial discovery was made on July 30 by N. Allan, who saw two mice at one of four nests in the hedge. The locality was later visited on a number of days by the writer, Mrs. P. A. Freshwater, A. Archer, A. E. Turner, P. C. Tinning and several students of Morley College, and about 30 nests were found along about 500 yards of road. They appeared to be on one side of the road only, and a wide gap in the hedgerow broke the line into two "colonies", one of at least 14 nests and the other of about 16. Visits to the site were paid between August 13 and early November (the second, eastern-most "colony" was not found until an extended search was made on November 5) and nests seen on one visit could not always be located on another. They were in various states of preservation, some being in use in August, others looking old and tattered even then. Two mice were observed on August 13; one of them was seen by Mrs. Freshwater to emerge from a nest and descend to the tangle of grasses at the bottom of the hedge. A single nest was also found on August 13 in a similar hedge along the same road, but about half a mile to the east, just to the south of Lullingstone Park.

No signs of Harvest Mice could be found along this road when I re-examined it in the summer of 1962.

The most recent record of Harvest Mice in the Kentish sector comes from Ruxley Gravel Pit, in the Cray Valley, where F. J. Holroyde found a nest on December 1, 1963.

The distribution of *Micromys minutus* in the London Area as known at present is shown on the accompanying map.

Nests

The Reverend Gilbert White, to whom we can give most credit for discovering the Harvest Mouse in Britain, described its nest in a letter to Thomas Pennant dated November 4, 1767, as "about the size of a cricket ball". White's description, published in 1789, has been used by natural historians ever since, and even allowing for slight changes in the size and weight of the cricket ball which have taken place since 1767, it is still a fair one. Mr. J. Rait Kerr, the Curator of the Marylebone Cricket Club, kindly informs me that since 1927 the standard cricket ball has had a circumference of $8\frac{3}{16}$ to 9 inches (and therefore a diameter of around 2·8 inches), and that it is unlikely that Gilbert White's idea of the size of a cricket ball would be greatly different from our own.

Nests found in the London Area have varied in diameter from $2\frac{1}{2}$ to 4 inches, some smaller than a cricket ball, others appreciably larger.

As Maxwell Knight (1963) points out, early drawings and paintings show the nests to be tidier and more symmetrical than they really are. The Chelsfield nest shown in the illustration was in good condition in August 1961 when the photograph was taken, and is anything but spherical. Two of the three nests at Bookham were measured (Beven, 1963) and their dimensions were $3\frac{1}{2} \times 2\frac{1}{2} \times 3$ inches in the case of the first, $3 \times 3 \times 2\frac{1}{2}$ inches in the case of the second. The third figure in each group represents the measurement from "top" to "bottom". The third nest was in too damaged a condition to be worth measuring.

Maxwell Knight (*op. cit.*) states that most of the nests he has found have been between six and ten inches from the base of the plants in which they were constructed. Not all the London Area observers have mentioned the height at which nests have been built, but, except at Ruislip, the majority seem to have been between heights of one and two feet. One nest I found at Chelsfield was built at four feet, and at Ruislip twelve nests found by B. P. Pickess were at heights of between 18 inches and 57 inches! If we except this latter nest, the average height of building was at 32·7 inches. It would presumably be to the animals' advantage to nest high in a marshy habitat where low nests might possibly be destroyed by flooding.

One nest at Chelsfield was placed as low as six inches, and the nests built under kale at Harefield were between six inches and a foot from the ground.

The Chelsfield nests were often found fairly close together; the shortest distance between nests was about a foot and nests from two to ten paces apart were frequent. Presumably the same animal might have been responsible for building nests so closely situated.

The nests at Chelsfield were on the field side of the hedge; none was found on the road side. The hedge was of Hazel (*Corylus avellana*), with Maple (*Acer campestre*) and Ash (*Fraxinus excelsior*), and were built in a variety of plants including the grasses Yorkshire Fog (*Holcus lanatus*) and Couch (*Agropyron repens*), Goosegrass (*Galium aparine*) and Traveller's Joy (*Clematis vitalba*). Nests at Ruislip were all in Reed Grass (*Phalaris arundinacea*), partly supported by sallows (*Salix* sp.) in the case of the one at 57 inches. At Bookham Common the nests were found in Tufted Hair Grass (*Deschampsia cespitosa*) around young hawthorns (*Crataegus* sp.), the Titsey nest was in Gorse (*Ulex europaeus*) amongst low hawthorns,


HERTS
ESSEX
MIDDLESEX
BUCKS
SURREY
KENT
N
RYE MEADS 1962-64
RUISLIP 1961-63
HAREFIELD 1954-58
HAYES 1956
ROMFORD S.F. 1959
St. Paul's
PERRY OAKS 1962
STAINES 1957
RUXLEY 1963
HORTON KIRBY 1961
HERSHAM 1961
ESHER 1961
CHESSINGTON
ESHER 1961
EPSOM 1962
OXSHOTT 1959
COBHAM 1960
STOKE D'ABERNON 1955
BANSTEAD 1962
BOOKHAM COMMON 1955, 1959, 1962
WEST WICKHAM 1956
LULLINGSTONE PARK 1952
CHELSFIELD-SHOREHAM 1961
TITSEY 1959
REIGATE HEATH 1958
Miles
Mouse/mice
Nest(s)
Both
Owl pellets
Mice - approx. site
County boundary

the Oxshott nest was in Bramble (*Rubus fruticosus*), the Hersham nest was attached to Stinging Nettle (*Urtica dioica*) and the Perry Oaks nest was also built in nettles and "long grasses".

It will have been noted that on several occasions nests have been found during the winter months. All have been of the typical, rounded, suspended type, survivals from the previous summer or autumn. Winter nests of Harvest Mice are built on the ground (Maxwell Knight, *op. cit.*), but I have as yet no experience of these in the London Area.

Ectoparasites

Few ectoparasites have been taken from specimens in the London Area up to the present. Nine mites were collected from the mouse found dead at Harefield by B. P. Pickess on January 20, 1955, and were determined by K. H. Hyatt as *Laelaps muris* (Ljungh). A common rodent flea, *Ctenophthalmus nobilis nobilis* (Roth.), was removed by Dr. Lloyd-Evans from the drowned mouse found early in 1964 at Rye Meads.

Predators and Activity

Little information has been published on the predators on Harvest Mice in Britain (Southern *et al.*, 1964). Maxwell Knight (1963) has twice found skulls in Tawny Owl pellets, and reference has already been made to the remains found in Barn Owl pellets from three London Area localities, Esher, Cobham and Reigate Heath. Domestic cats have accounted for Harvest Mice at Staines, Harefield, and presumably Chessington, and there is also the record of the Weasel carrying one at Rye Meads.

The Harvest Mouse is likely to fall a victim to both nocturnal and diurnal hunters, not only because it may be disturbed from its nest at any time, but because it is likely to be abroad both in daylight and in the dark. It has often been regarded as a diurnal rather than a nocturnal rodent (Barrett-Hamilton and Hinton, 1916), but Maxwell Knight (1963) affirms that it is active at fairly regular intervals, day and night, during the spring and summer at least. Observations made on captive Harvest Mice between 1958 and 1963 support this thesis. After I had on numerous occasions entered my darkened flat and found, on switching on the light, that the animals were busy feeding or climbing about the branches in their cage, L. W. Eversfield and I took turns to watch one mouse over two non-consecutive 24-hour periods during August 1960, noting its behaviour minute by minute. A red electric light bulb was used during hours of darkness, it having been assumed, perhaps wrongly, that the eyes of the Harvest Mouse were like those of some other rodents, insensitive to the red end of the spectrum. (The same red bulb had already proved invaluable in enabling me to watch a captive Dormouse (*Muscardinus avellanarius*) which would *never* emerge in normal electric light).

The observations were not published, mainly because, as shown by Crowcroft (1957) in his work on shrews, a more extended series of observations would be necessary for a true impression of the animal's activity rhythm to be obtained, but we did find that during our two watches short spells of activity—feeding, climbing, grooming, defecating, etc.—alternated with short periods of rest all through the 24 hours.

Habitat

Micromys minutus is traditionally associated in Britain with cornfields. Its English name (and for that matter its vernacular name in some other languages, e.g. French, Spanish and Welsh) was once appropriate, since, in the days of hand-reaping, the animal was most likely to have been seen in the corn at harvest time (Barrett-Hamilton and Hinton, 1916). Its name and the many published illustrations of it clinging to the cornstalks (usually in a photographer's studio!) have no doubt helped to reinforce the popular belief that cornfields have been its principal and still are its rightful home. It has therefore been convenient to connect the decline or disappearance of the species from agricultural land with the introduction of the mechanical reaper. Millais (1905) commented that nests in standing corn had become rarer, whereas this had at one time been the "favourite resort" of the mice. He recognised that other habitats were occupied, notably, during the spring and summer, "the rank vegetation of ditches and hedgerows bordering cultivation", and considered whether the species had adopted these, in his day, less vulnerable haunts as a result of the swift annual destruction of the "typical" one. He added that the mouse generally spent the winter in corn ricks, until disturbed by threshing, after which it re-entered the straw stacks or was obliged to find shelter in banks or make fresh winter nests.

Southern *et al.* (1964) in discussing summer habitats include reed-beds and tall grass, "even out into open fields and salt marshes", while it is described as living in ricks and surface burrows in winter. Table 3 in the same publication shows the main habitats as fields and ricks, with scrub as a subsidiary habitat, while, under the category of "Water", reeds are mentioned.

In the London Area the Harvest Mouse has been recorded not only from ricks, cornfields, and hedges and ditches bordering cultivation, but also from a kale field, an orchard, scrub, gardens, a wet, and to some extent scrub-covered common, a marsh, and on waste ground situated close to places where there was an abundance of marsh vegetation, *viz.* at four sewage disposal works, a flooded gravel pit and a flooded clay pit. The vegetation of some of the non-agricultural localities has been described, in detail in the case of Bookham Common, in the following papers: Bookham Common (Jones, 1954), Rye Meads (Gladwin, 1963), Weylands Sewage Works, Hersham (Parr, 1963).

An attempt has been made to classify the habitats frequented by Harvest Mice in the London Area (see Table I).

Records for the Society's Area and further study of the Harvest Mouse show that it is more adaptable than may be generally realized. Barrett-Hamilton and Hinton (1916) quote records of nests found in sand-dune vegetation in Norfolk and the Netherlands, and in tall sedges by the River Waveney. In April 1960 Gordon Mason, Warden of Woodwalton Fen National Nature Reserve, Huntingdonshire, showed me a nest in Bush Grass (*Calamagrostis epigejos*) in an area of herbaceous fen which was in the process of being colonized by carr, and I later found a nest in a similar situation in another part of the Reserve. Dr. P. Merrett of the Nature Conservancy and I also found Harvest Mice, sometimes in unexpected numbers in pitfall traps at Studland Heath National Nature Reserve, Dorset, in 1963 and January 1964, mainly on the sand dune ridges and in wet hollows. Mice were found on the more recent dunes, where Marram (*Ammophila arenaria*) was dominant, and on the older

TABLE 1

HARVEST MOUSE HABITATS IN THE LONDON AREA, 1954-1964

MAINLY DRY HABITATS					MAINLY WET HABITATS				UNCLASSIFIED, INCLUDING PELLET SITES (P)
a	r	o	g	sc	s	f	m	c	
Harefield nr. Chelsfield nr. Lulling-stone Park Esher	Harefield W. Wickham Banstead Epsom Stoke D'Abernon	Harefield	Hayes (Mddx.) Horton Kirby	Titsey Harefield (Bayhurst Wood)	Rye Meads Perry Oaks Hersham Romford	Oxshott Ruxley	Ruislip	Bookham Common	Esher (P) Cobham (P) Reigate Heath (P) Staines Chessington

a = agricultural land (fields, hedgerows, field ditches)
c = wet commons
f = flooded mineral workings
g = gardens
m = marsh
o = orchards
r = ricks and rickyards
s = sewage disposal works
sc = scrub

Harvest Mouse nest in hedgerow near Chelsfield, Kent, August 13, 1961
Photo by W. G. Teagle.

Site of Harvest Mouse nests, Bookham Common, April 8, 1962
From a colour transparency by W. G. Teagle.

Inner Ridge and Southern Heath, the physiographical history and flora of which have been described by Diver (1933) and Good (1935) respectively. Here the dunes support a carpet of Ling (*Calluna vulgaris*) with a certain amount of Gorse, while in the wetter places Purple Moor-Grass (*Molinia caerulea*) is the dominant grass and Ling is replaced by Cross-leaved Heath (*Erica tetralix*). One animal was also found in a small area of wet woodland where Birch (*Betula* sp.) and Hazel (*Corylus avellana*) make up most of the tree layer, bordering an extensive *Salix* carr.

In February 1964 S. Hedges (personal communication) caught a Harvest Mouse in a Longworth small mammal trap in a wet *Molinia*-covered area thinly planted with conifers near Oakley Inclosure in the New Forest, Hampshire, well away from agricultural land, and Albert Beintema, who carries out regular observations at the Naardermeer in the Netherlands, informs me that the mice live there in the reed-beds. Most naturalists will be familiar with John Markham's beautiful photograph of a Harvest Mouse at a nest built in reeds, one of the illustrations in Matthews (1952).

It is quite evident from all this that the so-called Harvest Mouse is to be found over a wide range of habitats, and that it is often associated with the tall vegetation of marshes and other wet places.

Discussion

The Harvest Mouse is generally regarded as one of our scarcer British mammals, and even in the southern counties, where it has been considered less of a rarity, its distribution is said to be discontinuous (Southwick, 1956).

Earlier writers provide evidence that it was not uncommon in agricultural districts around London about 70 years ago. Fitter (1949) quotes the statement by Beadell (1932) that it was abundant in the ricks and cornfields in the Warlingham-Chelsham district of Surrey in the 1890's, and Laver (1903) in saying that it had been frequent throughout Essex until the turn of the century. Bucknill and Murray (1902) considered it to be "fairly common in most places" in Surrey, but Baker (1908) said it was "of occasional occurrence" in Kent, an indication perhaps of a more cautious assessment, a limited distribution, or a scarcity of records. It is unfortunate that check-lists published in the volumes of the *Victoria County History* were not supplemented by distribution maps! Miller (1912) mentions a specimen in the British Museum collection which was obtained at the now suburban Middlesex locality of Kingsbury. R. W. Hayman kindly informs me that it was collected in 1871.

The mechanical reaper has been regarded as the principal reason for the disappearance of the Harvest Mouse from the English fields, and it is logical to assume that mechanization must have played a big part, just as the mowing machine was the main factor which affected the breeding distribution of the Corncrake (*Crex crex*) in Britain, as shown by Norris (1947). *But only on farmland.* The Harvest Mouse is by no means fully dependent on man's crops to provide it with a suitable habitat. As pointed out by Frank (1957) its small size has enabled it to take over an ecological niche not exploited by any other European rodent, "the stalk-zone of high grasses", and cornfields are not the only places that provide the right conditions. Since it is an indigenous species *Micromys minutus* presumably occupied the stalk-zone niche long before Neolothic man was planting corn in British soil, and it is tempting to suggest that reed swamp,

marsh, fen and salting might have been its original haunts. The cornfield was, of course, the habitat best known to the earlier naturalists, and the animal has probably been little sought elsewhere. Nests in harvested corn would in any case be more likely to be reported than nests in scrub or on marshland. Had Gilbert White seen a nest in a Hampshire reed-bed the popular natural history books of today might have read differently, and we might have adopted a more exact translation of the name *Mus minimus* which he suggested. To the Czechs, Dutch, Germans, Hungarians, Norwegians, Swedes and Danes it is the Dwarf Mouse or Little Mouse, but since the end of the 18th century we have called it the Harvest Mouse, and its apparent disappearance from agricultural districts was all too easily linked with changes in harvesting methods. Intensive grazing, the draining of fens and marshes, the "reclamation" of heathland, deliberate burning and urban growth, however, must each have played its part in diminishing the habitat, and the present century has seen the process of habitat destruction accelerated. Now, in the 1960's, the agricultural habitats are threatened by far more alarming forces than Millais' *bête noire*, the "close-cutting reaping machine". Hedge-removal, chemical seed dressings, chemical spraying, stubble burning, the destruction of weeds with herbicides, the filling-in and contamination of field ponds, and other developments are likely to have a catastrophic effect on wild life generally, as has been described by Moore (1952). The use of toxic chemicals is almost certain to have harmful results as the Harvest Mouse is to a large extent insectivorous, and is likely to prove to be yet another victim of the persistence of chlorinated hydrocarbons. Herbicides, in eliminating certain plants, would also have the effect of reducing the number of dependent invertebrate species upon which the mice might feed, and the universal use of the combine harvester will mean that a favourite winter home of Harvest Mice, the corn rick, will become a thing of the past. Straw stacks provide shelter, but less food.

The scarcity of records of Harvest Mice for the first four decades of the present century can also be partly attributed to a decline in the interest in British mammals amongst amateur naturalists, and the rarity of professional field zoologists during that period.

With the recent resurgence of interest in British mammals, fostered since 1954 by the Mammal Society of the British Isles, and with increased numbers of better-equipped amateur and professional mammalogists taking the field, it is not surprising that the Harvest Mouse has been rediscovered and even found to be quite numerous in parts of Southern England. Remarkable numbers of the mice have been caught, however, since the winter of 1954 at corn ricks in Oxfordshire, Berkshire, Hampshire and Surrey, and Southwick (1956), considering the abundance of *Micromys* in ricks around Oxford, was of the opinion that a real increase had occurred in the area. Rowe and Taylor (1964) commented that Harvest Mice in the ricks at Odiham, Hampshire, outnumbered House Mice (*Mus musculus*) in 1959. An increased rick-population noted at Micheldever, Hampshire, in the winter of 1954-1955, however, was apparently only temporary (Jenkins, 1957).

Dr. G. Beven (*in litt.*) suggests two biotic factors which may have been of benefit to the Harvest Mouse—the cessation of grazing on the commons, and the reduction in the numbers of Rabbits (*Oryctolagus cuniculus*) through the virus disease myxomatosis. He quotes the case of Bookham Common where grazing on a large scale ceased about 1925 when the

National Trust acquired the property. Small scale grazing was stopped in 1942, and after that there was virtually nothing to check the growth of grasses but the Rabbit, and this animal was nearly wiped out at Bookham twelve years later. Myxomatosis was confirmed in Kent and Sussex in October 1953 (Thompson and Worden, 1956), and by the end of 1954 it had affected most of southern, eastern and western Britain. At Bookham Common the disappearance of the Rabbit in 1954 resulted in more tall grass, and therefore an increase in Harvest Mouse habitat on the Common. One may assume that this would also have happened on other similar commons where the Rabbit population had been decimated. The Rabbit's absence would also have resulted in the taller growth of grasses in the hedgerows. It may not be entirely coincidental that the year of the apparent recovery of the fortunes of the Harvest Mouse in the south, 1954, was also that of the decline of the Rabbit.

The "return" of the Harvest Mouse to the London Area can also be related, however, to increased observation, and possibly to the incidental provision of suitable "new" habitats. Sewage disposal works and flooded mineral workings are wildlife refuges of comparatively recent origin. Their appearance over the face of Britain has had a significant influence on bird life. The sludge and humus beds of the former have compensated to some extent for the loss of natural marshes. The latter have added appreciably to existing expanses of open water, and in the London Area they possess botanical features which many of these lack—floating aquatic vegetation and reedswamp. As bird habitats around London the importance of these new "marshes" and lakes has been recognized by Homes *et al.* (1957), and they must obviously provide sanctuary for other threatened or specialized species of animals. The mammalian fauna of the gravel pits has as yet been little studied, but this is not surprising. Before the 1930's they failed to attract the attention of many naturalists, as did, incredible as it may seem, the sewage "farms" which can now at times be almost congested with birdwatchers. The records of Harvest Mice from Ruxley and Oxshott suggest that the closer examination of the vegetation around flooded sand, gravel or clay pits elsewhere might be rewarding.

The first record of a Harvest Mouse from a sewage disposal works was received in 1959, since when it has been reported from three other similar localities widely dispersed over the Society's Area. The discovery of the mouse at these sites has come about mainly because teams of observers, with a primary interest in ornithology, have taken a closer look at their birds' ecological background.

If we except the few, but none the less welcome, records of Harvest Mice which have come to light as a result of someone's chance discovery (or that of his or her domestic cat!) we find that the new information we have acquired about this charming creature's distribution in the London Area can be largely attributed to the new interest in ecology and wildlife conservation which is steadily claiming new devotees. The bulk of the London Area records given in this report have been submitted by members who have (*a*) gone out with the deliberate aim of increasing our limited knowledge of mammal distribution, (*b*) become interested in the analysis of bird of prey pellets and predator-prey relationships, (*c*) have become engaged on an ecological survey of a particular area (in several cases associated with a bird-ringing programme), or (*d*) been concerned

with the management of an area set aside for the conservation and study of certain forms of wildlife.

Acknowledgements

I wish to thank all those observers who have submitted records, and who have so willingly answered my requests for further information on certain points. I am particularly grateful to Roger Cross, Peter Tinning, Patrick Morris and Derek Yalden for becoming involved in lengthy discussions on Harvest Mice and for assistance in other ways, to Dr. Geoffrey Beven and Bryan Pickess for their encouragement and help in reading and criticising the typescript, and to my wife Joyce for her patience and tolerance during the weeks of incubation and final preparation of this paper.

Summary

1. The Harvest Mouse (*Micromys minutus*), considered to be extinct in the London Natural History Society's Area since the turn of the century, was reported from scattered localities in Essex, Hertfordshire, Kent, Middlesex and Surrey within that Area between the years 1954 and 1964.
2. Details are given of the dates and localities of occurrence.
3. The diameter of Harvest Mouse nests found varied between $2\frac{1}{2}$ and 4 inches, and most nests were recorded at heights of between one and two feet. At Ruislip, however, heights of up to 57 inches were noted. A list is given of the plants in which nests were found.
4. The mite *Laelaps muris* (Ljungh) and the flea *Ctenophthalmus n. nobilis* (Roth.) have been found on Harvest Mice in the Area.
5. Domestic Cat, Weasel, Barn Owl and possibly Tawny Owl have been recorded as predators on Harvest Mice in the London Area. Observations made on Harvest Mice in captivity suggest that they are active in daylight and in darkness, and could therefore be hunted by diurnal and nocturnal predators.
6. Although traditionally associated with the cornfield, occurrences recorded in the London Area and elsewhere suggest that the Harvest Mouse is a normal inhabitant of the "stalk-zone" of other plant communities, particularly those of wet situations. In the London Area these include marsh, wet common land, the vicinity of flooded mineral workings and sewage disposal works.
7. Reasons for the decline or apparent decline of the Harvest Mouse in agricultural districts are considered, and it is suggested that besides the use of the mechanical reaper, reclamation work, drainage, burning and urban development must also have made their impact. Current changes in agricultural practice, including the use of toxic chemicals, are likely to prove a serious threat to the species.
8. The lack of records for the first half of this century can also be attributed to the neglect of the study of mammals, just as the recently increased volume of records is partly due to a revival of British mammalogy. Whereas in certain districts the Harvest Mouse appears to have recovered its numbers, possibly assisted by the cessation of the grazing of commons and the recovery of vegetation once controlled by the Rabbit, the new information concerning its distribution in the London Area has been gained mainly through more intensive field work, especially in habitats where its presence might not have been suspected.

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Note on the Occurrence of Holocene Shell Deposits at Chiswick Eyot

By J. W. Simons

THE shell deposits at Chiswick Eyot were first discovered in August 1956 by Mr. M. P. McGann who brought them to the attention of the British Museum (Nat. Hist.). His offer to collect further material was readily accepted and the collection he made during the latter part of 1956, on joint visits with the writer, and those subsequently collected by the writer in 1958 and 1960 are now preserved in the British Museum (Nat. Hist.). Unfortunately at the time these collections were made no detailed sections of the deposits, with the exception of a sketch drawn by Mr. McGann, were constructed and it is with the view of inspiring more detailed excavations at this site, with particular reference to the stratigraphy and exact dating, that the following note was written.

Chiswick Eyot is a small island in the Thames, off the Middlesex bank of the river, lying between Hammersmith and Barnes bridges and opposite the Hammersmith Reservoirs (TQ/218779). The island is accessible only at low tide.

The shell-bearing deposits outcrop on the foreshore of the south (river) side of the island and consist of river-deposited gravels and sands capped by four to five feet of Recent, plastic, grey river clay. At the time of the first visits by McGann and the writer the molluscs appeared to occur in at least two distinct lenses but it should be stated, however, that during the writer's subsequent examination of the site he experienced considerable difficulty in tracing these owing to the amount of clay, gravel and shells which had been disturbed and redeposited on the foreshore by the river. Consequently, if such distinct horizons exist, the collections he obtained must be treated as a mixed assemblage. It would be interesting to ascertain if there are any changes in the molluscan assemblage throughout the sequence. A number of the specimens collected by the writer in 1956 were kindly identified by Dr. M. P. Kerney and a list is given below.

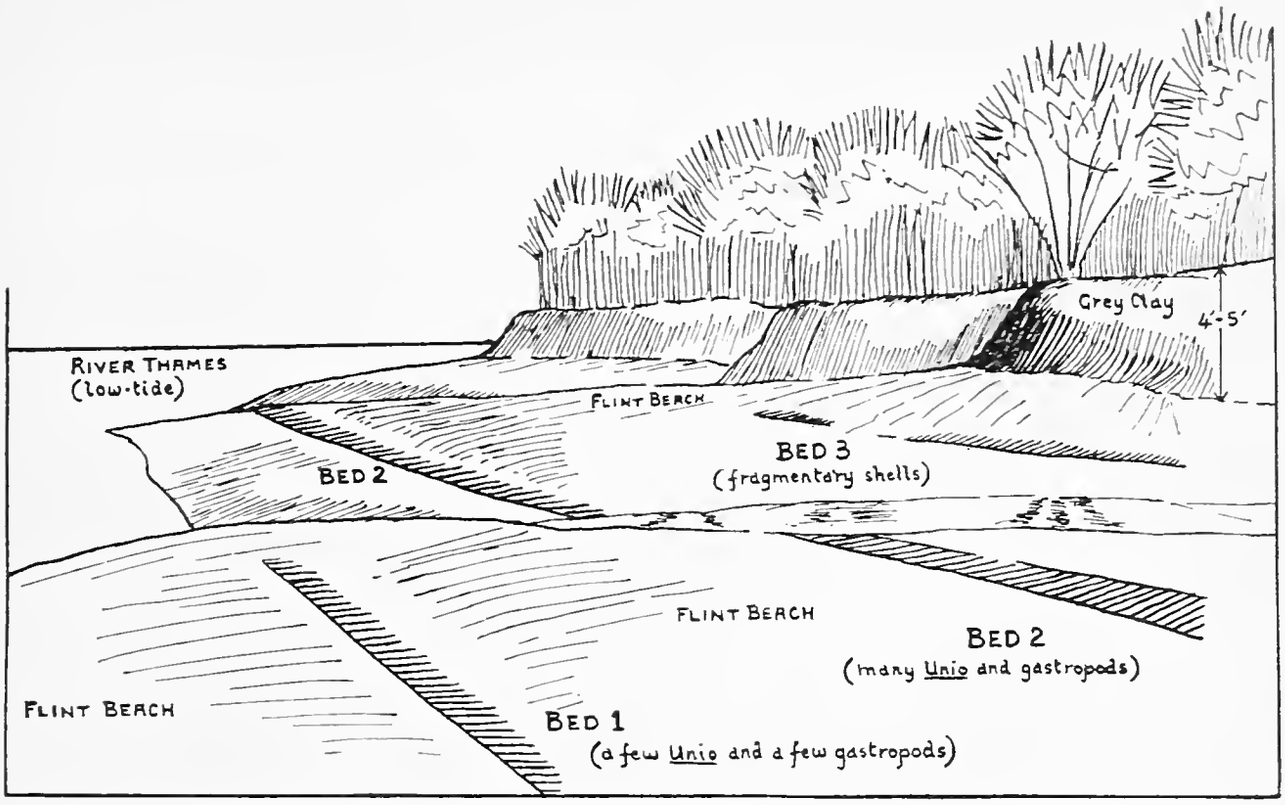
List of Mollusca obtained from Chiswick Eyot in 1956

Gastropoda (Aquatic)

1. *Theodoxus fluviatilis* (Linné)
2. *Viviparus viviparus* (Linné)
3. *Valvata piscinalis* (Müller)
4. *Bithynia tentaculata* (Linné)
5. *Lymnaea auricularia* (Linné)
6. *L. peregra* (Müller)
7. *Planorbis acronicus* Férussac
8. *Ancylus fluviatilis* Müller

Gastropoda (Land forms)

9. *Succinea* sp.
10. *Discus rotundatus* (Müller)
11. *Zonitoides nitidus* (Müller)



The foreshore of Chiswick Eyot (looking south-west) showing the outcrops of the Holocene shell-deposits (from a sketch drawn by M. P. McGann, 1956)

Of these eleven species of gastropods *B. tentaculata*, *V. piscinalis* and *V. viviparus* are the most common; *T. fluviatilis* still retains its original colour bands and *P. acronicus* is extinct in the Lower Thames.

BIVALVIA

1. *Unio tumidus* Philipsson
2. *Sphaerium rivicola* (Lamarck)
3. *S. corneum* (Linné)
4. *Pisidium amnicum* (Müller)
5. *P. casertanum* var. *ponderosum* Stelfox
6. *P. subtruncatum* Malm.
7. *P. henslowanum* (Sheppard)
8. *Ostrea edulis* Linné

Unio tumidus is by far the most common of the bivalves, valves of which are often found united with the hinge-ligament intact. *Pisidium amnicum* is also common. The occurrence in the deposit of the edible oyster, *Ostrea edulis*, is of particular interest since this species does not live in rivers and indicates that Man may have been responsible for transporting it to the site. The possibility of Man living in the vicinity at the time the deposits accumulated is further substantiated by a small man-made flint flake collected *in situ* by the writer from a bed of shell-bearing sand and by bones of domestic animals. A list of the animals represented follows:—

MAMMALIA

1. Horse, *Equus caballus* Linné
   Represented by an upper cheek-tooth and an incisor (collected by M. P. McGann in 1956).
2. Pig, *Sus scrofa* Linné
   Two specimens, a fragment of the posterior end and ascending ramus of the right side of the jaw and a right ulna.
3. Ox, *Bos* sp.
   A small ox is represented by a proximal end of a right metatarsal.
4. Deer, *Cervus* sp.
   A proximal end of a left metatarsal.
5. Sheep, *Ovis aries* Linné, or Goat, *Capra hircus* Linné
   One specimen, a proximal end of a juvenile left femur.

All of the specimens were found *in situ*, most of them in sand, and are heavily mineralized so that there can be little doubt that they are contemporary with the shell deposits and not later intrusions. On sieving some of the sand a tooth of a microtine rodent and a fish tooth were also recovered.

The precise age of the deposits cannot be determined until more conclusive evidence has been obtained but it is evident, from the very low altrimetric level of the gravels and the occurrence of domestic animals as opposed to extinct forms, that it post-dates the end of the Pleistocene Period and lies somewhere within the Holocene Stage. It was suggested by the late A. G. Davis that the deposit could be of Roman or Medieval date and it is interesting to note that the Romans in particular had a partiality for the oyster, *Ostrea edulis*, and were responsible for the refuse middens of these shells found on many an archaeological site of this period. Roman and Medieval pottery is also common on the foreshore of the river at low-tide in the vicinity of the Eyot. The flint flake is, unfortunately, of no value for dating purposes since it is insufficiently diagnostic to be assigned to any particular culture. It could also be of Roman or Medieval date when flint was prepared for building purposes though the possibility of it being much earlier and having been derived from an older gravel equally cannot be ruled out. There is a large Levalloisian flake in the British Museum collections (No. E.1400) which was also found on the foreshore of the Eyot.

Shell deposits are also to be found further upstream along the Thames; in particular those at Penton Hook, near Staines (Howard, 1952) are well known. Nearer to Chiswick Eyot, in the lower tidal part of the Thames, the writer discovered some beds of red and yellow sand containing shells of *Unio* on the Surrey bank of the river between Kew Bridge and Twickenham Railway Bridge, but this was before the bank was re-walled. A. G. Davis once related to the writer an amusing story of the time he was marooned by the tide for the best part of a day on Brentford Ait, near Kew Bridge, when, however, he succeeded in finding a bed with fresh-water molluscs. Although the writer has not examined the site to verify this statement it certainly justifies further investigation in the light of the discoveries at Chiswick Eyot and the river bank site not far from Kew Bridge.

The writer hopes that this short note will lead to further research at Chiswick Eyot, the other islands and adjacent river banks of this part of the Thames, the archaeology of which has for many years been neglected.

ACKNOWLEDGEMENTS

The writer would like to express his thanks to Mr. M. P. McGann for showing him the site at Chiswick Eyot, for field assistance and for allowing him to reproduce his sketch of the foreshore of the island, to Dr. M. P. Kerney for identifying some of the molluscs and to Mr. C. P. Castell for reading and correcting this note.

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Nature Conservation in the London Area in 1963

THE year has seen a satisfying increase in activity in the field of conservation, with much stronger liaison between the Committee, The Nature Conservancy and the County Naturalists' Trusts, greatly aided by the fact that several Trust officers and members also serve on this Committee.

A start has been made on the enlistment of Area Reporters to watch over and report on sites of natural history interest, and a Field Record Sheet and sample reports have been produced for their guidance.

A list of the statutory Sites of Special Scientific Interest in the Society's area has been obtained from The Nature Conservancy, and the urgent task of re-assessing these sites has been commenced. This is necessary owing to the ever-increasing pace of development in the London area during the last ten years, which has resulted in the restriction of many of these sites, and the altering of others to such an extent that they are no longer worth retaining on the statutory list. For the completion of this task, the Committee would be most grateful for assistance, on any scale, which members may be able to give.

The educational aspect of conservation has been kept much in mind, and during the year Committee members have been active on projects at, for example, Ruislip Nature Reserve, Brooklands Technical College and Esher Common, where a successful Nature Trail was staged during National Nature Week.

Plans for 1964 which are in hand include four field meetings at which conservation will be a main theme, and a general meeting at Holborn Central Library in March entitled "London's Vanishing Wild Life".

To give some report of activities in the counties: our Essex representatives report that the whole of the Lea Valley is being considered for recreational, landscape and other uses in the public interest. The Civic Trust has undertaken to make an assessment on these lines, and in this connection organized a conference in September on the natural history aspects, at which it was agreed that an ecological survey should be carried out jointly by the Essex Naturalists' Trust, the Hertfordshire and Middlesex Trust, and the London Natural History Society, to be completed by the end of November. It appears that the areas of most concern to naturalists are the gravel pits and water meadows to the north of Walthamstow Reservoirs, and of these, sites in the Sewardstone, Nazeing Marsh and Fishers Green areas are of greatest importance. It is to be hoped that the pleas for the preservation of the natural history interest in this valuable part of London will be successful.

In another Essex valley, the Roding, gravel extraction is to be increased, and in Epping Forest there will be some damage to the habitat from the building of the motor-way and the laying of the methane gas pipeline from the Thames to the North-west. In the southern area of Epping Forest, at Bury Wood, near Chingford, a gravel-surfaced horse-ride has been constructed as part of the improvement plan begun about two years ago. It is the second ride to be made up, and should be useful in lessening the pressure on the other pathways, and giving better conditions for walkers. Illegal shooting is still a problem in the Forest, and in the first half of the year nearly sixty people (more than half of whom were children) were prosecuted for carrying guns.

The Essex Naturalists' Trust is carrying out a survey of roadside verges, an interesting habitat which is all too often ruined by improper management, particularly in the use of toxic sprays.

From Hertfordshire comes a report of the inauguration on November 16 of the Hertfordshire and Middlesex Trust for Nature Conservation. The organizers are to be congratulated, as this Trust is one of the most necessary in the London area, these two counties probably being under the greatest pressure from potential development.

In the Moor Mill area, just south of St. Albans, a recent disturbing feature has been the destruction of old hedgerows and trees because of road-widening. With the increasing volume of traffic some such changes must be expected, but there is no doubt that a compromise could often ensure both greater road-safety and the protection of valuable habitats at the same time. Bishop's Wood, which is interesting botanically, is on the proposed methane gas pipeline, but the disturbance will be restricted to a comparatively small area and should only be temporary. The West Hertfordshire area will be affected by the proposed southward extension of the M.1 motor-way, but the full implications of this are not yet known.

The Osterley Park S.S.S.I. in Middlesex is threatened by a proposal to build an International Conference and Exhibition Centre, together with ancillary services, such as an hotel, offices and shopping centre. Reports on the natural history interest of the area were sent to The Nature Conservancy and the Council for the Preservation of Rural England, and an official objection on behalf of the Society was entered in writing at the Public Inquiry on July 3, 1963. The decision of the Minister of Housing and Local Government is now awaited.

A considerable amount of management and a number of scientific

studies have been carried out at the Ruislip Nature Reserve by the Ruislip and District Natural History Society. The Reserve is situated in a large S.S.S.I. which includes Ruislip Lido and is much used by the public at weekends. It was found that cars were being parked on the Common outside the official parking area, with a consequent risk to a valuable habitat, but a rope barrier was erected to prevent this, and no further trouble was noted. The Reserve has suffered a great deal of damage at the hands of golfers from the adjoining golf course, who frequently break through the hedges and beat down the undergrowth in search of lost balls, often resulting in the destruction of birds' nests. There has also been continual interference by local hooligans, culminating in the deliberate burning down of one of the bird-watching hides.

An example of the speed at which threats to sites develop occurred in this area. A car park was made in Mad Bess Wood about fifty yards from the main road, and was completed without the statutory notification to the Nature Conservancy and before any local action could be taken. During road-widening operations in the same area, earth was dumped in Copse Wood, and a number of trees grubbed up. Fortunately, the damage done was not too great, but the results could have been serious as the soil, which has not yet been removed, was dumped very close to a large colony of Twayblades.

Towards the end of 1962, the Harrow Borough Council announced its intention to "develop" Stanmore Common. Concerned at this, and lacking detailed information, both the Society and The Nature Conservancy approached the Council, with the result that Society representatives were invited to inspect the area and discuss the plans with senior officials of the Borough. The Society saw no reason to object to the plans as a whole, but minor modifications in the general programme of tree-felling and replanting were agreed to and the local authority accepted the principle of full consultation at every stage. The hard winter of 1962/63 delayed progress of the plans, but it is hoped that the work will be begun in the coming months, and further meetings between the Council and the Society are being arranged. Stanmore Common has long been regarded as an important area, and it is pleasant to be able to record that the Harrow Council accepts the wildlife interest as an integral part of the amenity value of the area, and is willing to seek the advice of the Society in preserving this. The nearby Harrow Weald Common possesses less variety of fauna and flora, but has the advantage of a Board of Conservators. These have been approached, and permission obtained to conduct an ecological survey of the area; this will include the digging of soil pits. Some preliminary work has already been carried out, and it is intended to continue with this in the coming year.

The extensive gravel diggings in progress on Harefield Moor have greatly reduced the botanical interest of the area, and it is probably not now worth retaining as a scheduled Site of Special Scientific Interest.

It seems likely that the proposed new reservoir at Staines is at last to be built to the west of and about the same size as the existing King George VI Reservoir. This will almost certainly mean the loss of part of Staines Moor, but will result in the formation of an extensive and interesting series of inland lakes. A proposal to extract gravel over one hundred acres of Kempton Park has been reported. Details are not available, but it seems likely that, as the race-course is not to be affected, the digging will take place at the eastern end of the Park, in the area where the heronry is situated.

Our County Representative for West Surrey reports that he has been consulted in connection with the management of the educational nature reserve at Brooklands Technical College, Weybridge. This reserve should prove most useful for the teaching of biology and conservation.

Last April, Fetcham Mill Pond received another threat, one of many in its chequered history, in the shape of a proposal to build a fire station in Cobham Road. The Public Inquiry has, however, been postponed indefinitely, pending investigation of alternative sites by the Surrey County Council.

The Queen Elizabeth II Reservoir at Walton has now been filled, and is a useful addition to the waters available to wintering wildfowl in the area, though the loss of the interesting gravel pits on the site is a matter of regret.

Intensive surveys are still being carried out by the Kent Naturalists' Trust at Ruxley Gravel Pit, and are yielding some interesting results, although, as always, there is a shortage of active workers.

Efforts are being made by the local authority to make a compulsory purchase of Crofton Heath, and representations have been made by the Kent Naturalists' Trust for the preservation of a small central area as a nature sanctuary.

The Committee would like to record its appreciation of the invaluable assistance given during the year by The Nature Conservancy, the County Naturalists' Trust and members of the Society.

In August, Prof. E. H. Warmington resigned his post as County Representative for West Hertfordshire, and the Committee would like to express its gratitude for the service he has given in the cause of conservation over so many years. In order not to lose the benefit of his experience the Committee has persuaded him to continue to serve in the capacity of Adviser.

In order to carry out the vital task of conserving wild life and habitats in the London area, the Committee needs the assistance of as many members as possible, either to act as Area Reporters to watch for threats to and report on sites of natural history interest, or to take part in field surveys of the S.S.S.I.'s. In the London area, these scheduled sites alone number sixty-seven, and there are a great many others not scheduled but still valuable, which gives some indication of the size of the problem involved.

In this densely-populated island, and particularly in the crowded area which is this Society's main concern, open spaces where naturalists may work and watch are at a premium and, but for the unstinting efforts of many individuals and organizations, would be even more depleted, if not entirely overwhelmed by the tide of development. Simply by belonging to a natural history society, every member is closely concerned with this problem, and should ask himself whether he is doing everything possible to ensure the future of our wild life.

L. MANNS, *Conservation Secretary.*

A NATURE TRAIL ON ESHER COMMON

ON a rather dull but warm day, Saturday, May 18, 1963, a dozen members gathered at the car park in Sandy Lane, Oxshott, to lay out a Nature Trail on Esher Common, as one of the Society's activities in connection with National Nature Week.

The staging of the Trail took some four hours, the last few yards being checked and completed, with more than a slice of luck, as the first visitors hove in sight, the vanguard of the 700 people who came to view the Trail between 2 p.m. on Saturday and 5 p.m. on Sunday.

The project was first proposed in March, 1962, and a short, experimental Trail was laid out on July 29, 1962, in order to gain experience in the techniques involved. The organization of the 1963 Trail involved many months of work, both indoors and in the field, by the planning committee and other Society members.

"Museum" Exhibit

It was decided that the agreement of the Esher District Librarian should be sought to the mounting, in the foyer of Esher Central Library, of an exhibit of material relevant to the Trail, such as maps, photographs of habitats and animals, drawings of plants, and mounted specimens of birds and animals typical of the area. The exhibit was on view for five weeks, i.e. four weeks prior to the Trail, and during National Nature Week until May 25.

The Trail

The Trail was about two and a half miles long, laid out in a circle from the base at Sandy Lane, Oxshott. It was designed to cover as wide a range of habitats as possible, taking in dry and damp oakwoods, open heath, pure birchwood, young and mature pine plantations, naturally regenerated pinewood, and fresh water.

The descriptive matter consisted of:—

1. Five general habitat descriptions.
2. Individual labelling of plants.
3. Indication of points of interest connected with animals, such as old badger setts, squirrel dreys, old woodpecker holes, and ant nests and trails.
4. Soil profiles.
5. Simple descriptions of ecological principles, such as food chains and nutrient cycles.

In addition, there were numbered cards at selected points, linked with notes in a duplicated leaflet, which also contained a short background note on the Trail, acknowledgments, and details of local natural history societies and organizations.

These leaflets, together with Society publications, and publicity material from the Council for Nature, the Surrey Naturalists' Trust and the Royal Society for the Protection of Birds, were distributed from a base tent in the car park at Sandy Lane, Oxshott. We are extremely grateful to the Y.M.C.A., Kingston, for the loan of the tent, and to the Oxshott Heath Conservators for permission to erect it on this site.

At the Black Pond, a table of live exhibits was arranged, with small rodents, reptiles, amphibians and insects in glass tanks, and trays of bog and water plants. This proved to be extremely popular, and for much of the time had a group of interested children round it.

Publicity

Local publicity was given by the Esher District Librarian in the local libraries, by an article in the *Esher News*, and also, on a national scale, by the Council for Nature. The Editor of the *Esher News* visited the Trail, and published a very favourable report in the following week's paper.

Acknowledgments

Whilst it is always invidious to select individuals from the many who contribute, special mention must be made of the unstinting assistance given by our botanist, Mrs. J. E. Smith, and by P. A. Morris on the zoological side. Without their efforts the Trail would not have been the success that it was.

The Committee would like to express their gratitude to the following:—

Esher Urban District Council, particularly the District Surveyor and the District Librarian, for allowing us to stage the Trail and exhibit, and for their co-operation throughout the project; the Weybridge Natural History and Aquarist Society for the loan of the specimen tanks; and the Royal Society for the Protection of Birds for their donation of a set of wall-charts of British birds.

I would also like to add my personal thanks to the Committee (Dr. G. Beven, G. H. Gush, Major K. P. Keywood and Mrs. J. E. Smith) and the other Society members (T. G. Collett, D. G. Hall, P. C. Holland, A. E. Le Gros, P. A. Morris and D. W. Yalden) who gave such able assistance, and not least to my wife who cheerfully bore with our activities for so many months.

Conclusions

From the large number of visitors and the many compliments received, it must, I think, be acknowledged that the project was a success. Whilst the results that were achieved must, of necessity, be mainly intangible, it is certain from visitors' comments that very many people had been made aware of interesting things that they hardly realized existed, and had been given a little insight into the problems involved in caring for our countryside.

It is clear that Nature Trails will be increasingly used as a tool in the teaching of biology, ecology and conservation, and that local natural history societies will have a valuable part to play, both in their organization and in their management and use.

L. Manns.

Hertfordshire and Middlesex Trust for Nature Conservation

FOLLOWING a considerable amount of groundwork by a steering committee composed of representatives of the Hertfordshire Natural History Society, the London Natural History Society, the National Farmers Union, the Country Landowners Association, the Hertfordshire Society and various other interested bodies, the Inaugural Public Meeting of the Trust was held at St. Albans on November 16, 1963, and the Town Hall was packed to capacity. At this meeting the Council, under the Presidency of Major A. G. N. Hadden-Paton, was elected.

The Council met for the first time early in 1964 and various sub-committees—Executive, Scientific Advisory, and Publicity and Education —were appointed. During 1964 the Articles of Association will be taken out and a start made on the numerous problems that face a newly-formed Trust, including a comprehensive survey of Sites of Special Scientific Interest and other interesting areas. Already the Trust has been consulted on a wide range of subjects relative to conservation and is clearly assuming a position of authority in the two counties. Negotiations are at present under way regarding the possible acquisition of certain sites of interest, and others have been earmarked for early attention. The first year of existence is bound to be largely a period of settling-in, formulating policy and assessing the problems and dealing with the most urgent cases.

It is encouraging that by March 1964 the membership total had exceeded 370, a figure which other Trusts have only reached after a year or more of work. Nevertheless there is no cause for complacency and a membership of at least four times this number is desirable if the Trust is to operate on a sound basis financially, and in an area with such a high population density as Hertfordshire and Middlesex there must surely be many people with some desire to preserve what remains of the countryside around them. The close proximity of the Trust's area to the great metropolis results in tremendous pressures on the countryside from all quarters, and only the whole-hearted support of the public will enable the Trust to achieve solid and lasting results in the field of conservation.

BRYAN L. SAGE.

The Kent Naturalists' Trust

IN the year that has elapsed since the appearance of the last article on the Kent Naturalists' Trust in the *London Naturalist* (**42**, 104–105, 1963) a very considerable increase in the commitments of the Trust has occurred, and this has thrown a great burden on its organizational resources which continue to depend entirely on the part-time labours of unpaid volunteers. The Trust's increased responsibilities are most welcome and necessary in view of the great and increasing threats to the wild life and the countryside of Kent, which are probably greater than anywhere in the country. They were made possible by a generous donation of £5,000 from Mr. Bernard Sunley, with which has been set up a Bernard Sunley Nature Reserve Fund. Already, thanks to this fund and to donations from the World Wildlife Fund, the Society for the Promotion of Nature Reserves, and Mr. Peter Cadbury, it has been possible to acquire 150 acres of chalk wood and downland in East Kent. More reserves mean more organization, development planning and conservation work, and it is to be hoped that it will be possible to appoint a paid full-time Conservation Officer and Secretary in the near future.

These major developments are outside the Society's area, but the work of the Trust has continued and increased also in metropolitan Kent. It is pleasing to be able to report the success of negotiations with the Orpington Urban District Council, which have been carried on in a most cordial manner on both sides, on the subject of nature conservation in publicly owned open spaces. Another time-consuming but urgent and vital task that has been continued is the review of Sites of Special Scientific

Interest and other places of importance to natural history in the area. This work has now reached a stage where negotiations for the better protection of some of the places which are most severely threatened are about to be initiated.

Conservation work involving scrub clearance, fence repairs and other work has continued to be carried out at Darwin's Orchid Bank, Downe, and Ruxley Gravel Pit, Sidcup. This labour has been freely given by Trust members, the Council for Nature Conservation Corps and such local organizations as Scientific Societies, Field Clubs and the Youth Hostels Association. It is regrettable to have to record that it has been necessary to expend many man-hours in clearing rubbish dumped by the public on these as well as on other reserves in the county. At Downe, beech seedlings—legacy of the "full mast year" of 1960—have been removed from the chalk grassland to preserve the essential character of the site as a reserve for orchids. At Ruxley the thinning of willow thickets in the marshy areas has already resulted in an influx of smaller birds. The scientific side has not been neglected. A paper dealing with the effects of certain conservation measures at Downe has been published (F. H. Brightman: Darwin's Musk Orchid Bank. *Transactions of the Kent Field Club*, 1. 150–154), and another concerned with the Ruxley reserve is in the press (A. G. Spooner and D. Stoyel: Botanical Survey of Ruxley Gravel Pit).

In early January, 1964, a proposal to build a new town, to be called Cray Town, between Sidcup and Orpington, became public. This plan for a suburban development in the Green Belt covering 284 acres and intended to house 12,500 people may yet become a major threat to the Ruxley reserve. The behaviour of the intending developers followed a pattern that has become familiar to conservationists. First news of the project was "leaked" to the national press. Then full scale articles were placed in the local papers; the accompanying artist's impression showed Ruxley Pit converted into a sort of inland marina with yachts, speedboats, waterside restaurants, car parks, and so on. This evoked a vigorous reaction from the Trust. Letters appeared in the local press refuting the developers' claim that the reserve was valueless as a wildfowl refuge, and local opinion was mobilized in opposition to the scheme. The developers then lodged plans with the local authority, which rejected them as the proposed development is entirely on Green Belt land. If and when there is a public enquiry, the opposition campaign will be renewed. A useful outcome of the incident is that the Executive Committee of the Trust was led to affirm its opposition to Green Belt encroachment on nature conservation grounds whether or not there is a direct threat to a particular reserve. It is pleasing to note also the cordial relations established between the Trust and the Orpington Green Belt Preservation Society.

The lesson of the past year has been that there is a great deal still to do in the Society's area, and that constant vigilance is essential.

F. H. BRIGHTMAN.

* Members of the L.N.H.S. are invited to communicate information of threats to wild life, requests for access to reserves, or comments on any matters relevant to the Kent Naturalists' Trust to the following area representatives:

North Metropolitan Kent (Chislehurst and Sidcup, Bexley, Erith, Crayford, Woolwich, Greenwich, Deptford, Lewisham): Mr. F. J. Holroyde, 5 Henville Road, Bromley, Kent.

South Metropolitan Kent (Penge, Beckenham, Bromley, Orpington): Mr. F. H. Brightman, 2 Red Oak Close, Orpington, Kent.

Thames-side (including Dartford and Swanscombe): Mrs. A. G. Side, 107 London Road, Stone, Dartford, Kent.

Obituary

OLIVER G. PIKE

(1877-1963)

WITH the death of Oliver Pike on October 17, 1963, at the age of 86, an era came to an end. He was the last of the great pioneers who, with Richard and Cherry Kearton and R. B. Lodge, began during the 1890's to take pictures of wild life in its natural surroundings and so started a new venture in photography.

He was born in Enfield, Middlesex, on October 1, 1877, and was educated at Enfield Grammar School. At the age of thirteen he obtained a camera and began using this to take photographs of flowers and nests and eggs. His first book, *In Birdland with Field Glasses and Camera*, was published in 1900 and twenty-four more books followed. In those days the existing cameras were very heavy and cumbersome so he constructed a $\frac{1}{4}$-plate reflex of his own design. This was later put on the market as the "Birdland" camera and used by many nature photographers in all parts of the world. In 1907 he was awarded the Fellowship of the Royal Photographic Society and he served on the Council of that body from 1924 to 1948 when he was made an Honorary Fellow.

By 1906 he had developed a passion for the cine-camera and in all he produced over fifty films of British mammals, birds, pond life and other natural history subjects. The most famous of these was exhibited in August 1907 in the then Palace Theatre, London, where it ran for a month, but from the scientific point of view his film of a hen Cuckoo laying her egg in the nest of a Meadow Pipit in 1922 was the most important. In the course of his long career he travelled to practically every well-known bird haunt in the British Isles, though his visits to St. Kilda in 1909 and 1910 were probably the most exciting.

Oliver Pike's association with our Society was of very long standing. He joined in 1897 and although he did not take a very active part in the running of the Society he was a secretary in 1901. In that same year he gave a lecture on bird life illustrated with his own lantern slides and he also led meetings at Winchmore Hill, Potters Bar and Hatfield, country near his own home which he knew so well. In 1905 he read a paper on the Life of the Honey Bees and around that time his name appears on the syllabus for lectures on a wide range of subjects relating to birds and always illustrated with his lantern slides. He was made an Honorary Vice-President in 1949 and in 1957 presented to the Society a fine collection of his photographs when we celebrated our Centenary.

He married Anne Primrose Chapman in June 1914 and throughout his life she was his most enthusiastic co-worker. They had two sons and two daughters. In the First World War he joined the Royal Flying Corps, served for two years in France and was demobilized in 1919 with the rank of Captain.

Many bird photographers and ornithologists must owe their original interest to Oliver Pike's books and lectures and his work will long be remembered.

E.H.

Statement of Accounts for the

GENERAL

1962 £ s. d.	Receipts	£ s. d.	1963 £ s. d.
1,758 12 4	Subscriptions Current	1,858 7 4	
56 19 6	Subscriptions Arrears	22 10 0	
27 10 0	Subscriptions Advance	65 10 0	
42 5 0	Entrance Fees	62 5 0	
1,885 6 10			2,008 12 4
21 18 6	Donations	... ...	9 18 6
2 12 6	Interest £75—3½% War Stock	2 12 6	
5 8 0	Interest £180—3½% Savings Bonds 1960/70... ...	5 8 0	
56 2 0	Interest Deposit Account	46 11 8	
			54 12 2
50 0 0	Sale of Specimen Cases	... ...	1 15 0
— — —	Insurance refund	... ...	13 0
27 3 2	Balance in hand 31.10.62	... ...	57 9 10
£2,048 11 0			£2,133 0 10

PUBLICATIONS

79 15 0	Sale of Publications	104 14 6
150 0 0	Grant from Royal Society	150 0 0
11 16 0	Advertisements	19 0 0
121 15 7	*London Bird Report* No. 25 Reserve less cost	— — —
814 10 6	Grant from General Account	1,078 13 8
£1,177 17 1		£1,352 8 2

CONSOLIDATED "LONDON

Balance of receipts over payments 1.11.58 to 31.10.63	145 17 4
Grants from General A/c to 31.10.62	388 11 2
Birds of London Area Account	64 11 10
	£599 0 4

"BIRDS OF LONDON

Paid for 87 copies *Birds of London Area*	... ...	115 5 6
Deposit account	64 11 10	
Interest on Deposit account	1 9 0	
		66 0 10
Trans. from General Account...	... ...	100 0 0
		£281 6 4

LIBRARY AND

137 15 8	Balance 31.10.62 including Grants for binding periodicals £100 and printing catalogues £150	277 15 11
50 0 0	Royal Society Grant for catalogues	
100 0 0	General Account Grant	35 18 6
£287 15 8		£313 14 5

PREMISES

Balance from Reserve Account at 31.10.62	700 0 0
Trans. from *London's Birds* Account	534 8 6
Trans. from General Account...	65 11 6
	£1,300 0 0

LIFE COMPOSITION

Balance 31.10.62	£400 0 0

Audited and found correct

May 13, 1964

Year Ended October 31, 1963

ACCOUNT

1962 £ s. d.	Payments	1963 £ s. d.
168 16 3	Hire of Rooms and Halls	195 6 0
34 4 6	Library, cost of move	— — —
47 12 6	Printing and Stationery	77 13 6
150 0 0	General Secretary's Honorarium	175 0 0
30 6 9	General Secretary's Telephone	38 12 9
47 7 3	General Secretary's etc. Postages	63 0 8
25 5 6	Subs. to other Societies	27 19 0
81 12 9	Sectional and Group Grants and Expenses	106 12 8
10 9 1	Sundries including Insurance and Typewriter	58 15 0
180 16 1	Grant to Bird Film Account	— — —
100 0 0	Grant to Library Account	35 18 6
814 10 6	Grant to Publications Account	1,078 13 8
— — —	Trans. to *Birds of London Area* Account	100 0 0
300 0 0	Trans. to Reserve Account	65 11 6
57 9 10	Balance in hand 31.10.62	109 17 7
£2,048 11 0		£2,133 0 10

ACCOUNT

125 14 0	Programme 1963	187 10 0
442 14 7	*London Naturalist* No. 42	551 16 6
— — —	*London Bird Report* No. 26 less Reserve	1 19 4
500 0 0	*London Bird Report* No. 27 Reserve	500 0 0
35 18 6	Addressing and Wrapping	39 15 4
73 10 0	Postages	71 7 0
£1,177 17 1		£1,352 8 2

BIRDS'' FILM ACCOUNT

Trans. to *Birds of London Area* Account	64 11 10
Trans. to Premises Account	534 8 6
	£599 0 4

AREA'' BOOK ACCOUNT

Cost of leaflets	7 16 0
Balance 31.10.63	273 10 4
	£281 6 4

COLLECTION ACCOUNT

9 19 9	Library expenses	34 10 3
— — —	Collections expenses	12 16 0
277 15 11	Balance 31.10.63	266 8 2
£287 15 8		£313 14 5

ACCOUNT

Balance 31.10.63	1,300 0 0
	£1,300 0 0

ACCOUNT

Balance 31.10.63	£400 0 0

R. W. Hale, *Hon. Auditor.*
H. B. Camplin, *Hon. Auditor.*
V. F. Hancock, *Hon. Treasurer.*

Books

While Some Trees Stand, by Garth Christian. 192 pages, 16 plates. Newnes. 1963. 21s.

All nature conservationists will welcome the appearance of this timely book. The sub-title on the dust jacket, "Wild Life in our vanishing countryside", explains its theme. "Garth Christian focuses attention on the urgent need for responsible balanced nature conservation" to quote the publishers. He shows how the disappearance of woodlands and hedgerows and the spraying of fields is depriving many mammals and birds of their natural habitats and promoting an unwelcome increase in others.

The chapters are devoted usually to one species, its past and present status and how the species is standing up to the rapid post-war changes in our countryside. His pleasant chatty style, with numerous personal reminiscences from his own Sussex countryside, conveys much interesting and up-to-date information and should enable him to bring home the importance of nature conservation, not only to the converted naturalist but to those of the general public at all interested in our wild life. C.P.C.

Animal Life in Fresh Water, by Dr. Helen Mellanby. 6th Edition revised and reset. Methuen. 1962.

Is it just a coincidence that two of the more useful guides to our aquatic animals have been known to several generations of students as "Nellie" and "Helen", dealing with littoral and freshwater faunas respectively? The volume now under review is a carefully revised edition of the latter and will be welcomed by all the more serious students of our ponds and rivers—and, to judge by recent publications, by those whose concern is with their pollution.

Designed more specifically for that vaguely defined species, the "school pupil" (it is well within the compass of six-formers), it will also, as Professor Eastham says in his introduction, "prove of value to the teacher, the university student and the amateur naturalist". Especially, one might add, to those who have strayed from their own specialization, for here they will find much of the information they require, well-illustrated and with the relevant next reference.

If one notes that just over half the book deals with Arthropoda one can estimate the degree of compression necessary to fit in chapters on various worms, molluscs and "the wholly microscopic groups". Within its set limits and noting that no attempt to over-simplify identification by keys has been attempted, the book admirably achieves its set purpose.

Inevitably one finds minor blemishes—not all the drawings are anything like as good as the best and a few are not scaled; in a few cases some useful references have been omitted but the author is to be congratulated on keeping such a wide range of literature so well surveyed.

Finally it is interesting to find that some problems which have arisen in connection with our Society's activities still remain unsolved—such as the peculiar 5 cm. lower limit of size of local *Unio*, the malarial potentialities of British mosquitoes and also the parasitic status of certain protozoa, to quote a few.

A book of this type is always a stimulus to widen the basis of our studies and it is to be hoped that this new edition will bring help and encouragement to an ever-widening circle of more sophisticated "pond-dippers". J.F.S.

A study of Reptiles and Amphibians including their care as pets, by Alfred Leutscher. 80 pages. Blandford. 10s. 6d.

This is a book which I would strongly recommend to any one who wants to know the ins and outs of herpetology and to know where to start. It is particularly suitable for the young naturalist.

The sixteen chapters are divided into four groups: Background (history, evolution and classification), Modern amphibians, Modern reptiles and Herpetology (describing fieldwork and experiments).

The book is well illustrated with numerous photographs and the author has also used illustrations from the 15th century *Hortus Sanitatis* and Edward Topsells' *History of Four Footed Beasts and Serpents* (1607). There are also many excellent diagrams by the author, but his drawings of representative species of each group of animals fall a little short of the standard of the rest of the illustrations.

J.A.B.

Birds and Woodlands, by Dr. Bruce Campbell. 24 pages, 16 photographs, Forestry Commission Leaflet No. 47, H.M. Stationery Office, 1964, 2s. 0d.

In this booklet Dr. Bruce Campbell describes the types of woodland to be found in Britain and the birds that inhabit them. He discusses briefly the value of these birds to the forests in the light of recent research and concludes with a few suggestions for making the forests more attractive to them. Although inevitably brief it is a welcome addition to the literature of a subject about which little has hitherto been written.

E.P.B.

ADDITIONS TO THE LIBRARY

The following books, in addition to those reviewed here, are among recent accessions to the Society's library:—

Bell, T. Hedley, *The Birds of Cheshire* (1962);

Dorst, Jean, *The Migrations of Birds*, translated by Constance D. Sherman (1962);

Fitter, R. S. R., *Guide to Bird-Watching* (1963);

Fretter, V., and A. Graham, *British Prosobranch Molluscs* [Ray Society Volume 144] (1962);

Hvass, Hans, *Mammals of the World*, translated by Gwynne Vevers (1961);

Kimmins, D. E., *Key to the British Species of aquatic Megaloptera and Neuroptera* (1962);

Matthews, L. Harrison [editor], *Animals of Britain:*

No. 17—Crowcroft, Peter, *Shrews* (1963);

No. 18—Blackmore, Michael, *Noctule, Leisler's, and Serotine Bats* (1963);

No. 19—Knight, Maxwell, *Harvest Mice* (1963);

No. 20—Whitehead, G. Kenneth, *Ancient White Cattle* (1963);

No. 21—Thompson, Harry V., *Rabbits* (1963);

No. 22—Hurrell, H. G., *Pine Martens* (1963);

No. 23—Watson, A., and R. Hewson *Mountain Hares* (1963);

No. 24—Matthews, L. Harrison, *Baleen Whales* (1963);

Payn, William H., *The Birds of Suffolk* (1962);
Perry, Richard, *At the Turn of the Tide* (1938);
Pounds, Hubert E., *Notes on the Birds of Farleigh and District and the North Downs, Surrey* (1952);
Richardson, R. A., *Birds of Cley and neighbouring Norfolk Parishes, 1962* (1962);
Scott, Peter, Morning Flight: *A Book of Wildfowl* (1949);
Tenison, W. P. C., *Zoological Record: Aves*, 1960 (1961);
Tenison, W. P. C., *Zoological Record: Aves*, 1961 (1962);
Thorpe, W. H., *Bird-Song: The Biology of Vocal Communications and Expression in Birds* (1961).

In addition to the above-mentioned, the large number of runs of journals and periodicals taken by the Society continued to be kept up to date by means of purchase or exchange; and excellent progress is being made with the binding of these publications.

Instructions for Contributors

PAPERS should be submitted to the EDITOR, 8 HILL TOP, LOUGHTON, ESSEX, not later than the middle of February if they are to be considered for publication in the same year. They should be typed, with double spacing and a wide margin, on one side only of quarto paper. Submission in duplicate facilitates the essential process of refereeing. It also helps the Editor if the total number of words is pencilled in at the head of the paper.

Scientific names should be underlined, but headings and sub-headings only in pencil if at all. References should be listed at the end, in alphabetical order of authors' names, in the following standard form:—

MATTHEWS, L. HARRISON, 1952, *British Mammals*, London.

YOUNG, G. W., 1905, The Chalk Area of North-East Surrey. *Proc. Geol. Assoc.*, **19**, 196–206.

The corresponding references in the text would be (Matthews, 1952) and (Young, 1905).

Dates should be in the form June 9, 1964.

Line drawings should be submitted separately, in Indian ink on thick white paper or card, preferably 2× or 3× the size finally intended. Any lettering must be large enough to be clear when reduced, and all lines must be solid black, not pale or imperfect. Legends should be typed separately as they will be set up by the printer. The Editor should be consulted in good time if there is any doubt about the preparation of illustrations. Photographs can be accepted only after prior consultation.

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

Up to 25 free reprints will be supplied on request.

THE LONDON NATURAL HISTORY SOCIETY

WHATEVER your interest in natural history—even if you are still a beginner—the Society will welcome you as a member. You are offered a wonderful opportunity of extending your knowledge and increasing your enjoyment. The Society's Area lies within a 20-mile radius of St. Paul's and here most of its activities take place. Although so much of the area is covered with bricks and mortar it is a most exciting region with an astonishing variety of fauna and flora.
The Society consists of Sections whose meetings are open to all members without formality. If you are interested in: ARCHAEOLOGY, BOTANY, ECOLOGY, ENTOMOLOGY, GEOLOGY, MAMMAL STUDY, ORNITHOLOGY, RAMBLING, or if you are a Young Naturalist there is a section ready to help you.

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Nearly every week throughout the year with **Films, Lectures** and **Discussions** on all aspects of natural history.

FIELD MEETINGS

Led by experts, at week-ends and on summer evenings to visit " good " natural history places, often outside our Area. These excursions are very popular with beginners wishing to improve their knowledge.

PUBLICATIONS

The London Naturalist, published annually, a permanent record of the Society's activities, including records of plants and animal life in the London Area.
The London Bird Report, published annually, containing papers, facts and figures of special interest to bird watchers in London. Compiled by the Ornithological Section which also issues a quarterly *Bulletin* (2s. 6d. a year post free).

LIBRARY

A large selection of books and periodicals, many with special reference to London. now housed at Ealing Central Library and available for the use of members.

READING CIRCLES

Many important natural history journals enabling members who subscribe to these circles to read any of the journals at a fraction of the cost of an individual subscription.

UNIVERSITY LECTURES

With the co-operation of the University of London, Department of Extra-Mural Studies, courses of evening lectures during the autumn and spring. They are designed to meet the needs of members for more knowledge of any particular aspect of natural history.

MEMBERSHIP AND SUBSCRIPTIONS

MEMBERS	THIRTY SHILLINGS
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ENTRANCE FEE	FIVE SHILLINGS

All members except family members receive one free copy of *The London Naturalist* and *The London Bird Report.*

All details may be obtained from:—

THE GENERAL SECRETARY, MRS. L. M. P. SMALL,
13 WOODFIELD CRESCENT, EALING, W.5.