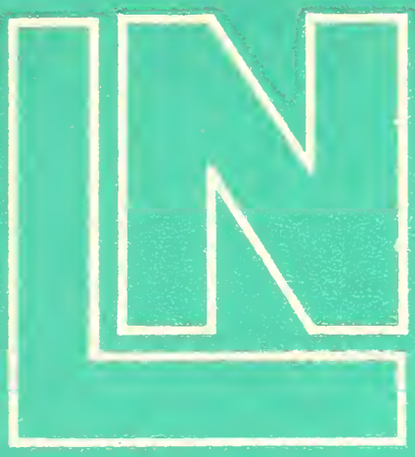

No. 47

THE LONDON NATURALIST

the Journal of the
LONDON NATURAL HISTORY SOCIETY

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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.
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Editorial

MEMBERS will note the reduced size of this issue of the *London Naturalist*. Regrettable as this is, the Society should know that it is due to the necessity for economy, and not to any lack of material. Indeed, the Editor has had the sad and difficult task of excluding several papers, all of them of high standard and worthy of a place in our journal.

Of course, it can be argued that it is better, from an Editorial point of view, to have too much material, rather than too little! Readers of the *London Naturalist*, however, may not wholeheartedly subscribe to this outlook. Whilst it is true that an abundance of material reflects an active Society, it is also obviously desirable that the results of research should be made available to members as soon as possible, and authors themselves naturally prefer that their work should reach the printed form at the earliest practicable stage. This is probably even more true at the present time, with increasing human pressure and rapid ecological change in our area, than it has been in the past.

Provided the authors are themselves happy with the arrangement, it is intended that papers worthy of publication which have to be omitted from one *London Naturalist* should be given priority for the next issue: in this way no paper of merit is excluded. For this year, however, circumstances dictate a short *London Naturalist*. It is hoped that members will appreciate the reasons for this, and take comfort from the fact that it is not expected to be more than a temporary phenomenon.

Report of the Society for 1967

THE membership of our Society at the end of October, 1967 numbered 1,709, which represents an increase of 26 over the corresponding figure for the previous year. This is the fourth successive year in which we have been able to report an increase of this order in our membership figures, but rapid rises in operational costs such as printing and hiring of halls have more than discounted the higher income from subscriptions.

It is with deep regret that we record the deaths of the following members: R. B. Benson, L. H. Buckland, Garth Christian, Miss W. L. George, C. Hillyer, L. James, Mrs. E. Leighton, F. Metcalf, H. Munro Fox, E. M. Niblett and W. J. Rees.

The new Rules were formally adopted at a Special General Meeting held on November 2, 1967. This important event in the history of our Society marked the fruition of the considerable labours over a period of three years, of a Working Party appointed by the Council. The Society is grateful to the members of this Working Party for their sustained efforts, and in particular to Mr. R. S. W. Pollard for his guidance on the various legal aspects involved in framing these rules and finally ensuring that they did comply with the requirements of the Charity Commissioners.

After serving the Society for 15 consecutive years both as General Secretary and Assistant Treasurer, as well as in many other capacities, Mrs. L. M. P. Small has reluctantly decided that she can no longer continue to perform these onerous duties. It was obvious to us that we would possibly never again find another member ready to give so much time in the service of the Society. Hence after considerable discussion, a new secretarial structure has been devised, including the institution of three additional officers, within which the present duties of the Society Officers have been redistributed. It is difficult to convey in a few words, the great debt that the Society owes to Mrs. Small for all these years of unstinted service and in fact she will stay in the Society administration for at least one year more, filling the new position of Publication Sales Officer.

In connection with the Society's project to resurvey the vegetation of Bookham Common, we are pleased to acknowledge that the Trustees of the Carnegie Trust have approved in principle a contribution of £180 towards the cost of equipment and £100 for the Director's fees and expenses.

This has been the first full year over which members of the Society could pay their Annual Subscription under the Covenant Scheme. We have now received a sum of £70 from the Inland Revenue Commissioners in respect of the subscriptions convenanted for last year, but this is only a start and every member is urged to consider whether he, or she, is ready to aid the Society in this manner.

Several anonymous donations, including one for £100, have been received from members this year and we would like to record our thanks for these gifts.

The Society's film "London's Birds" has been shown during this year to the "Friends of Richmond Park" in April and to the Bristol Ornithological Club in September.

Our Archaeological section has taken part in several investigations of Roman roads in London during recent years, and much of this was illustrated with maps and photographs in an exhibition mounted by the

Section at this year's annual conference of the London and Middlesex Archaeological Society.

Real progress was made in washing and marking material and particularly pottery found during the excavations at 199 Borough High Street, but more helpers will always be welcome. Miss I. Darlington, a central figure in the activities of the Archaeologists for many years, has now retired to Berkshire and was made an Honorary Member in recognition of her services to the Society. We all wish her well.

The Calystegia survey is now finished and hence the Botanists will now be concentrating their energies on their ambitious Plant Mapping Scheme. A progress map is being prepared which will indicate the under or non-recorded areas. Essex is particularly in need of workers, but help would be welcome almost anywhere in the Society area. The Sectional programme comprised five formal lectures, well attended informal meetings and a wide range of field meetings several of which were held jointly with other societies such as the Essex Field Club and the South London Entomological and Natural History Society. These joint meetings can be most profitable and helpful in promoting friendly relations between kindred societies.

The Ecologists report an increase in attendance at the regular monthly meetings at Bookham Common, though one or two entomologists would be a welcome addition to the regular team. A field meeting in the Darent Valley was followed later by a symposium on the ecology of chalk downland. Members should note that the Recorders will be pleased to receive any records of mammals, reptiles, amphibians or fishes observed in the Greater London Area.

There have been many projects in the field of natural history for recording in the grid system technique and our entomologists are planning to carry out a survey on the Coccinellidae: this is a scheme to which all members could contribute. Generally however, Entomology has always tended to be a subject for the enthusiastic specialist, and anyone wishing to make a start in this fascinating field would do well to attend the Section's informal meetings which are devoted to practical subjects like preservation and setting, use of keys and identification.

The Easter field meeting of our Geology Section was held this year in Norfolk, visiting the Hunstanton Red Rock, Weybourne Crag and the Sandringham Beds. Among other field meetings in the programme were a visit to Lewes to examine quarry sections of the Upper and Middle Chalk, coach trips to the Isle of Ely, and to the Isle of Thanet, all of which were very well attended. A programme of monthly informal meetings arranged this year for discussion of such subjects as identification of specimens has proved to be very successful.

In his sixth and last year as the Field Meetings Secretary for the Ornithological Section, Mr. R. Kettle set a very high standard for his successor. In addition to a full and varied programme of field meetings in and around London, as many as eleven Sunday coach trips were organised to enable our members to visit some of the best areas of ornithological interest in S.E. England. For those members who were determined not to allow other business to interfere with their bird watching there were weekend visits to Pembrokeshire in the Spring and to Dorset in October, and a wonderful whole week in Northumberland in June.

There were two Junior weekends which were both well supported, in fact over-subscribed. It is difficult to keep the cost low enough nowadays

but these weekends may certainly help to attract and retain a growing number of keen young ornithologists in our Society.

The Section was very active indoors also, with nine formal lectures covering a wide range of places and races, and a regular and popular series of informal discussion meetings. On the social side, the Annual Dinner held at the Rembrandt Hotel was much enjoyed by all those present.

Apart from the rambles, from which the Section takes its name, there are always a number of Ramblers' visits which cover a range of facets of London life and history, and this year was no exception, starting with Strawberry Hill Gothic and finishing on a cool October evening in a bakery at Forest Gate. There is something for everyone in the Ramblers' programme.

The South West Middlesex Section reports an encouraging rise in average attendance figures particularly at indoor meetings. Certainly this year's programme both in and out of doors was very attractive, catering for a wide range of members' interests. The Section is continuing its connection with the Hounslow Council for the Arts and is now exchanging details of meetings with other Societies in the Borough.

Botanical Records for 1967

Compiled by J. Edward Lousley

THE main effort of our botanical recorders is now concentrated on the scheme for mapping the flora of the London Area on the basis of the National Grid and a report of the progress will be found on page 6. With so much effort devoted to noting the common species it is perhaps not to be expected that new stations for rarities will be found at the same rate, but even so the contribution of records for 1967 is disappointing. For Kent and Middlesex we received important lists but for the parts of other counties falling within our Area there is very much less to report than in the past.

There was only one record of outstanding interest and this was for a sedge, *Carex strigosa*, from Old Park Wood, Harefield, Middlesex. Twenty-six plants were found in August by Dr. F. Rose and P. A. Moxey. This sedge was last recorded from Middlesex about 1887 when John Benbow found it in the same wood and D. H. Kent and others have many times searched for it there in vain. This is yet another example of the difficulty of being sure that a species is really extinct even when the habitat remains unchanged.

Very few members have failed to supply full National Grid references, or at least tetrad references, and these have been entered in the card index, but for this report it is sufficient to cite 10-kilometer squares in brackets following localities. As usual, the nomenclature is based on the *List of British Vascular Plants* (1958) prepared by J. E. Dandy and for species which appear in that *List* authors' names are omitted to save space.

V.-c. 16, West Kent

We are particularly grateful to R. M. Burton who provided a most valuable detailed list which not only added to our records, but also fully reported the present position of a number of important habitats including Keston Bog and Foots Cray Meadows. In view of the rapid changes taking place in the London Area this is just the sort of help we need. His records included Lily-of-the-Valley, *Convallaria majalis*, and Solomon's Seal, *Polygonatum multiflorum*, from a new locality, Rowhill Woods, Wilmington (57), Spearmint, *Mentha spicata* from Eynsford Station (56), and *Senecio* × *londinensis* growing with both its parents at Lakewood (46). He reports that the garden Aubrietia, *Aubrietia deltoidea* DC., is established on the near vertical cliff of a chalkpit in Mount's Road, Greenhithe (57) and that the very rare Catchfly, *Silene italica*, which grows near, was sprayed with a herbicide in June but has not suffered serious damage. On a refuse tip near Dartford, with E. J. Clement and J. R. Palmer, he found *Sisymbrium loeselii* which is strangely rare south of the Thames though frequent in South Essex and Middlesex.

H. M. Pratt sent in his usual list which is always welcome, and J. R. Palmer made some useful contributions. Especially valuable are his records of willows from Ruxley Gravel Pits (47) found in company with E. J. Clement. These include *Salix triandra*, and two hybrids, *S. alba* × *fragilis* and *S. cinerea* × *viminalis* named by R. D. Meikle. The willows of the London Area are inadequately recorded and it is encouraging that several members are now taking an interest in the genus. J. R. Palmer also found *Anthemis tinctoria* in a field near Nash (36) and reports *Petasites japonicus* as established by a stream at Bickley (46).

V.-c. 17, Surrey

The Cornflower, *Centaurea cyanus*, is seldom seen now in cornfields but G. H. Gush noted three plants at the edge of a barley field on Wey Manor Farm, Addlestone (06), and he also reported about 60 flowering spikes of *Dactylorhiza praetermissa* (Druce) Soó by a disused gravel pit near Thorpe (06). Numerous plants of an alien Foxglove, *Digitalis lutea*, were found by B. Wurzell on quarried chalk scree on the Downs near Betchworth (25) which is an extension from known localities. With it grew one plant of *Campanula alliariifolia*. From P. W. E. Currie came a report of June Berry, *Amelanchier confusa* from Limpsfield Common (45), including one bush in "Happy Valley" which was studied in great detail in our pre-war ecological survey. On waste ground at Barnard's Wharf, Surrey Commercial Docks, Rotherhithe (37), R. C. Palmer collected *Rumex triangulivalvis*. This is of special interest as this dock seems to be permanently established just across the Thames at Shadwell. From a garden at Greyswood Street, S.W.16 (27), H. M. Thomas sent a specimen of *Bupleurum lancifolium* Hornem, which was no doubt introduced with bird-seed. J. R. Palmer found a few interesting plants in the vicinity of Festival Hall (38) including Hen-bit, *Lamium amplexicaule*.

V.-c. 18, South Essex

We again received very few records from Essex. Mrs. L. M. P. Small found a rare alien clover, *Trifolium lappaceum* L., on waste ground at Little Ilford (48) which was last recorded from our Area from Finchley

in 1910, and P. Holland and Miss M. E. Kennedy found *Oenanthe aquatica* in a pit in the middle of a cultivated field at Theydon Garnon (40) whence this decreasing species was recorded by C. S. Nicholson in 1907.

V.-c. 20, HERTS.

Some of the Hertfordshire records additional to our own list are already covered by Dr. Dony's new *Flora of Hertfordshire* but others appear to be new to both. Miss M. E. Kennedy found *Cerastium semidecandrum* at Northaw (20), and *Lithospermum arvense* at Essendon (20), and with C. P. Castell, *Callitriche platycarpa* (det. D. H. Kent) at Cheshunt (30). Mrs. M. Trayner found Dyer's Greenweed, *Genista tinctoria*, at High Barnet/Monken Hadley (29), and E. B. Bangerter records *Hieracium brunneo-croceum* from the edge of playing fields at East Barnet (29).

V.-c. 21, MIDDLESEX

From the number of records of interest it might be thought that our members spent most of their time in Middlesex but much of this is inspired by the great enthusiasm of D. H. Kent. As already mentioned above, the rediscovery of *Carex strigosa* in Old Park Wood (09) by Paul Moxey and Dr. F. Rose is outstanding, and Mr. Kent's own find of another sedge, *Carex disticha*, in a marsh north of Enfield Lock (39) is also important.

From Inner London, D. McClintock continues to add to his list from Buckingham Palace Grounds (27) with *Scleranthus annuus*, *Pastinaca sativa*, *Sisymbrium orientale*, and *Carex pendula*, while G. H. Gush noted *Cymbalaria muralis* in Dean's Yard, Westminster (37). In a marsh at Northolt (18), growing with *Rumex palustris*, D. H. Kent found Sea Aster, *Aster tripolium*. Here this salt-marsh species is regarded as having been introduced. In noting *Euphrasia nemorosa* in a garden at West Ealing (48) he observes that this is now a rare species in Middlesex except on the chalk. This is now true of much of the London Area and Eyebrights have become strangely scarce in recent years. The explanation is probably destruction of habitats rather than a special threat to the species concerned, but accurately named records of Eyebrights are now particularly welcome. He also found *Potamogeton lucens* in the Regent's Canal at Stepney (38), Fiddle Dock, *Rumex pulcher* on the village green at West Drayton (07), *Erodium cicutarium* on lawns at Brentford and Hanwell (17) and *Oxalis incarnata* as a garden weed at West Ealing (18). With Miss M. E. Kennedy he recorded *Montia sibirica* as well established in a wood at Enfield (39), *Epilobium lanceolatum* at South Tottenham (38) and *Nicandra physalodes* on a refuse tip at Harmondsworth (07), where they also found *Chenopodium probstii* Aellen in my company. Miss Kennedy reports *Berula erecta* and Viper's Bugloss, *Echium vulgare*, from Tottenham (39).

The visit of the Botany Section to a refuse tip at Yiewsley (08), produced a number of uncommon aliens including *Polygonum pulchellum* Loisl., *Trachyspermum ammi* (L.) Sprague ex Turrill and *Solanum rostratum* Dunal. Another party, which included E. J. Clement and myself found *Polygonum pennsylvanicum* L. on a tip at New Year's Green (08). Mrs. L. M. P. Small found several clumps of *Bromus inermis*, an increasing grass in the London Area, in The Highway, Shadwell (38) a locality known to D. H. Kent but new to our records. On waste ground near Gardiners'

Corner, Whitechapel (38) I saw several giant plants of Henbane, *Hyoscyamus niger*, and by London Bridge on the Fishmongers' Hall side (38), a plant of Archangelica, *Angelica archangelica*. Also in the City, Soapwort, *Saponaria officinalis* is persistent by Route 11 having spread a little since it was first found in 1944, and Yellow Bedstraw, *Galium verum* now grows on a bombed site in Lower Thames Street (both 38).

On a rubbish tip at Harefield (09), Dr. J. G. and Mrs. C. M. Dony found Yam, *Ipomoea batatas* L. (det. Dr. B. Verdcourt), and on the river-wall at Hampton Court (16) R. M. Burton found *Lamium hybridum*. At Northwood (09) J. Moore found Early Purple Orchis, *Orchis mascula*, which is now very rare in the county. In a garden at Chiswick (27), Mrs. M. A. G. Véal found *Cyperus eragrostis* Lam. in 1956 and 1967—on the only previous occasion we have had this it grew on allotments near Croydon where it was believed to have been introduced with onion seed. In busy Chiswick High Street (27) E. C. Kite found a plant of *Camelina sativa* at the foot of a post, while Mrs. J. McLean found several interesting plants on the floor of a disused reservoir at Ealing (18) including *Centaurium erythraea*.

V.-c. 24, Bucks.

At Wraysbury (07), Miss M. E. Kennedy and D. H. Kent found *Solidago gigantea* var. *leiophylla* (Fern.) Fern. and *Veronica catenata* in a gravel pit, and *Calystegia pulchra* Brummitt & Heywood on a hedge.

We are grateful to the following who have contributed records during the year: E. B. Bangerter, R. M. Burton, C. P. Castell, E. J. Clement, P. W. E. Currie, Mrs. C. M. Dony, Dr. J. G. Dony, G. H. Gush, P. Holland, Miss M. E. Kennedy, D. H. Kent, E. C. Kite, J. E. Lousley, D. McClintock, Mrs. J. McLean, R. D. Meikle, J. Moore, P. A. Moxey, Miss B. M. C. Morgan, John R. Palmer, R. C. Palmer, H. M. Pratt, B. R. Radcliff, Dr. F. Rose, B. F. C. Sennitt, Mrs. L. M. P. Small, H. M. Thomas, Mrs. M. Trayner, Mrs. M. A. G. Véal, A. Warde, R. P. Widgery, Mrs. M. L. Wiseman, B. Wurzell.

The Nature and Conservation of West Middlesex Chalk Grassland

By Philip A. Stott
Department of Geography, King's College London

BOTANICAL studies on a County or Watsonian Vice-County basis, while embodying many obvious limitations, still have much to commend them. The interest naturally aroused by the flora of one's "home County" stimulates both amateur and professional botanist alike, provides the initial impetus to many young botanists and maintains enthusiasm among a wide variety of people outside the strictly limited field of scientific research. Indeed, the amateur interested in the plants of his County has contributed significantly to our detailed knowledge of the British flora. In France, where the system of Départements has never aroused the same degree of local patriotism to be found in our ancient Counties, there have been few such amateurs, and, in consequence, the flora is proportionally less well-known. This enthusiasm however may be misdirected, for example in the wanton collecting of rare species, and it must be admitted that County floras have been in many cases impoverished by the labours of their botanists.

On cursory glance, Middlesex (V.-c. 21) seems to offer little hope to even its most ardent local botanist, being dominated throughout by the urban sprawl of London. Yet, even in this unlikely County, Gilbert White's dictum "all nature is so full that the district produces the greatest variety which is most examined" still holds true. This paper is a detailed examination of some of the remaining Chalk Grassland habitats in West Middlesex, and it is hoped that it will arouse an interest in areas rarely considered by most botanists. The question of conserving these habitats will also be raised, and discussed both in relation to urban-industrial advance and the botanist's personal collection of the rarer species.

DEFINITION AND DISTRIBUTION

Chalk Grassland is a well-known and readily recognisable vegetation type. Yet one rarely finds in the literature any clear, comprehensive definition of precisely what is meant by "Chalk Grassland".

Since Tansley (1935) first crystallised the concept of the "ecosystem", a vegetation unit has been regarded as a dynamic system of interactions between plants and environment. The logical outcome of this view has been well expressed by Lambert and Dale (1964), who state that in any vegetation system "There are . . . three elements to be distinguished: (1) the plants themselves; (2) the sites (defined by position in space); and (3) the environmental features associated with these sites". This framework of plant/site/habitat provides a good basis on which to define Chalk Grassland. It also provides a satisfactory approach to the study of Middlesex Chalk Grassland.

The plant element in Chalk Grassland is a complex one, consisting of varying combinations of grasses and sedges, herbaceous annuals and perennials, dwarf woody shrubs, tuberous plants, mosses and liverworts,

and more rarely lichens and fungi. The sites are governed by the distribution of Upper Cretaceous Chalk, and the availability of factors to arrest the development of a site to scrubland, and then to woodland. Very steep slopes, rabbit grazing, sheep grazing, cattle grazing, burning, and constant trampling are all factors that maintain Chalk Grassland against invasion by scrub species. These factors prevent a given site developing the maximum vegetation possible in relation to the prevailing climate; they prevent Chalk Grassland developing to the "Climatic Climax" vegetation of woodland. If the Chalk Grassland is maintained by a physical factor, such as very steep slopes, the site is said to have a "Subclimax" vegetation, but if it is maintained by a biotic factor, such as grazing or trampling, it is said to be a "Deflected" or "Plagioclimax". At any given site, the arresting factor is an integral part of the habitat element, which also involves micro-climate and soils. Most Chalk Grassland is developed on what is termed an immature, grey rendzina soil. The typical rendzina is a very shallow soil (rarely more than 30 cm. thick), with its humus layers resting directly on parent rock. It is saturated with free calcium carbonate, and has a decidedly alkaline reaction (pH 7–8). A rendzina is usually a warm, well-drained soil, with virtually no leaching and a good humus content.

There is great variation within the plant/site/habitat elements from area to area, and it is this variation which makes the study of Chalk Grassland so interesting. A grassland maintained by cattle grazing is very different to one maintained by rabbit grazing. Cattle break up the sward, create open habitats that are colonised by meadow plants and weeds, and increase soil Nitrogen. Rabbits create a very dense, closed, short sward very different from the above. The Middlesex Chalk Grasslands show a number of variations, and these will be discussed later.

The distribution of Chalk Grasslands in Middlesex is severely restricted owing to the limited exposure of the chalk, intensive quarrying activities, and urban development. They appear to be relatively recent in origin, being derived from a once generally wooded landscape. However, the grasslands around Harefield were certainly in existence by the early 18th Century (Blackstone 1737). Other sites are much more recent in origin. All the areas studied lie within Trimen and Dyer's (1869) "Upper Colne Botanical District", in the north-west of the County. There are two main areas of distribution:—

i The grasslands west of Harefield. These are developed on the outcrop of Upper Chalk that forms the valley side escarpment of the left bank of the Colne. They are becoming very fragmentary through quarrying activity.

ii The grasslands east of Harefield. These comprise a number of very local sites, developed either where the chalk outcrops for a short distance, or where an "artificial" site has been created by the dumping of Chalk debris. This study deals primarily with the small "Chalk Area" (600 square metres) in the Ruislip Local Nature Reserve. (See Moxey, 1964).

THE PLANTS

i The Grasslands West of Harefield

The best developed Chalk Grassland lies to the west of Harefield (from TQ 046932 to TQ 048900), and, having little continental flavour in the range of species present, may be assigned to the sub-alliance,

*Mesobromion erecti**. One of the remarkable features of this sub-alliance in Britain is the abundance of the grass, *Bromus erectus*, over large areas, for example, as Rose (1965) points out, on "Les pelouses aux expositions Sud des "North Downs" de l'interieur du Kent et du Surrey". The Upright Brome-grass appears to be locally common on the Middlesex grasslands also. Trimen and Dyer (1869) record the species as "abundant" in "Field above the chalkpit, Harefield", and Rose (pers. comm.) records it as locally frequent near Garrett Wood (TQ 046932), though much of this site has now been quarried away. It is also to be found below Old Park Wood and on Copper Mill Down (TQ 0490). With it, one usually finds *Festuca ovina* on unstable quarry slopes and spoils, heavily grazed areas, and the lighter, drier soils, and *Briza media* spoils, heavily grazed areas, and the lighter, drier soils, *Briza media* and *Carex flacca*.

The following relev or quadrat gives the basic structure of the community. The phytosociological methods employed are those of Braun-Blanquet. The first figure given is an estimate of cover degree, the scale being:—5 = over 75% of the area; 4 = 50–75%; 3 = 25–50%; 2 = 5–25%; 1 = less than 5%, but affecting community structure; + = occasional, not affecting structure; o = one plant only. The second figure is an estimate of plant sociability (i.e. how a given species is distributed over the quadrat area):—5 = pure populations; 4 = large colonies; 3 = small patches or cushions; 2 = small groups or tufts; 1 = no grouping.

COPPER MILL DOWN

Grid ref.: TQ 043907
Date: 30/8/67
Site: West of area of scrub
Soil: pH 8·5
Aspect: 250°
Slope: 11°

1 square metre

Bromus erectus 2.2
Dactylis glomerata 1.2
Briza media +.1
Festuca ovina +.1
Carex flacca 2.2
Thymus pulegioides 2.3
Hieracium pilosella 2.3
Ranunculus bulbosus 2.2
Pimpinella saxifraga 2.2
Prunella vulgaris 1.2
Senecio jacobaea 1.2
Ctenidium molluscum 1.1
Pseudoscleropodium purum 1.1
Eurynchium swartzii 1.1
Fissidens sp. 1.2

In the past, the sites in the Garrett Wood/Springwell Down area have yielded many interesting records, and it is to be regretted that quarrying has destroyed so much of these grasslands. For example, *Helianthemum chamaecistus*, once known near Garrett Wood, could not be refound there by Kent and Rose (pers. comm.) as far back as 1946. One very interesting species recorded for these sites is *Gentianella germanica*. The presence of this species shows that the Chalk Grassland of Middlesex can be regarded as an outlier of the Chiltern flora, for in Britain *Gentianella germanica* is virtually restricted to the Chiltern area, and the widespread Chalk Grassland species is *Gentianella amarella*, which also occurs in the Springwell area. In France, however, the position is reversed, the common Chalk Grassland species being *Gentianella germanica*. Other

*In the terminology of Continental Phytosociologists. This sub-alliance of the *Mesobromion erecti* embraces most of the normal chalk and limestone grasslands of the British Isles. Braun-Blanquet, J. and Moor, M., 1938, Verband der *Bromion erecti*. *Prodomus der Pflanzengesellschaften*. Fasc. 5—Leiden.

records for these sites include *Euphrasia nemorosa*, *E. pseudokerneri*, *Ononis repens*, *Blackstonia perfoliata*, *Viola hirta*, *Primula veris*, and *Thymus pulegioides*. With these occur the basic Chalk Grassland species, such as: *Poterium sanguisorba*, *Pimpinella saxifraga*, *Daucus carota*, *Leontodon hispidus*, and *Knautia arvensis*. On grassland from Springwell to Old Park Wood, Boniface (pers. comm.) records *Lotus corniculatus*, *Poterium sanguisorba*, *Pimpinella saxifraga*, *Cirsium acaulon*, *Ononis repens*, *Centaurea scabiosa*, *C. nigra*, *Hypericum perforatum*, *H. hirsutum*, *Leontodon hispidus*, *Chrysanthemum leucanthemum* and *Geranium columbinum* among others. The disturbed nature of the ground, especially around quarries, is reflected in the nature of the grasslands.

The *Flora* of Trimen and Dyer (1869) suggests that the Chalk of Middlesex was once quite rich in Orchids, and includes Blackstone's (1737) records for *Orchis ustulata* ("In Harefield chalkpit, sparingly"), and for *Orchis purpurea* and *Orchis militaris*, though it is possible that "*purpurea*" records should be referred to "*militaris*". *O. militaris* was refound in 1885 and last recorded in 1902, and in the heart of all botanists there must remain a faint hope that it will turn up again. This was perhaps the finest plant of both Hertfordshire and Middlesex, and some reasons as to why it became extinct will be given when the question of conserving the flora is discussed. Trimen and Dyer also record *Ophrys insectifera* (their "*muscifera*") as "very rare" in "copses and bushy places on chalk".

Today Orchid records are few. *Anacamptis pyramidalis* and *Ophrys apifera* are locally important, 50 spikes of the former being recorded for Copper Mill Down in 1965 (Moxey, 1966). *Dactylorchis incarnata*, *D. fuchsii*, and *D. praetermissa* have all been recorded for various chalk pits, and in 1965, Pickess (Pickess, 1966) discovered an Orchid new to Middlesex in a chalk pit at Harefield. Growing in association with a ground layer of *Hedera helix*, and in deep shade, he records 70 or more plants of *Epipactis phyllanthes* var *degenera*. One Orchid which may be found to be more frequent than believed is *Gymnadenia conopsea*. One spike was recorded by Mrs. B. Welch in 1946, and a new locality found in 1965 (Moxey, 1966).

The bryophytes are, in general terms, those typical of west facing Chalk Grassland, aspect being fundamental in determining the bryophyte flora of any area. In the sward one finds *Acrocladium cuspidatum*, *Brachythecium rutabulum*, *Ctenidium molluscum*, *Camptothecium lutescens*, *Campylium chrysophyllum*, *Pseudoscleropodium purum*, *Rhytidiadelphus squarrosus*, *Dicranum scoparium*, *Eurynchium swartzii*, and, where there is shade, *E. praelongum*. Two very interesting records are those for *Thuidium philibertii*, which has long been known at Springwell Chalk pit and Down, and which was recorded in 1967 by Coker (pers. comm.) for Copper Mill Down. Boniface (pers. comm.) records *Brachythecium glareosum* as "rare" on Springwell Down, and *Brachythecium albicans*, which is commonly found in grass on sandy soils, occurs where the Reading Beds are mixed with the Chalk. On bare soil areas, *Dicranella varia* is abundant at Springwell, and *Barbula convoluta*, *B. fallax*, *Leiocolea turbinata*, and *Fissidens* spp. are common.

On the Chalk/Reading Beds spoil heaps below Old Park Wood, lichens come into their own, and include *Cladonia chlorophaea*, *C. fimbriata*, *C. subrangiformis*, and a *Peltigera* sp.

ii THE GRASSLANDS EAST OF HAREFIELD

Groves (1965) records a similar lichen flora to the above near the swallow hole of the Chalk Area in the Ruislip Local Nature Reserve (TQ 089899), including *Cladonia subrangiformis* and *C. chlorophaea.* He comments that these are interesting records" since there are not many surface chalk habitats in Middlesex where one could possibly expect them to be among the lichen colonisers". This site, and the Old Park Wood site, are both disturbed Chalk habitats, the latter being spoil heaps often partially mixed with Reading Beds, and the former being an area "covered with chalk spoil from the well dug by the Colne Valley Water Company" (Moxey, 1964).

The bryophyte flora of the Chalk Area in the Reserve is very rich, and very interesting. Around the swallow hole occur *Fissidens taxifolius* and *Camptothecium lutescens* (Moxey, 1965); *Riccardia sinuata* is in association with *Dicranella varia*, and *Dicranem bonjeani;* while, *Ceratodon purpureus*, *Acrocladium cuspidatum*, *Brachythecium albicans*, *Hypnum cupressiforme*, and *Rhytidiadelphus squarrosus* are recorded*. Higher plants typical of Chalk Grassland include *Poterium sanguisorba*, *Linum catharticum*, *Origanum vulgare*, and *Briza media*, but the dominant plant is *Tussilago farfara*, reflecting the disturbed nature of the site.

From the above discussion, three general points may be made about the plant element in Middlesex Chalk Grassland:—

(i) The flora is an outlier of the Chiltern Chalk Grassland flora.

(ii) Within the last two hundred years, the flora has become greatly impoverished.

(iii) The disturbed nature of certain sites is reflected by the flora present.

THE SITES

The Chalk Grasslands of Middlesex appear to be maintained both as a subclimax and a plagioclimax vegetation, steep, unstable slopes and animal grazing both being effective in halting scrub development. It seems paradoxical that the very destroyer of much Middlesex Chalk Grassland, quarrying, also produces ideal slopes for the development of Chalk Grassland. This is a common feature everywhere. In Pas-de-Calais, France, some 75% of the Chalk Grassland sites are associated with old quarry workings. Unfortunately, in Middlesex, the quarries are still active and are eating into the grasslands.

The evidence for grazing is widespread. Copper Mill Down is maintained as Chalk Grassland through the all-year grazing of 50 cows and 20 heifers. On this stretch of down, there are large mushroom-like clumps of *Crataegus* where the base of the shrubs has been grazed away. Pickess (1964) carried out some work on the evidence for rabbit grazing in the Chalk Area of Ruislip Local Nature Reserve during the severe winter of 1963. Describing the attack by rabbits to a Broom (*Sarothamnus scoparius*), he writes, "The only plant in the Reserve had by the end of this cold weather over half its shoots eaten down to the hard wood . . . shoots almost two feet above ground level were reached and eaten".

* Moxey (1965) also records *Neckera crispa.* Should this be *Neckera complanta?*

He also records the nibbling of young twigs, the barking and the eating of young shoots of *Crataegus*, and the taking of shoots and a little bark from Briars (*Rosa* sp.). Yet, despite this grazing, scrub rapidly encroaches on the area. Burning seems to have been used to try to keep it back.

The "artificial" nature of certain sites is another interesting feature, as already mentioned. The Chalk/Reading Beds spoil heaps and the Chalk spoil of the Ruislip Reserve being the obvious examples. They tend to differ from the Chalk Grassland norm, for example, in the Reserve dominant, *Tussilago farfara*.

HABITAT VARIATION

For an example of habitat variation, the soils of Copper Mill Down are useful. Sandy ant-hills are dominated by cushions of *Thymus pulegioides*. Dry, sandy terracettes carry a community of acrocarpous mosses, while hollows have a Clover community. But the most interesting variation occurs in a line south-east to north-west along the main stretch of the grassland from the farm gate through which the cattle enter the field to its other end. The Total Nitrogen content in the soil decreases steadily from the gate northwards. Table 1 compares two surface soils (2″), one near the farm, the other some distance away.

TABLE I

COPPER MILL DOWN: SURFACE SOIL (2″)

	pH	Available Ca	Available Na	Available K	Total Nitrogen as NH_4.
Near Farm:	8·4	227 ppm.	4 ppm.	8 ppm.	264 ppm.
Away from Farm:	8·6	247 ppm.	3 ppm.	5 ppm.	115 ppm.

This variation is probably related to the pressure of grazing, the area nearest the farm being the most heavily grazed. The heavier grazing should increase Total Nitrogen in two ways. Firstly, cattle excreta will add to the Nitrogen in the soil, and secondly, as the cattle break up the turf, open habitats are created and meadow plants enter, such as Clover, which is Nitrogen fixing. Through this the Chalk Grassland vegetation is gradually destroyed and reduced to meadow pasture. Cause and effect are difficult to separate, so perhaps it is best to attribute this variation to bovine indolence!

CONSERVATION

The question of the conservation of Middlesex Chalk Grassland will be discussed under three headings; areas already protected, possible future areas, and personal responsibilities.

Areas already protected

At the moment only two areas of interesting Chalk Grassland are officially protected, namely Copper Mill Down, which is a S.S.S.I., and the Chalk Area of the Ruislip Local Nature Reserve. The main threat to the latter is the invasion of scrub species, and a constant effort will be needed to maintain the area as grassland. The protection of Copper Mill Down seems rather ineffective, and the cattle grazing already discussed is breaking down the Chalk Grassland vegetation. The area would probably develop a much better Chalk Grassland sward if it was grazed by sheep.

Possible future areas

As pointed out earlier, the best Chalk Grassland lies to the west of Harefield, but is being quarried away at a rapid rate. Small areas have also been built on. It is very unlikely that the urban-industrial advance will be stopped for the sake of preserving a small area of vegetation, but one certainly hopes that the woodland areas, with *Dentaria bulbifera*, above the grasslands will be saved.

Personal responsibilities

The greatest danger, however, to any flora probably lies in botanists themselves. Dalby (1963) referring to "the private herbarium assembled by the private individual" comments "it is here that I believe the greatest threat to our flora lies". The saga of *Orchis militaris* in Middlesex and Hertfordshire certainly justifies Dalby's belief.

In 1885, Benbow refound this plant in a wood near Harefield. He says, there were "several plants but some unfortunately taken up by the roots by my sons and nephews". In 1889, the plant was still in this station, and on May 23, 1889, Benbow gave a specimen to a Miss Hazelhurst. In 1885, he had also found a similar station in Hertfordshire near the Middlesex boundary. In that year, there were some 20 plants at this site. In 1889, he gave one plant to the Rev. M. Reader. In 1890, there were 12 plants. In 1891, there were eight plants, and some were given to the Rev. W. R. Linton. In 1892, there were four plants, but in 1895, some were given to the Rev. E. Linton. In 1896, there were no plants. During the next few years one or two spikes appeared at the site, and one final spike was seen in 1902. In Benbow's herbarium there are no less than 13 specimens as well as numerous notes to the effect that various specimens had been presented to eminent botanists of the time. D. H. Kent, in a letter on this saga, concludes, "One can only feel that Benbow assisted greatly in eradicating from the two counties their finest plant!"

The above is an extreme case, but it should emphasise to all botanists the need to exercise restraint in the collecting of rare species. In Middlesex all plants could be regarded as rare, and surprisingly much of interest still remains despite urban expansion. Whilst hoping that this paper will create a new interest in part of the Middlesex flora, it is also necessary to stress the responsibility of botanists in preserving their local floras.

List of English Names of Vascular Plants Referred to in the Text

It has not been thought possible to provide a list of English equivalents for the Bryophytes and Lichens mentioned.

Anacamptis pyramidalis (Pyramidal Orchid)
Blackstonia perfoliata (Yellow-wort)
Briza media (Common Quaking Grass)
Bromus erectus (Upright Brome-grass)
Carex flacca (Carnation Grass)
Centaurea nigra (Lesser Knapweed)
C. scabiosa (Greater Knapweed)
Chrysanthemum leucanthemum (Ox-eye Daisy)
Cirsium acaulon (Stemless Thistle)
Crataegus monogyna (Hawthorn)
Dactylis glomerata (Cock's-foot)
Dactylorchis fuchsii (Common Spotted Orchid)
D. incarnata (Meadow Orchid)
D. praetermissa (Fen Orchid)
Daucus carota (Wild Carrot)
Dentaria bulbifera (Coral-wort)
Epipactis phyllanthes var. degenera (Green-flowered Helleborine)
Euphrasia nemorosa (Eyebright)
E. pseudokerneri (Eyebright)
Festuca ovina (Sheep's Fescue)
Gentianella amarella (Felwort)
G. germanica (Chiltern Gentian)
Geranium columbinum (Long-stalked Cranesbill)
Gymnadenia conopsea (Fragrant Orchid)
Hedera helix (Ivy)
Helianthemum chamaecistus (Common Rockrose)
Hieracium pilosella (Mouse-ear Hawkweed)
Hypericum hirsutum (Hairy St. John's Wort)
H. perforatum (Common St. John's Wort)
Knautia arvensis (Field Scabious)
Leontodon hispidus (Rough Hawkbit)
Linum catharticum (Fairy Flax, Purging Flax)
Lotus corniculatus (Birdsfoot-trefoil)
Ononis repens (Restharrow)
Ophrys apifera (Bee Orchid)
O. insectifera (Fly Orchid) ...
Orchis militaris (Soldier Orchid)
O. purpurea (Lady Orchid)
O. ustulata (Burnt Orchid, Dark-winged Orchid)
Origanum vulgara (Marjoram)
Pimpinella saxifraga (Burnet Saxifrage)
Poterium sanguisorba (Salad Burnet)
Primula veris (Cowslip)
Prunella vulgaris (Self-heal)
Ranunculus bulbosus (Bulbous Buttercup)
Sarothamnus scoparius (Broom)
Senecio jacobaea (Ragwort)
Thymus pulegioides (Larger Wild Thyme)
Tussilago farfara (Coltsfoot)
Viola hirta (Hairy Violet)

Clapham, Tutin and Warburg (1962) and McClintock and Fitter (1956) have been referred to for the Scientific and the common names of vascular plants.

Paton (1965) and Warburg (1963) have been referred to for the names of the Bryophytes and James (1965) has been referred to for the names of the Lichens.

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Reconnaisance Surveys of Vegetation

By Herbert A. Sandford

BOTANICAL surveys by members of the Society fall under four fairly well-defined headings. Intensive studies of particular species and habitats include the *Calystegia* (Bindweed) Survey (Bangerter, 1967) and D. H. Kent's earlier study of the plants growing on walls in Middlesex (Kent, 1960). Larger projects involving many sections of the Society, such as the Bookham Common Survey, represent another major aspect of the Society's work and in 1965 the Botany Section launched its Plant Mapping Scheme which involves recording the species present in each tetrad within the Society's area.

Studies of these kinds have contributed much to the reputation of the Society, a reputation which extends beyond the metropolis, but there is an unfortunate tendency to overlook the value of the reconnaissance survey of areas of modest size, generally accompanied by species lists and notes of habitat and frequency. The results of this work are seldom published and, unfortunately, not always recorded. Nevertheless, *in toto*, it represents a very considerable proportion of the work done by members. The importance of this work is great, not only in its own right (*vide* Welch, 1961) and as a valuable training in botany, but as an essential preliminary to major studies, revealing problems that merit investigation and providing the context within which the investigation is to proceed.

Before adopting a method for surveying the vegetation we must decide whether it is sufficiently reliable in its use and valid in its results for its purpose. What is the purpose of a reconnaissance survey? There are two main aims. One is to provide a body of information about the distribution of species in an area that might never be selected for more detailed study; the other is to show whether such detailed study is needed. The immediate objective in each case is a formal description of the vegetation, species present, their frequency, pattern of distribution and so forth.

The species list as such requires no defence while a worthwhile description of the pattern of distribution is impossible in any reconnaissance. The life form of the plants (Raunkiaer, 1934) and the structure of the vegetation (*vide inter alia* Küchler, 1949), so necessary to describe in regions being "worked" for the very first time, may within our area be assumed to be "normal" unless special note is made to the contrary, e.g. *Carpinus betula* (coppiced), common; *Fagus sylvatica* (seedlings), frequent. I make no apology however for discussing at length the frequency list, for only a thorough understanding of the idea of plant frequency and of the difficulties in applying this concept to the description of a vegetation can enable a much needed improvement in its effective use.

The reconnaissance survey, relying as it does upon the species list with notes on habitat and relative abundance, has been criticised as not employing the elaborate and time-consuming quadrats, traverses and so forth, appropriate to the detailed study. This is not a valid criticism. Reconnaissance surveys *are* necessary and *for their purpose* a quick method is more appropriate. The use of frequency symbols has come under particularly heavy criticism and the method needs justification. It must be shown to be both reliable and valid enough for reconnaissance purposes.

Frequency symbols have long been in use and will be familiar to members of the Society. A species is recorded as being abundant, common, frequent, occasional or rare, generally by using the letters *a*, *c*, *f*, *o* and *r*. Sometimes the scale is either expanded or extended by the use of the adjective "very", *v*, particularly in the categories *va* and *vr*. Use can be made of "very" to qualify all five primary classes of frequency and so yield a ten-point scale but this is undesirable as the more divisions there are on a scale the more difficult it is to distinguish between them (Vernon, 1953).

The use of the term "dominant" in frequency lists has been repeatedly condemned (Greig-Smith, 1964) as its meaning in this context is ambiguous. Foresters call dominant a tree species that rises above the forest canopy while plant sociologists and others may use the term for the plant species that exerts most influence of some kind over the other species in the community. In the frequency list the word should imply "physiologically dominant" or "most abundant species"; it has been so used instead of "very abundant" but appears often to have overtones of dominance in its other senses. Not only does this reduce the value of the frequency scale by introducing another factor, but any dominance in the sense of influence, itself a controversial concept, can be ascertained only after a detailed study and not during reconnaissance. Cases are known, for instance, when the regeneration of a tree species (the apparent dominant) is prevented by a herb species (the true dominant) "crowding out" the tree seedlings. Many cyclic changes in vegetation appear to involve similar factors (Watt, 1947) and it has been suggested that in frequency lists the term "dominant (ecol.)" be used to avoid ambiguity (Richards *et al.*, 1940).

The additional term "local" is similarly ambiguous, being used to mean very rare, relatively rare and discontinuous in distribution or simply discontinuous whatever the frequency. Thus the word introduces the idea of *pattern* of distribution and logically cannot be part of the *frequency* scale. It would seem preferable to use primarily the symbols *va*, *a*, *c*, *f*, *o*, *r* and *vr*, reserving the letters *d* (dominant) and *l* (local) for *additional* information, the former to be employed only when there is some evidence of influence and the latter when there is marked discontinuity for whatever reason.

It is generally accepted that the reliability of the frequency scale is very low, i.e. not only do two recorders often obtain different results but the same recorder might get a different result when he repeats his observations. This was investigated by Hope-Simpson who found that two independent judges disagreed over the abundance of a species in 56% of their assessments (Hope-Simpson, 1940). There is evidence however that, despite wide divergencies of opinion over particular species, the average disagreement can be very small (Greig-Smith, 1964) and most experienced botanists would seem to have a fairly good idea as to what is meant by common, rare, abundant and so on.

Some disagreements are due to random errors. These are errors not known to be "biased" in any way, plants being noticed or passed over for reasons that will not affect the results in any determinable direction. Some plants will not be present in the observer's field of view and the observer himself blinks at intervals when scanning the vegetation and appears to observe only when his eye comes to rest. Truly random errors cancel out one another and may be tolerated in the frequency list for the commoner plants; rarities however will be under-recorded and this will seriously affect the compilation of the species list.

Non-random errors are often personal, observers not recording or even not noticing plants belonging to groups with which they are unfamiliar. Quite a number of botanists, for instance, confess to being "weak" on grasses and sedges, and a number of groups, such as the eyebrights and the brambles, need a specialist for their identification. Tired recorders tend to ignore inconspicuous and infrequent plants while some species tend to be under-recorded because of a superficial resemblance to another but commoner one, the black currant (*Ribes nigrum* L.) being taken for the red currant (*Ribes sylvestre* (Lam.) Mert. & Koch) for instance. Other non-random errors depend upon the plants themselves, such as the ready apparence of mistletoe in winter and the inconspicuousness of the wavy hair-grass (*Deschampsia flexuosa* (L.) Trin.) when not in flower. It is clearly necessary to mention the season of observation and highly desirable to make at least one subsequent visit.

Despite the unreliability of the frequency scale it is certainly the best we have at our disposal for reconnaissance work and its long use suggests that it has proved at least sufficiently reliable for its purpose. The method has been attacked on other grounds however. It has been criticised as being invalid, that is, for not doing what is expected of it—for not measuring *frequency*.

Hope-Simpson and others have shown that frequency estimates take as much if not more account of conspicuousness, cover, density and pattern as of frequency itself. This criticism is based essentially upon confused nomenclature. The word "frequency" is being used in two quite different ways. In the narrow or statistical sense frequency is the

chance of finding a particular plant in a unit sample area, such as a quadrat, selected at random. This is best referred to as a frequency percentage, the percentage of such quadrats in which the plant would be found, and there are appropriate techniques for assessing this quantitatively. Now the numerical calculation of frequency percentages was developed after the subjective assessment of frequencies in its wider meaning which embraces conspicuousness, density and so forth. Indeed, it was the failure to express numerically this complex concept that led to quantitative methods of describing separately its several included elements. We could therefore argue that the prior and therefore the true meaning of "frequency" is that of the term in its original wider sense. It is no argument to say that the frequency estimate *sensu lato* cannot be valid because it does not measure frequency *sensu stricto*. On the contrary, we can prove the validity of the method all too easily—the word "frequency" grew up describing what was measured by the method and so the method must necessarily measure frequency!

Paradoxically, this weakness in the concept of frequency, that it contains a number of more or less independent elements, is also its strength and gives it its value in reconnaissance surveys. The whole is greater than the sum of its parts; a vegetation is not just a number of plant species with particular densities, covers, frequencies *sensu stricto* and patterns of distribution, each of which can be separately assessed. In reality one of these four elements will generally predominate and only the subjective concept of frequency, frequency *sensu lato*, appears able to give expression to this pre-eminence and thus to describe the character of the vegetation as a whole.

It has come increasingly to be realised that one of a group of elements may override the others, exerting a kind of halo effect that must necessarily be incorporated into any description. Personality testing affords some excellent examples of this problem and how it may be overcome (Vernon, 1953). This does not imply an organistic view of a plant community but merely recognises that some weighting should be given to the several factors involved and that the particular weighting will depend upon the species being assessed in one place at one time.

Numerous attempts have been made to construct scales that allow for several of the elements involved in the description of a vegetation, notably those of Braun-Blanquet (Braun-Blanquet, 1964) and his followers. The most accessible account is to be found in the work of Poore (Poore, 1955-56). Poore was very critical of the theoretical basis of the Braun-Blanquet system because it was built around certain concepts that appeared to imply a community of plants to be an organised entity, concepts which however seem no longer to be held with these implications by its current practitioners (Moore, 1962). In any case it remains an extremely useful tool for the ecologist (Poore, 1955-56) but one which may be used profitably only by the very experienced (Webb, 1954).

Thus it seems that the concept of frequency is valid and has sufficient reliability for reconnaissance work. Its continued use appears to be justified but it might be well to refer to it as frequency (ecol.) to distinguish it from frequency (stat.), the frequency percentage.

Despite this reassurance we should endeavour to improve the reliability of assessments of frequency (ecol.). A mere awareness of the difficulties should help in achieving this but a conscious endeavour to do so is also

necessary. The random errors to which the observer is subjected probably cannot be much reduced, though it might help if he proceeded very slowly at first until he "gets his eye in" and also near the end of the survey when he may be feeling tired.

Not all plants present in an area will necessarily be growing on the route taken by the recorder and such random errors due to the distribution of plants cannot be avoided. On the other hand, the observer can introduce considerable bias according to the path he takes. Any reconnaissance survey may be considered as a type of traverse even if it occasionally crosses itself or if different portions of it overlap. As the eye is repeatedly falling upon different plants along the "traverse" one could consider the latter as being continuously sampled, though each sample will contain only a few plants. Any traverse has a certain width and if the area to be covered by the survey is small enough it may be possible to cover the whole area by contiguous "traverses". To traverse an area in a wandering manner is likely to leave some parts unscanned and to duplicate others as there is a distinct tendency to move from one conspicuous or interesting feature to another. This allows considerable bias to enter into the assessment of frequencies. This bias can be avoided by patrolling the area in the manner in which a field is ploughed, provided that there are sufficient landmarks to make this possible.

Reconnaissance surveys however do not generally attempt to cover the whole ground but rely upon making a sample traverse. There is a very strong tendency, often deliberate, to follow ridges, rides in woods, paths across meadows, watercourses and so forth. Generally this is done for ease of progress but it favours the recording of certain species at the expense of others. This can be avoided by making a series of parallel traverses at a convenient distance apart. An interval of 100 metres is useful as then the traverses can be worked out from the O.S. $2\frac{1}{2}$ ins. map before starting, using the "eastings" and "northings" already printed on it. A compass will generally be necessary in the field; the fact that grid north and magnetic north do not coincide would be of no consequence in small areas as one would only be making a series of parallel traverses set at a small angle to the ones planned on the map. This method of selecting a traverse is often called random though in fact it is not: it is difficult however to conceive of any way in which the results could be influenced by having selected lines dependent upon the earth's magnetic field. Purists may make the necessary compass adjustments and follow grid lines selected by random numbers!

A more difficult question concerns the deliberate choice of a traverse that will take the observer into each habitat appearing different on the map or in the field, with a relatively brief period of observation in each that is not in proportion to its area. This of course could be legitimate if the purpose is to establish the presence of a particular species or to draw up a species list. It is however meaningless to attach frequency estimates to the list; it becomes a proper method in reconnaissance survey only if separate frequency estimates are made for each portion of the total area thus sampled, if these samples are long enough and if no attempt is made to assess the overall frequency. An arbitrary decision may be made such as that if in the last quarter of the traverse so far made in a particular habitat no new species have been found then the traverse will not be prolonged.

In all cases it is important not only to state in which month the work was carried out but also the type of traverse and any personal bias known to the recorder. For example: "5 sq. mls. May. Samples: Woodland; $\frac{3}{4}$ of area, traverse 900 yds. Meadow; $\frac{1}{4}$ of area, traverse 300 yds. Traverses along grid northings. Sedges not recorded". It is also helpful for observers to spend some time working together in a variety of habitats in order to develop a standard use of words like "common" and "rare".

The frequency scale has had a long history in reconnaissance surveys of the vegetation. The built-in validity of the method should ensure its continued use but a conscious effort is needed to improve its reliability and in interpreting its results. It is hoped that this article will help to bring about these improvements, to encourage more members to record what they find on their weekend walks and to persuade them of the personal satisfaction and great value in a well-planned excursion.

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Mammals in the London Area, 1966

By Ian R. Beames

THE information accumulating in the Society's files about the mammals to be found in the London Area increases from year to year. As more precise, detailed information is received the picture of the distribution and habits of mammals living in and around the rapidly expanding metropolis becomes a little clearer.

In the London Area there is an unrivalled opportunity to study both the immediate short-term and the long-term effects of urbanisation. It is to be sincerely hoped that this opportunity will be grasped firmly in the future.

Detailed records in reasonable quantity come from only few observers: it would be very encouraging to see several more people making mammals their principal subject. It is also hoped that every member who sees a British wild mammal in the London Area will send in the details to the Recorder.

There is this year, an enormous bias of records from Surrey and a deplorable lack of them from Essex: indeed there appears to be only one person in Essex regularly submitting records.

By far the most important information in the studies of mammals concern the common species: it is frequently not realised how little is really known about even the commonest animals.

Some species are easy to record, either by their traces (molehills, squirrel dreys, rabbit droppings, etc.) or by sight of the animals themselves. Some are also fairly common in the London Area: these are the Hedgehog, Mole, Fox, Hare, Rabbit and Grey Squirrel.

The Rabbit illustrates our lack of information on these common animals. Rabbits reached an enormous peak in numbers some years ago. With the onset of myxomatosis, they were almost exterminated in much of Britain, but for some years now have been increasing in numbers. Past records refer to the animal as common, but no actual figures are given. Fifty in a five mile walk or fifty in a hundred yards may be described as common by different people.

Despite the magnificent opportunity for some worthwhile research, which in this instance is easily undertaken by amateurs, the London Natural History Society is quite unable to give any precise information about the distribution and numbers of the Rabbit, either before or after myxomatosis. Many observers ignore the mundane Rabbit as not worth recording, and yet it is an animal of vast economic importance.

This is thus an appeal for all records of all the common mammals and, in particular, those of the Rabbit. Details of numbers seen and of warren location are needed. Rabbit droppings are also an indication of the presence of the animal and should be recorded where no animals are seen.

Precise information is required to ensure accurate mapping of distribution. At least four-figure grid references or sufficient descriptive information should be given so that the Recorder may obtain a grid-reference. In the built-up area the name of the road should be given if a grid-reference is unobtainable.

Small mammals may be recorded in several ways, all varying in efficiency. Bearing in mind that most mammals are mainly nocturnal, these methods are (*a*) see the animal alive, (*b*) find it dead, (*c*) trap in Longworth traps, or break-back traps, (*d*) identify remains in owl pellets and (*e*) remains from discarded bottles (Morris and Harper, 1965).

Despite some duplication of localities in the systematic lists which follow, all records of small mammals are given, on this occasion, to demonstrate the relative efficiency of the various methods.

This present paper follows the standard procedure adopted in past, issues of the *London Naturalist;* the letters B, E, H, K, M and S stand for the counties of Buckinghamshire, Essex, Hertfordshire, Kent, Middlesex and Surrey. 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. The check list numbers and scientific names are from Corbet (1964).

I should like to thank all those people who sent in records. My thanks go, in particular, to those who made concentrated searches for mammals and sent in detailed notes of these. My thanks go to John Burton, my predecessor as Recorder, whose attempts to persuade people to concentrate on mammals are now bearing fruit. Pat Morris, who is a frequent companion in my own field work, and who is individually responsible for over 35% of all the records, has my sincere thanks for his help, advice and scathing criticism of anything which is not scientifically accurate.

The following is a full list of contributors. My apologies go to anyone inadvertently omitted.

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SYSTEMATIC LIST 1966

INSECTIVORA

1. HEDGEHOG. *Erinaceus europaeus* L.

The Hedgehog must rank as one of the most familiar of the common British mammals. One does not have to be an expert mammalogist to

find Hedgehogs in London. It seems that in the London Area, at least, the optimum habitat, for Hedgehogs, is Suburbia (Morris 1966). By far the largest number of records come from very near human habitation. In gardens and parks throughout the London Area, compost heaps, sheds and wood piles provide excellent places for nests and hibernation; while the gardens themselves are good feeding grounds.

Many people put out bread and milk for their semi-tame Hedgehogs. Some who put meat scraps and table scraps (a better) diet on the lawn find their Hedgehogs return daily throughout the summer.

There are, again, very few records from Essex, and not very many from Hertfordshire.

There are several records of Hedgehogs found dead on the road during the winter months. The three months from January to March provided several records of active Hedgehogs, presumably looking urgently for food before hibernating again. A very large number of records in the last week in April and the first two weeks in May seem to indicate the general awakening period for most London hedgehogs.

At the other end of the year there were 26 records in November and nine in December.

At Esher, Dr. G. Beven saw hedgehogs throughout the season, in his garden. The first was noted on April 22 and the last on November 7.

Hedgehogs usually emerge quite late in the evening in suburban gardens. By far the best way of finding one is to wait, silently, in the garden and listen for the animals' noisy progress through the flower beds and hedges.

Hedgehogs are the most frequent animal found run over on London's roads. This high mortality rate is caused by their habit of curling up in the road when startled. 199 were reported killed on the area's roads during the year.

A hedgehog seen in a public house beer garden at Bedfont on May 15, presumably knew where to get food and drink, as did the one seen late one evening in Hampton, swimming in a goldfish pond, carrying a large goldfish in its mouth.

An animal found freshly dead on the road, on July 19, half-a-mile inside Richmond Park north of Kingston Gate is one of the first records from there for some years.

Hedgehogs were reported from the following localities:

B Datchet (PAM). Iver (AP).

E Great Warley and Harold Wood (RBW).

H Barnet (PAM), Brookmans Park (JP, RPW, Colney Heath (MK), East Barnet (EPB), Northaw (MK), Potters Bar (JP, RPW), Whetstone (AM per GB).

K Beckenham, Blackheath, Brockley, Bromley, Catford, Crofton Park, Dartford, Eltham, Greenwich, Hayes, Hither Green, Kidbrooke, Lee, Lewisham, New Cross, Sevenoaks, Sidcup, Sydenham, Welling, West Wickham (m.o.).

M Bedfont, Bushy Park, Chiswick, Enfield, Feltham, Fulham, Hampstead, Harefield, Harrow, Harrow Weald, Hayes, Holland Park, Hounslow, Isleworth, Kempton Park, Laleham, Neasden, Pinner, Queen Mary Reservoir, Regents Park, Ruislip, Shepperton, Staines, Stanmore, Upper Halliford (m.o.).

S Banstead, Battersea, Bookham, Bookham Common, Bletchingley, Camberwell, Carshalton, Caterham, Chertsey, Chessington, Claygate,

Croydon, Dulwich, Epsom, Esher, Ewell Village, Godstone, Hampton, Herne Hill, Hersham, Hinchley Wood, Kew Gardens, Kingston, Kingswood, Leatherhead, Merstham, Mitcham, Molesey, Mortlake, Motspur Park, New Malden, Norbury, Norwood, Oxshott, Petersham, Pixham, Purley, Redhill, Richmond, Richmond Park, St. Helier, Staines, Stoneleigh, Streatham, Surbiton, Thorpe, Tolworth, Tooting, Tulse Hill, Wallington, Walton, West Ewell, Weybridge, Wimbledon (m.o.).

2. MOLE. *Talpa europaea* L.

Moles themselves are rarely recorded, being very much subterranean animals. Their presence in an area is usually betrayed by the appearance of fresh mole-hills: these little heaps of fresh earth may be found in many types of habitat. Although they are most noticeable on a smooth expanse of grass, they may be found in enormous numbers in suitable places in woodland.

Animals were found dead on the surface in several places.

785 fresh hills in one field in Osterley Park, Middlesex, on February 12 and 1,500 in a small part of Staines Moor, Middlesex, were both counted by PJE.

Four "fortresses"—the mole breeding nest—were dug out at Esher, Surrey, on April 18. Two of these contained litters of three young each.

From the records there appears to have been only one mole in Essex in 1966 and it lived in Weald Park! It is to be assumed that there are more and records would be of much value.

Moles were reported in 1966 from the following localities:

B Rush Green (IGJ).

E Weald Park (RBW).

H Croxley Moor, Leggatts Wood, London Colney, Moor Park, North Mimms, Otterspool and Water Hill (m.o.).

K Badgers Mount, Brasted Chart, Chevening, Eynsford, Keston, Lullingstone Park, Oxted Green, St. Pauls Cray, Shoreham, Sundridge Park, West Wickham (m.o.).

M Stated as very common in the river valleys between Uxbridge and Rickmansworth. Full details (i.e. each 1 km. grid square occupied) would be welcome for all river valleys in the London Area.
Bayhurst Wood, Bentley Priory, Breakspear House, Copse Wood Ruislip, East Bedfont, Harefield, Hilly Fields Park Enfield, Maple Lodge, Northaw, Northolt, Old Park Wood, Osterley Park, Queen Mary Res., Shepperton, Staines Moor, Whitewebbs Park (m.o.).

S Addington, Addlestone, Ashtead, Ashtead Park, Banstead, Bookham Common, Buckland, Carshalton, Caterham, Chelsham, Chertsey, Cobham, Coulsdon, Downside, Egham, Epsom Common, Esher, Esher Common, Farleigh, Godstone, Headley, Hersham, Mickleham, Nutfield, Oxshott, Pebblecombe, Princes Coverts, Selsdon, Silvermere, Sixty Acre Wood Chessington, Tilburstow Hill, Titsey, Walton Res., West Humble, Weybridge, Worms Heath (m.o.).

3. COMMON SHREW. *Sorex araneus* L.

B, E & H—No records.

K Badgers Mount, one lying dead on a path May 14 (PK). Beckenham Place Park, one found dead in a bottle on May 25 (PK). Sundridge

Park, two dead in bottles Feb. 20 (PK). Nr. West Wickham, 11 found dead in bottles Feb. 27 (PK).

M Harefield Grove, one seen on Sept. 17 (IGJ). Harlington, one brought in by a cat July 19 (AP). N. Finchley, one brought in by a cat Sept. 27 (JTB).

S Once again this county has been given extensive coverage. Animals seen alive: one running about in a field at Oxshott on Apr. 10 (HK). Three under metal sheets at Weybridge on Sept. 22 (GHG). Animals found dead: Bookham Common, one on June 12 (GB). Caterham, one on June 11 (PJW). Oxshott, 1 dead on the road Sept. 27 (MK). Pebblecombe, one on June 19 (IRB, LAB).
Trapped in Longworth traps: Bookham Common, four in Aug. (KAJG). Oxshott, two on Mar. 31, three on May 11, and one on Aug. 20 (HK). Princes Coverts, one on May 30, 5 on Sept. 24(IRB, LAB).
From Owl Pellets: Caterham, 17 on June 4 (PK). Holmethorpe, two on Sept. 24 and one on Oct. 22 (GB, DW). Oxshott, one on May 16 (HK). Richmond Park, five on Jan. 24 (MG).
Found dead in bottles: Chelsham, five on Feb. 26 (PK). Chessington, five on Jan. 9 (IRB, LAB). Claygate, one on Mar 18 (HK). Cobham, six in Jan. and Mar. (IRB, HK, PAM). Egham, five in Feb. and Mar. (PAM). Esher, one on Jan. 23 (PAM). Fairmile Common, ten on Apr. 3 (HK). Godstone, two on Jan. 1 (IRB, PAM). Hersham, two on Sept. 8 (PAM). Leatherhead, three on Apr. 12 (HK). Mickleham, one on July 23 (IRB, LAB). Nutfield, one on Nov. 13 (IRB, LAB, PAM). Oxshott, total of ten on several dates (IRB, HK, PAM). Richmond Park, one on Apr. 11 and June 14 (PAM). Surbiton, four on Jan. 7 (PAM). Thorpe, one on Mar. 16 and May 30 (GHG, PAM).

4. PYGMY SHREW. *Sorex minutus* L.
B, H, K & M—No records.

E Brentwood, one found dead on July 15 (RBW). South Weald, one found dead on Sept. 17 (RBW).

S Esher Common, one caught by hand on July 10 (HK). Chaldon, one found dead on a path Apr. 9 (PK). St. George's Hill, Weybridge, one caught in a Longworth trap in a garden rockery on Sept. 10 (GHG).
From Owl Pellets: Caterham, one on June 4 (PK). Holmethorpe, one on Sept. 24 (GB, DW). Richmond Park, one on Jan. 24 (MG) and May 1 (HK).
Found dead in bottles: Egham, one on Mar. 16 (PAM). Mickleham, one on July 19 (IRB). Oxshott, one on Feb. 13 (IRB).

5. WATER SHREW. *Neomys fodiens* (Schreber).

K Near West Wickham, one dead in a bottle on Feb. 27 (PK).

S Princes Coverts, one caught in a Longworth trap on May 15 (IRB, LAB).
From Owl Pellets: Caterham, two on June 4 (PK). Holmethorpe, one on Aug. 6 (GB, DW). Thorpe, one dead in a bottle on Mar. 16 (PAM).

CHIROPTERA

A paper on the Bats of the London Area appears elsewhere in this issue. For the sake of completeness of the Mammal Report, records for 1966 are also included here.

11. Whiskered Bat. *Myotis mystacinus*. (Kuhl).
S Godstone, found hibernating as follows: two on Jan. 1, seven on Mar. 13, six on Dec. 10 (IRB, LAB, PAM, DWY).

12. Natterer's Bat. *Myotis nattereri* (Kuhl).
S Godstone, two hibernating on Jan. 1 (IRB, PAM, DWY).

14. Daubenton's Bat. *Myotis daubentoni* (Kuhl).
S Godstone, five hibernating on Jan. 1 and four on Mar. 13 (IRB, LAB, PAM, DWY).

16. Serotine. *Eptesicus serotinus* (Schreber).
S Hersham, a colony of 15 or 16 in a loft of an occupied house during the summer (IRB, PAM).

19. Pipistrelle. *Pipistrellus pipistrellus* (Schreber).
S Esher, caught in mist nets as follows: one on June 17, June 29 and July 10, three on June 30 (HK, PAM).

21. Long-Eared Bat. *Plecotus auritus* (L.)
S Godstone, three hibernating on Jan. 1 and one on Dec. 10 (IRB, LAB, PAM, DWY).

CARNIVORA

24. Fox. *Vulpes vulpes* (L.)

Following the publication in 1966 of the survey of the Fox in the London Area (Teagle 1967), it is to be hoped that London Natural History Society members and anyone else interested in the London Area will be stimulated to send details of every fox they see to the Mammal Recorder. In this way it should be possible a few years from now to make a useful comparison with the situation as it is known to-day.

Apart from sight records of the animals themselves, foxes may be traced fairly easily. The earth, a hole often rather bigger than a large rabbit hole, is found usually in a hedge or wood, bank, etc. More unusual sites are quite frequent in the London Area, as the fox adapts itself well to suburbia. If the earth has been recently occupied remains of the fox's meals are strewn about. Feathers and bones are most often found. The pungent scent of a fox, once recognised, is quite unmistakeable. It is invariably present at an occupied earth. Fox hairs, which are brown and white, often with black tips, may be found in the diggings thrown out of the earth.

Foxes were recorded from the following localities:
B No records.
E Harold Wood (RBW). Woodford Green (BHF).
H Potters Bar Area. Over 40 sightings, in several different places, of up to five including cubs (JRW, RPW). Whetstone, one on Oct. 2 (AM per GB).

K Beckenham Place Park, Bellingham, Bexley, Blackheath, Bromley, Chislehurst, Danson Park, Dartford Heath, Eden Park, Elmers End Sewage Farm, Eltham Park, Eynsford, Forest Hill, Lee, New Eltham, Oxleas Wood, Shooters Hill, Welling, West Wickham, Woolwich (m.o.).
M Bayhurst Wood, Bedfont, Bush Hill Park, Bushy Park, Cranford, Hampstead, Harrow, Osterley Park, Rickmansworth, Ruislip, Ruislip Local Nature Reserve, Wembley Park (m.o.).
S Bookham Common, Chessington, Dulwich, Esher, Godstone, Kenley, Mickleham, Oxshott, Princes Coverts, Sutton, Thorpe, Wallington, Walton, Wimbledon, Wimbledon Common (m.o.).

27. STOAT. *Mustela erminea* L.
K Southend Pond, one seen on Oct. 26 (JH).
S Buckland, two dead on a gamekeeper's gibbet in Dec. (AJG). Headley Heath, one on Apr. 12 (PJW).

28. WEASEL. *Mustela nivalis* L.
H Hawkshead, near Brookman's Park, singles seen on Jan. 10, Mar. 7, Apr. 30, May 17 (JPW, RPW). West Hyde, one crossing on road on Feb. 15 (IGJ).
K Eynsford, The Birches, one seen in June (PK). Ruxley G.P., one on Apr. 23. Another on Apr. 30 was seen to climb out of a Blackbird's nest which contained three broken eggs (DJM).
M Bedfont, May 14, one dead on Stanwell Road (PJE). Heathrow, one crossing the Airport perimeter road on Aug. 4 (AP). Poor's Field Ruislip, one watched for several minutes on July 10 (AFB).
S Bookham Common, one on Aug. 7 (EMF). Buckland, six dead on a gibbet in Dec. (AJG). Coulsdon, one seen in a garden on Oct. 27 (PJW). Epsom Common, one found dead on B280 on May 30 (IRB, LAB). Petersham Common, one seen (EM-R). Thorpe, singles at the same spot on Aug. 21 and Sept. 10 (GHG).

31. BADGER. *Meles meles* (L.)

Badgers are almost invariably fully nocturnal in the London Area, usually owing to disturbance. They are probably more common than most people would think.

Badgers, quite unmistakable when seen, are, like the Fox, quite easy to find by their traces. Setts are most common in sandy soil and chalk downland: active setts are usually obvious by the out-pourings of sand or chalk from the entraces. These are often set into a slope. There is no smell in comparison with an active fox earth.

Badger hairs may be found in the earth outside the holes. These hairs are quite coarse and usually alternately coloured black and white along the length of the hair.

A paper will shortly be published on the result of the Society's enquiry into the distribution of the Badger in the London Area.

Even now, in the London Area Badgers are still molested and in view of the presence of active Badger digging teams on the outskirts of the area it is not proposed to publish any details of occupied setts. Much information on the Badger and its distribution is still needed by the Society, especially for the Essex sector of the area.

ARTIODACTYLA

There are three species of deer at present living wild in the London Area. These are the Fallow, Roe and Muntjac.

DEER SPP.

S Tracks of unidentified deer have been found on several occasions in mud in Princes Coverts and 60-Acre Wood.

Large tracks seen are presumed to have been made by some Red Deer which escaped from Chessington Zoo recently. The smaller tracks seen were believed to be those of Fallow Deer. Some of these have escaped from Chessington Zoo in the past and are probably established in very small numbers in the area.

45. ROE DEER. *Capreolus capreolus* (L.)

The Roe appears to be spreading slowly into the southern counties of the area (Burton 1966).

There are now two or three definite records on the eastern and northern side of the R. Mole. Observers on the Surrey North Downs and Commons in particular are asked to report all traces of Roe Deer at once to the Mammal Recorder who lives in the area and will gladly visit any locality discovered.

S Barrow Green, one seen in Dec. (AJG).

47. MUNTJAC. *Muntiacus sp.*

Two species of this small deer were introduced into Britain. One is now believed extinct but records are still probably best allocated simply to the genus.

The Muntjac is spreading quite rapidly in suitable areas of Britain. It has recently been recorded in several woodland areas around Potters Bar, Herts. It may be reasoned that it is quite probably present in some woodland areas east of the R. Colne and in the Enfield area. Observers in this area are asked to keep a special watch for this attractive little deer as it is showing definite signs of spreading into the North and West suburbs.

H 16 dated sightings in woods around Potters Bar (JPW, RPW.)

S Barnes, Putney and Castlenau, one reported from these localities was finally caught on Jan. 6 on Barnes Common. It was kept at Richmond Park until its release elsewhere (PAM, DWY).

LAGOMORPHA

53. HARE. *Lepus capensis* L. (*L. europaeus* Pallas).

Hares are typically animals of open grassland and most of the records tend to come from the more rural outskirts of the area. More records would be welcome.

E Childerditch, one on May 14 (RBW).

H Leggetts Park, two at 05.00 hours on May 14 (JPW, RPW). Northaw, one crossing the road July 9 (MEK). West Hyde, one on Feb. 19 (IGJ).

K Brasted, one on Apr. 3. Clement St. two in May. Horton Kirby, eight, seven together fighting in a field, Apr. 11 (RVW).

M Little Britain Lake, one on Apr. 10 (AP). London Airport, up to 40 regularly (AP, HE). Northolt Airfield, two on June 30 (IGJ).

S Addington, two on May 1 (TRS). Caterham, one dead on the road June 11 (TRS). Egham, one dead on the road Sept. 29 (PAM). Richmond Park, the Gamekeeper reported to PAM that Hares were still present but scarcer than before. Thorpe, three on Sept. 3 (GHG).

55. RABBIT. *Oryctolagus cuniculus* (L.)

There is an appeal for records of this species, along with other common species, in the general introduction at the beginning of this report.

Rabbits were recorded from:

B Colnbrook (PAM), Datchet (PAM), and Denham (IGJ).

E Brook Street (RBW), Epping and Tilbury (AF, BSM).

H Hadley Woods (JP, RPW), Leggatts Park (JP, RPW), Little Berkhamsted (MK), London Colney (WGT), Maple Cross (IGJ), Northaw Woods (JP, RPW), North Mimms Park (MK), St. Albans (WGT), Wells Woods (JP, RPW).

K Beckenham Place Park, Bromley, Elmstead Woods, Layham's Farm, Sundridge, Sundridge Park G.C. (PK), St. Paul's Cray (VG).

M Bayhurst Wood, Bedfont, Bentley Priory, Bushy Park, Cranford Park, Harefield, Harefield Place, Harlington, Hayes End, Little Britain Lake, London Airport, Longford, Old Park Wood, Perry Oaks S.F., Queen Mary Reservoir, Ruislip, Southall G.C., Staines, Staines Moor, Trent Park, Wraysbury (m.o.).

S Ashtead Park, Betchworth, Bookham Common, Caterham, Chelsham, Cobham, Egham, Esher, Ewell, Fairmile Common, Farleigh, Godstone, Headley, Island Barn Reservoir, Kempton Park Reservoir, Kew Gardens, Leatherhead, Mickleham, Oxshott, Oxted, Pebblecombe, Princes Coverts, Richmond Park, Selsdon Woods, Thorpe, Thorpe G.P., Tilburstow Hill, Tolworth, Wimbledon Common (m.o.).

RODENTIA

57. GREY SQUIRREL. *Sciurus carolinensis* Gmelin

Every record of Grey Squirrel is required. It is a frequent inhabitant of small parks, clumps of trees, gardens, woods and hedgerows. There must be thousands of localities in the London Area which might hold a squirrel or two.

In the suburban parks they are often incredibly tame, climbing onto people's laps to be fed.

A litter was raised in a house roof in New Malden, Surrey; and one in East Finchley, Middx., one was to be heard frequently at 2.00 a.m. scampering round the loft of the observer's house.

Squirrels appear to have been entering houses for food in the Esher area for some time. It is apparently not unusual to find squirrels squatting in the kitchens, waiting for food, in this area. No doubt such habits occur elsewhere. The Recorder would be interested in any notes on the adaptability of squirrels to suburban life.

Squirrels are frequent road casualties. 91 were recorded in this way in 1966.

B No records.

E Harold Wood, Holden's Wood, Thorndon Park, Warley, and Weald Park (RPW).

H London Colney (WGT), Potters Bar (MK), St. Albans (PAM, WGT), Whetstone (AM per GBJ).

K Beckenham, Biggin Hill, Blackheath, Bromley, Chislehurst, Eden Park, Elmers End, Elmstead Woods, Greenwich Park, Keston, Kidbrooke, Ladywell, Layham's Farm, Lee, Lullingstone Park, Mayo Park, Mottingham, Orpington, Sidcup, Southill Park, Sundridge, Sundridge Park, Sydenham, Westerham (m.o.).

M Bayhurst Wood, Broomfield Park, Bush Hill Park, Bushey Park, Camden, Ealing, Eastcote, East Finchley, Enfield, Enfield Chase, Gladstone Park, Hampstead, Harefield Place, Harrow Weald, Hatch End, Hayes, Hendon G.C., Laleham, Lavender Hill, Moor Park, North Harrow, Northolt, Old Redding, Osterley Park, Pinner Park, Regents Park, Ruislip, Ruislip Park and Lido, Stanmore Common, Turner's Wood, West Ruislip G.C., Winchmore Hill, World's End G.C. (m.o.).

S Addington, Arbrook Common, Ashburton Park, Ashtead, Ashtead Park, Banstead, Barnes Common, Beddington Park, Bookham, Boxhill, Brixton, Brockwell Park, Burgh Heath, Carshalton, Chaldon, Chertsey, Chessington, Chipstead Woods, Cobham, Coulsdon, Dulwich, Egham, Epsom, Epsom Common, Ewell Village, Ewell Court Park, Esher Common, Fairmile Common, Farthing Downs, Godstone, Grange Park, Hersham, Hinchley Wood, Kew Gardens, Kingston, Langley Bottom, Leatherhead, Limpsfield, Littleheath. Woods, Malden, May's Green, Motspur Park, Oxshott, Princes Coverts, Putney, Petersham, Redhill, Richmond Park, Roehampton, Selsdon Woods, Stoneleigh, Surbiton, Sutton, Thames Ditton, Thorpe, Tolworth, Tulse Hill, West Ewell, Weybridge, Whyteleaf, Wimbledon, Wimbledon Common, Worcester Park (m.o.).

61. Harvest Mouse. *Micromys minutus* (Pallas)

Since the publication of *The Harvest Mouse in the London Area* (Teagle 1964), there has been an increase in the localities from which this animal has been recorded. This is probably because more people are becoming aware of the localities at which it might be found.

K West Wickham, three found dead in bottles on Feb. 27 (PK).

S Esher, nests found in long grass on three dates (HK, PAM). Oxshott, one found dead in a bottle, Jan. 30 (IRB, LAB, PAM). Thorpe, one caught Sept. 18 (GHG).

62. Wood Mouse (Long-Tailed Field Mouse) *Apodemus sylvaticus* (L.)

B Colnbrook, one caught by hand, May 24 (PAM).

M Bedfont, singles found dead on road on Nov. 8 and 25, Dec. 12 (PJE). Laleham, two in a nest under a metal sheet, Apr. 24 (GHG).

S Animals found alive, not trapped: Chessington, one caught by hand in a ditch on Jan. 8 (IRB). Egham, six caught on Apr. 16 (PAM). Park Estate, Petersham, a flourishing diurnal colony (EM-R).

West Ewell, one eating bread on a garden lawn, among the sparrows on Aug. 10 (IRB, LAB). One on Dec. 31 sitting on bicycle handlebars in a garage (IRB, LAB).

Animals found dead: Beddington S.F., one on Apr. 11 (PJW). Cobham, one dead on road May 12 (HK). Hinchley Wood, one dead on the cycle track of the A3, May 4 (IRB).

Trapped in Longworths: Chessington, 60-Acre Wood, two on Nov. 28 (IRB). Esher, one at West End on Apr. 3 (HK). Oxshott, 21 between May 13-24 (HK). Princes Coverts, 39 during the year (IRB,

LAB). West Ewell, one in a garden on May 29 (IRB, LAB). Weybridge, five caught in one trap in an old garden, in four days (GHG).
Owl Pellets: Nil.
Found dead in bottles: Mickleham, two on July 23 (IRB, LAB). Oxshott, one on Jan. 30 (IRB, LAB, PAM) and one on Nov 28 (HK). Princes Coverts, one on Apr. 24 (IRB).

63. YELLOW-NECKED MOUSE. *Apodemus flavicollis* (Melchior).

K Near West Wickham, one dead in a bottle Feb. 27 (PK).

S Cobham, two found dead in a garden, Mar. 31. One dead in a house cellar Dec. 11 and one caught in a Longworth trap in an apple store in the same house on Dec. 23 (HK). Oxshott, one very freshly dead in a bottle, Jan. 30 (IRB, LAB, PAM). Princes Coverts, one caught in a Longworth trap on Sept. 25 (IRB, LAB).

62/63. *Apodemus* sp.

The following are records of mice found dead in bottles in which the remains were not critically examined. It is very difficult to distinguish the skulls of *A.sylvaticus* and *A.flavicollis* with certainty.

K Elmers End two, Grove Park Station three, Ravensbourne Station one, West Wickham, six (PK).

M Hampstead, one in Nov. (PAM). Queen Mary Res., one (HK).

S Chertsey, three (PAM), Claygate, one (HK), Cobham, 11 (HK), Esher, one (PAM). Fairmile Common, four (HK), Hersham, one (PAM). Oxshott, four (HK, PAM), Surbiton, two (PAM), Walton Res., one (HK). From Owl pellets: Beddington, two (PJW), Caterham, two (PK). Selsdon, three (PK).

67. BANK VOLE. *Clethrionomys glareolus* (Schreber).

As with almost all the other species of small mammals, the records for the Bank Vole show a great bias towards Surrey. This is, of course, caused by the distribution of observers and in no way can be related to the distribution of the animal itself. It is worth noting that all but one or two of these records are the work of three people.

A series of "live trapping" experiments were conducted in Princes Coverts during the year. The Bank Vole proved to be by far the commonest animal I caught. It was trapped more frequently, in the newly planted conifer plantations, than any other animal and was deemed responsible for the wholesale destruction of conifer seedlings a foot high, by "stripping" the bark from the main stem of each plant.

B and E—no records.

H London Colney, one caught in a Longworth trap Oct. 2 (WGT).

K Ravensbourne Station, four found dead in bottles May (PK). West Wickham, nine dead in bottles on Feb. 27 (PK).

M East Bedfont, one seen Feb. 6 (PJE).

S Animals, seen alive, not trapped: Oxshott, one under tin Mar. 27 (HK).
Animals found dead: Esher, one extracted from the stomach of a dead Tawny Owl, Jan. 2 (HK).
Trapped in Longworth traps: Bookham Common, three in August (KAJG). Oxshott, a total of 12 on several dates from Mar. 30 to May 24 (HK). Princes Coverts. A total of 54 on ten dates from February to October (IRB, LAB). Sixty-Acre Wood, Chessington, nine on Nov. 28 (IRB).

From Owl Pellets: Caterham, four on June 4 (PK). Princes Coverts, 11 on Feb. 20 and ten on Apr. 8 (IRB). Richmond Park, two on May 1 (HK) and one on Dec. 30 (GB). Selsdon four in Feb. (PK).
Dead in bottles: Chelsham, four on Feb. 26 (PK). Chessington, eight in Jan. (IRB). Claygate, one on Mar. 18 (HK). Cobham, one on Jan. 30 (IRB) and four on Mar. 14 (HK). Egham, three on Feb. 18 and one on Mar. 16 (PAM). Esher, two on Feb. 15 (PAM), Fairmile Common, five on Apr. 3 (HK). Hersham, one on Sept' 8 (PAM), Leatherhead, three on Apr. 12 (HK). Nutfield, one on Mar. 13 (IRB, PAM), Oxshott, one on Feb. 13 (PAM).

68. WATER VOLE. *Arvicola terrestris* (L.)

This is the only small mammal which does not show a bias towards Surrey in the number of records received. A considerable number of records were received from Middlesex. The reasons for this appear to be that Middlesex has a large number of suitable localities (lakes, rivers, canals, G.P.s, etc.) and these localities attract a fair proportion of London's Ornithologists, from whom some of these records come.

B Colnbrook, two on Apr. 30 (PAM).

E Epping, one on May 7 (AFM).

H Maple Cross, *c.* 10 on Oct. 15 (IGJ). West Hyde, three on Apr. 18 (AP) and three on Oct. 15 (IGJ).

M Described as common between Uxbridge and Rickmansworth on the R. Colne and the Grand Union Canal (IGJ). Bayhurst Wood, one on Oct. 29 (AP). Cuffley Brook, Whitewebbs Park: Several on Dec. 22 (PAMy). Harefield Moor, one on Mar. 13 (AP). Little Britain Lake, two on July 18 (AP). Perry Oaks S.F., one in the R. Colne on Aug. 21 (PAF). Ruislip L.N.R., one on June 14 (PAMy). Shepperton, one dead on road Mar. 16 (PAM). Staines Moor, up to four on several dates throughout the year (AP). Yeading Brook, Northolt, seven on June 30 (IGJ).

S Bookham Common, one on May 22 (FCR). Chertsey, much activity on the R. Bourne during the summer (GHG). Esher, hundreds of tracks in mud, R. Mole (IRB, PAM). Godstone, four at Godstone Ponds in Apr. (PK, PJW). Holmethorpe, 11 from Tawny Owl pellets, during the summer (GB, DW).

69. FIELD VOLE ((Short-tailed Vole). *Microtus agrestis* (L.)

B, E and H—No records (although one or two were received from just outside the 20 mile boundary).

K Ravensbourne Station, one dead in a bottle May 25 (PK). West Wickham, four dead in bottle on Feb. 27 (PK).

M Bushey Park, one caught and released on Feb. 12 (PAM), three in a fox dropping on Mar. 22 (IRB, PAM). Cranford Woods, one under "tin" Apr. 17 (AP). Hampstead Heath, five in Tawny Owl pellets in Mar. (KES). Harlington, one found dead in a garden (AP). Little Britain Lake, several, including young in nests, found (AP). Southall, two nests on a railway bank Mar. 20 (AP).

S Animals seen alive: Beddington S.F., one on Oct. 9 (KAJG). Chertsey, two caught and released Feb. 28 (PAM). Kew, seen occasionally (EM-R). Oxshott, caught and released on several dates in Jan. and Feb. (IRB, LAB, HK, PAM). Surbiton, S.F., two seen plus 12 nests found Jan. 7 (PAM). Thames Ditton, four caught and released (PAM).

Animals found dead: Bookham Common, one on May 8 (FCR). Mitcham Common, one recovered from a Kestrel, Mar. (PAM). Princes Coverts, three in a fox dropping Jan. 8 (IRB).

Trapped in Longworth traps: Bookham Common, three in Aug. (KAJG). Esher, two on Apr. 3 and Apr. 6 (HK). Oxshott, a total of 18 between Mar. and May (HK). Princes Coverts, a total of 10 between Mar. and May (IRB, LAB). Sixty-Acre Wood, Chessington, one on Nov. 28 (IRB). From Owl Pellets: Beddington S.F., seven on May 1 (PK). Caterham, 37 on June 4 (PK). Ham, 56 during the first half of the year (GB). Holmethorpe, three Aug. to Oct. (GB, DW). Princes Coverts, six on Feb. 20 (IRB). Richmond Park, 118 on Jan. 24 (MG), eight on May 1 (HK), and one on Dec. 17 (GB). Selsdon, one in Feb. (PK).

Dead in bottles: Chessington, two on Jan. 9 (IRB). Cobham, one on Mar. 14 (HK), Fairmile Common, five on Apr. 3 (HK). Oxshott, one on Feb. 13 (PAM) and five on 7ar. 16 (HK). Surbiton S.F., two on Jan. 7 (PAM).

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CORRECTION TO *LONDON NATURALIST, No. 46.*

PAGE 43.—HARVEST MOUSE. The record given as Brentford should read Brentwood S.F. A nest was found there on Sept. 5, 1964 by RBW.

Bats in the London Area

By Ian R. Beames

THE purpose of this paper is to discuss briefly what is known of the general habits of the various species of bats with particular reference to the London Area, and to present all the records of bats in the London Area for the five years 1962-1966 inclusive.

Much of the section on general habits is based on general observation and impressions which are not positively confirmed. The information given should thus be taken as a guide rather than a statement of fact.

No attempt is made to give very full physical descriptions of the various species, although their diagnostic points are mentioned. Detailed descriptions may be found in the *Handbook of British Mammals* (Southern 1964), *British Mammals* (Harrison-Matthews 1952) and *Identification of British Mammals* (Corbet 1964).

Bats are usually very difficult creatures to observe. Most species only fly when it is already too dark to see them very well and hence the time available, on any one day, for studying them in flight is limited to short periods around dusk and dawn.

Bats can be caught in flight or at rest. Catching a bat in flight is often quite difficult. Small bats may be caught by using a small area of mist-netting strung between two long canes; the whole being used like a large butterfly net. Bats are best caught, like butterflies, with a following stroke of the net. They are very adept at avoiding the lunging net of a "wicket-keeping" batter.

Large bats can occasionally be caught in flight by using a large stationary mist-net. Small pebbles are used as "bait". These are thrown in front of the oncoming bat, persuading it to stoop after the pebbles, which it believes are insects, and thus dive into the net. It should be noted that bats are much more difficult to extract from mist-nets than are birds. These methods of catching bats are fully described in Hancock (1963) and Cranbrook and Barrett (1965).

Obtaining bats at rest is easier than catching them in flight. Finding summer roosts or winter hibernacula is usually a matter of pure chance, although Hancock (1963) describes a feasible way of finding summer roosts. Bats may be seen entering or leaving holes in roofs or trees. When bats are located in this way some may be caught easily, although a little ingenuity and planning may be needed at the outset.

Bats are seen more easily where they occur in some numbers. The solitary bat flitting down a hedgerow in the half-light of dawn or dusk is easily missed; whereas even a small group of bats is much more obvious. There is thus usually a bias in the number of records towards localities at which bats congregate.

Bats will gather in larger numbers where there are concentrations of insects. Large bats, such as Serotines and Noctules may frequently be seen over sewage farms where there are large numbers of insects. Lakes and ponds, even reservoirs, attract large swarms of insects especially in late summer. Small, and occasionally, large bats occur in some number over and around many of these waters.

In the London Area, as elsewhere, places which provide a bat with a good hunting "beat" are well worth observation. Besides the ponds

and sewage farms already mentioned, rivers and canals which abound in the west and north-east parts of the London Area in particular, provide ideal hunting grounds for hungry bats. Small bats frequently hunt along tall hedgerows and paths which are fringed with bushes and trees. A two poled mist-net or a large butterfly net may be used to considerable advantage in such places. Bats which have been caught in this way often prove to be a species other than the ubiquitous Pipistrelle.

During the winter bats in the British Isles hibernate. Some species are found predominately in caves, whilst others hibernate in trees and buildings. There are few natural caves in the London Area but in the south there are some extensive mines in the Greensand. There are also a few holes and mine tunnels in the chalk of the North Downs, many of which often contain hibernating bats. These mines and tunnels are undoubtedly unsafe, and many have now collapsed, effectively barring access to bats and humans alike.

GENERAL HABITS

Eleven of the fifteen species of bats recorded in Britain are known to have occurred in the London Area. Of these, only the Lesser Horseshoe Bat has not been recorded in the five years under review. Of the ten species which have been recorded during this period, three species, the Greater Horseshoe Bat, Leisler's Bat and the Barbastelle, have one or two records only. The other seven species are recorded regularly.

From information collected over the country as a whole, it is reasonably clear that individual species of bats may have very different habits.

The Greater Horseshoe Bat is a large bat with a wingspan of about 13 or 14 inches. It is predominantly light grey brown in colour. Its most unusual feature is the "nose-leaf" which makes it quite unmistakeable. It has a fluttering flight, often very near the ground. Its wings are markedly rounded.

During the summer it usually lives in house roofs and cellars. It hibernates during the winter in caves and disused mines. It is a gregarious animal and is sometimes found in large numbers. This species is found principally in the south and west of Britain, and there are few past records for the London Area. It was seen in the early part of this century in Chislehurst caves, at Godstone caves in 1951 (D. L. Harrison, pers. comm.) and at Oxleas Wood, Kent in 1953 (R. G. Rigden, 1955).

It would appear that its status has not changed and it seems to be very unusual in the London Area.

The Lesser Horseshoe Bat is similar in appearance and habits to its larger relative. It is quite a small bat with a wingspan of eight or nine inches. It was last recorded in the London Area in 1939 when one was caught in a butterfly net near the Serpentine in Hyde Park (M. Blackmore). Prior to this two were taken from the porch of H. G. Wells's house in Regents Park in 1926 (B. Vesey-Fitzgerald). There are even older records from Godstone and Chislehurst caves.

The Whiskered Bat is a small species, being just a little larger than a Pipistrelle. The fur of its upper parts is very dark. The under-surface is usually lighter in colour as in most bats. The Whiskered Bat has a black face, black ears and a thin pointed black tragus. It flies rather like a Pipistrelle but is said to be erratic and slower. It is believed to fly often

by day, as does the Pipistrelle. No information is available in the London Area on the sites of its summer roosts, but in the country as a whole it uses buildings quite often and occasionally holes in trees. In the winter it commonly hibernates in caves and mines.

Natterer's Bat and Daubenton's Bat are both medium-sized species having a wingspan of about 10 or 11 inches.

Natterer's Bat is brown above and has very white fur on its underside. It has a very pink face and large ears which extend beyond the tip ofits nose when laid forward. Daubenton's Bat is rather similar but its underside fur is a grey-white. Its ears are much shorter and it has a less pink face. Its feet are considerably larger than those of the preceding two species.

In common with the Whiskered Bat, nothing is known of their summer roosting places in the London Area. Both species are gregarious and colonies are believed to use buildings and holes in trees for their roost. They are both found regularly in caves and mines during their winter hibernation.

The Long-Eared Bat* is the last of the four London species regularly found hibernating in caves during the winter. This bat is a medium-sized species with a wingspan of about 10 inches. It possesses enormous ears, over half the length of its body in size. At rest it tucks these away under its wings. When half awake the ears are curled outwards but with the tips still tucked under the wings. The folded ears may give rise to some doubt as to the bat's identity if it is seen at rest.

Colonies occupy roof spaces in houses and churches during the summer, although no such colony has yet been found in the London Area.

Its flight is punctuated with some glides and it often hovers near bushes and trees in order to pick insects from the foliage.

The Daubenton's Bat is also known as the "Water" Bat from its habit of skimming an inch or so above the water surface. In the London Area most of the Daubenton's Bats caught in flight have been taken over or near water. However, all bats seen flying over water should not be automatically regarded as Daubenton's Bat as in the London Area the bat most frequently caught over or near water is the Pipistrelle. Besides the Pipistrelle and Daubenton's Bat, Whiskered and Long-Eared Bats have both been caught beside ponds and it is to be assumed that they also fly over the water.

It has often been thought that hibernation among such animals as Hedgehogs and Bats is a continuous process lasting unbroken from late autumn until about Easter. The records of hibernating bats in the London Area show that this is not always so and that there is considerable movement among the populations of hibernating bats. These never appear to be static for any length of time, even given the absolute minimum of disturbance. Many individuals awake and change their hibernating site several times during the winter, and may occasionally be seen flying on a cold winter's day.

Records for the past 20 years for Whiskered, Natterer's, Daubenton's and Long-Eared Bats are mainly confined to the southermost fringe of the area.

*There are actually two species of Long-Eared Bat in Britain—the Common Long-Eared (*Plecotu auritus*) and the Grey Long-Eared (*Plecotus austriacus*). They are virtually identical in the field. The presence of the Grey Long-Eared Bat in Britain has only recently been described (Corbet 1964a) and (Stebbings 1967). All the Long-Eared Bats critically examined in the London area seem to be *Plecotus auritus*.

The Noctule, Serotine and Leisler's Bat are all very similar in appearance and are here dealt with together. All have a wing-span of from 12 to 15 inches. The wings of the Noctule and Leisler's Bat are long and quite narrow. The Noctule is covered with silky golden-brown fur, while Leisler's Bat is usually very much darker in colour, although its overall shape is very similar. It is indistinguishable in flight from a small Noctule. Both have broad heads, blunt faces and rounded ears. The tragus is short, not pointed and broader than it is long.

The Serotine is about as large as a Noctule but its fur is conspicuously darker. It has a much more fox-like face. Its ears are longer and more pointed, as is the tragus. The last two joints of the Serotine's tail project about a quarter of an inch beyond the surrounding membrane. This is unique amongst British bats.

The broader wings of the Serotine may help to distinguish it from the Noctule in flight but this may be apparent only when the two species are flying together as they do over some sewage farms and large ponds in the London Area.

The Noctule is one of the first bats to appear in the evening, usually some half an hour before the Serotine. Its flight is rapid and powerful, with swift dashing movements, often at considerable height, while the Serotine's flight is regarded as heavier and less agile than the Noctule (Blackmore, 1963).

Both the Noctule and Leisler's Bat usually roost in trees in summer. From the scanty information in the British Isles generally, Leisler's Bat more readily inhabits the edges of the built-up area (Blackmore, 1963); the two recent London records of Leisler's Bat are from suburban locations. The only other for the area is of one at Abbey Wood, Kent in 1953 (Rigden, 1955). This bat is regarded as rare throughout Britain, with the exception of Ireland.

The Noctule prefers large woods and well-timbered parks. Its summer roosts are usually in holes in trees, such as old Woodpecker holes, or in hollow trunks of trees. In the London Area all recorded roosts are from such places. In particular it seems to favour holes in beech trees, although this may purely be that occupied holes in beech trees are easier to locate than in other trees. It also lives in house roofs occasionally but has not been found like this in the London Area.

In large woods colonies may move from one tree to another during the summer. In one locality on the beech covered slopes of the North Downs this is known to occur quite frequently.

Noctules are very gregarious and noisy animals. It is sometimes possible to locate summer dens in trees, by standing still in a quiet wood where large bats occur, and listening for the squeaks coming from the den. These noises may be heard at a distance of 20 or 30 yards. Another useful sign of a hole used by Noctules is the stain down the outside of the tree below the hole, caused by the bats' droppings. This must be distinguished from a rain-filled hole spilling water down the trunk.

Blackmore (1963) believes that Noctules favour the roofs of buildings in winter. Dutch workers mention seven hibernacula containing about four hundred bats, all in trees, although they also mention mid-European workers who report it hibernating in buildings. So far only one record of hibernating Noctules has occurred in the London Area. This was of two bats in a beech tree in Weybridge and is mentioned in the systematic list in this paper.

The Serotine usually lives in buildings during the summer. This is borne out by the fact that four roosts so far found in the London Area have been in buildings and one was found using a hollow tree in a garden. (G. H. Gush in Hancock, 1963).

Hancock has described (1963) in great detail his observations of a Serotine roost in a house near Bletchingly, Surrey. This roost is still in existence. The most recently recorded roost was found in 1965 in Hersham, Surrey. This colony of some 12 or 15 bats were breeding in the loft of an ordinary semi-detached house. They emerged from holes under the eaves at both ends of the house. These bats were likely to be destroyed by the residents who had recently cut a trap door into the loft. The loft had previously been sealed and the colony had apparently been undisturbed for some years.

While the residents here had no objections to the bats themselves, they objected to the considerable squeaking, especially that caused by the young bats. In addition the bats emerged exactly over the front door of the house, thereby bombarding callers and members of the household alike with droppings.

With the co-operation of the householders these bats were removed to another site in 1966.

No winter hibernacula of the Serotine have been found in the London Area. Indeed, very little information seems to be available on the hibernation of the Serotine in Great Britain as a whole. Neither Blackmore (1963) nor Southern (1964) mention the subject, although Southern (1964) states that it is rarely found hibernating in caves. It has not been found in any caves in the London Area. Presumably it hibernates in trees, or buildings or perhaps both. In view of its frequency in the London Area, especially in the south, this seems to be worth further study.

The Pipistrelle is generally regarded as the commonest bat in the British Isles. From the records this statement appears to apply equally well to the London Area. It is the smallest British bat, having a wing-span of about eight inches, just a little smaller than a Whiskered Bat. It has a very dark, almost black, back and its underparts are dark brown. It has a small rounded tragus. It also has a post-calcarial lobe which is not present in the *Myotis* species. Pipistrelles may form considerable colonies using all sorts of nooks and crannies for shelter. In the London Area they have been found singly behind loose bark and overhanging ivy on a wall or in colonies in holes in trees and in buildings. Past records show a wide distribution. The flight is very fluttering and often quite low, usually along a regular beat round trees, a pond or down a lane.

The Barbastelle is a medium-sized bat with a wing-span of about 10 inches. The fur is black. The inner edges of its ears join just above the eyes, giving it a most distinctive appearance. In the past 50 years it has been recorded from Acton (1939), Richmond Park (1946) and Sidcup (1952) and twice during the five years under review. Little is known of this rare bat in the London Area. Records elsewhere suggest that it enters caves to hibernate only in extremely severe conditions, and otherwise presumably hibernates in trees.

INNER LONDON

The number of records of bats in Inner London has dropped sharply in the years after the Second World War. Apart from a Pipistrelle found dead in Holland Park in 1962 the last positively identified bat in Inner London was the Lesser Horseshoe Bat caught at the Serpentine in 1939.

A Long-Eared Bat was killed by a cat in Regents Park in 1925 and Daubenton's Bat has been recorded as having been taken on Blackfriars Bridge. There are no later records of bats identified in the hand from Inner London.

BATS AND MEN

Bats in the London Area and elsewhere are suffering, to a certain degree, at the hands of man. Many people will not tolerate the presence of a colony in their roof.

Older houses with good roosting sites make way for more modern ones with none. Trees are felled and hedges cut down in the London suburbs. Tree-dwelling bats lose their homes and often their feeding grounds. This has happened recently in the Epsom area where a large number of hedgerows have been removed. Besides the destruction of many other forms of wildlife, two species of small bats have vanished, no doubt forced to move to less disturbed ground.

Owing to increased disturbance by children and vandals some of the best cave localities for hibernating bats now usually have fewer species and individuals than formerly.

For example, Chislehurst Caves, once a location where hibernating bats occurred in some numbers, is now much used by humans and thus suffers considerable disturbance. Many tunnels and mines in the Chalk and Greensand have been completely or partially destroyed by quarry extensions and tunnel collapse. Some have even been used for mushroom cultivation. The Godstone hearthstone mines are being systematically sealed by the local council and it is to be assumed that the intention is to close them all. It is to be hoped that the entrances to those remaining are firmly sealed with suitable locked gates to allow access for the small bats using the caves as well as naturalists.

SYSTEMATIC LIST

Records based upon identification in flight are a useful guide, but are not wholly reliable. Therefore all records given in the following detailed account are of animals positively identified in the hand.

Nevertheless, flight records of unidentified bats are still of much interest as they frequently indicate what species might be present and it is then easier to decide how to go about the problem of catching one for positive identification.

Details of previous records of bats for the years 1900 to 1965 have appeared in earlier volumes of the *London Naturalist* (Fitter, 1949, 1950 and 1960; Rigden, 1955) and for the period 1957 to 1961 in *London Naturalist* No. 42 (Hancock, 1963).

Some records for individual years may be found in more recent volumes of the *London Naturalist* (Teagle, 1963, 1964 and 1965; Burton, 1966 and 1967).

The initials B, E, H, K, M and S are used to indicate the counties Buckinghamshire, Essex, Hertfordshire, Kent, Middlesex and Surrey respectively as in the usual convention.

All the records are those of P. A. Morris and D. W. Yalden accompanied recently by I. R. Beames, unless otherwise stated. Other individual observers' initials are quoted against their records.

INDIVIDUAL SPECIES

GREATER HORSESHOE BAT. *Rhinolophus ferrum-equinum* (Schreber).

S The sole record during the period is of one found hibernating in a chalk cave near Boxhill on Jan. 18, 1964. The cave itself was very unsafe and is now blocked.

WHISKERED BAT. *Myotis mystacinus* (Kuhl).

This species is more frequently recorded in hibernation during the winter months than at any other time. It is found regularly in small numbers in the Greensand mines at Godstone, Surrey and at Westerham, Kent from October to March. It has occasionally been found in a Chalk cave near Boxhill.

Detailed records are as follows:—

K Westerham Caves: Animals hibernating, 2 on Jan. 1, 1962; 1 on Jan. 13; 1 on Feb. 10 and 1 on Nov. 4, 1962; 1 on Jan. 26, 1964; 1 on Feb. 23, 1964 and 2 on Jan. 23, 1965. (JAB, GBC, WGT *et al.*).

S Godstone Caves: Animals all found hibernating, 5 on Dec. 22, 1963; 9 on Jan. 2, 1964; 10 on Jan. 18; 4 on Feb. 9, 4 on March 7; 6 on Nov. 28 and 7 on Dec. 28, 1964. 7 on Jan. 9, 1965; 7 on Feb. 6; 7 on Nov. 29; 2 on Oct. 30, 1965. 2 on Jan. 1, 1966; 7 on March 13 and 5 on Dec. 10, 1966.

Chalk cave near Box Hill: 1 on Dec. 8, 1963; 1 on Nov. 7 1964 and 2 on Nov. 28, 1964.

Bookham Common: 1 skull from a Tawny Owl Pellet (Beven, 1965).

NATTERER'S BAT. *Myotis nattereri* (Kuhl).

In common with the Whiskered Bat, this animal is recorded most frequently in hibernation at Godstone and Westerham.

H One caught by a cat at Wadesmill in Feb. 1964 (JJW).

K Westerham Caves: Animals in hibernation. 1 on Feb. 10, 1962; 5 on Jan. 26, 1964; 3 on Feb. 23, 1964 and 2 on Jan. 23, 1965. (JAB, GBC, WGT *et al.*).

S Godstone Caves: Animals hibernating. 4 on Dec. 22, 1963; 1 on Jan. 2, 1964; 5 on Jan. 18; 6 on Feb. 9; 4 on Nov. 7, and 2 on Dec. 28, 1964; 3 on Jan. 9 and 3 on Feb. 6, 1965; 2 on Jan. 1, 1966.

Cave near Box Hill: 1 on Jan. 9 and Jan. 30, 1963.

Reigate Cave: 1 on March 7, 1964.

Brockham Quarry: 1 behind loose Chalk in March 1964. (JS).

DAUBENTON'S BAT. *Myotis daubentoni* (Kuhl).

This bat, the third of the *Myotis* species regularly recorded in the London Area, is similarly a "cave" bat, being most easily located in caves during the winter.

Detailed records:—

K Westerham Caves: Animals hibernating. 2 on Jan. 13 and 2 on Nov. 18, 1962. 4 on Jan. 26 and again on Feb. 23, 1964. (JAB, GBC, WGT *et al.*).

S Godstone Caves: Animals hibernating. 3 on Jan. 18, 1964; 2 on Feb. 9; 1 on Nov. 7; 4 on Nov. 28 and 3 on Dec. 28, 1964; 3 on Jan. 9, 1965; 3 on Feb. 6; 1 on Mar. 29 and 1 on Oct. 30, 1965; 5 on Jan. 1, 1966; 4 on Mar. 13 and 1 on Dec. 10, 1966.

Godstone Ponds: Caught in flight (PJW *et al.*). 2 on May 20; 1 on May 28 and 1 on June 4, 1964 (BDH).

Chalk cave near Box Hill: Animals hibernating. 2 on Dec. 8, 1963; 1 on Jan. 2, 1964; 1 on Jan. 18 and 1 on Nov. 28, 1964.

Reigate cave: Animals hibernating. 2 on Mar. 7, 1964 and 2 on Jan. 9, 1965.

SEROTINE. *Eptesicus serotinus* (Schreber).

This bat is normally described as uncommon in Britain, being most frequently found in the Home Counties south of the Thames (Southern, 1964). In the London Area from the existing records it appears at first sight that this bat is more common than the Noctule. In particular in the Esher-Hersham-Oxshott area of Surrey, which is intensively watched, the Serotine is, at present, more frequently recorded. This is probably because of the Serotine's preference for roosting in buildings whilst the Noctule usually prefers holes in trees. The Serotine is thus both easier to find and easier to catch.

Detailed records:—

H 3 caught in flight during May 1963 at Rye Meads S.F. and mist-netted on several dates in 1964 at the same locality (JJW, RMRG).

S A breeding colony using an old house near Bletchingley has been in existence for at least ten years. The maximum recorded so far being 42 on July 12, 1964. This colony has been described by Hancock (1963).

3 were shot at Godstone on Sep. 27, 1964 and 1 at Caterham on Oct. 4, 1964 (RMcC).

1 found in Juniper Hall, Mickleham in July 1965 (JS).

Hersham: A colony using a house throughout the summer of 1965 had left by September. The same house was recolonized in 1966. 15 adults and 4 young were removed from the roof space July 4-6, 1966 to save them from destruction threatened by the residents.

LEISLER'S BAT. *Nyctalus leisleri* (Kuhl).

This species is generally regarded as rare throughout England (Southern, 1964), but it may well be overlooked in view of its great similarity to the Noctule.

There are two recent records, both in Surrey.

1 found on the pavement in Walton-on-Thames on July 21, 1964, apparently damaged by a cat.

1 found hibernating in a branch of a tree which had just been cut down in Kew Gardens on Dec. 20, 1965 (EM-R).

NOCTULE. *Nyctalus noctula* (Schreber).

As a result of the Noctule's tree-dwelling habits and its ability to fly high and strongly, it is very difficult to find its roosts and, in normal circumstances, even more difficult to catch. Hence, despite the fact that

this bat is regarded as one of the commonest bats in the British Isles (Southern, 1964), the detailed records are few.

H Rye Meads S.F.: 1 caught in a mist-net on June 2, 1962 (RMRG). Approximately 20 caught in mist-nets during May 1963 (JJW).
Broxbourne: 1 shot on Nov. 14, 1964 (RMcC).

S Esher: 10 caught emerging from a hole in an oak tree Sept. 3, 1962 (JA, PAM).
Weybridge: Singles found in a hollow beech tree, flooded out by melting snow, Mar. 4 and 7, 1963 (JA, PAM).
Beddington S.F.: Singles caught in flight on June 30, 1964 and July 2, 1964 (JAB, AMH).
Juniper Hall, Mickleham: 1 dead in the garden summer 1965 (JS).

PIPISTRELLE. *Pipistrellus pipistrellus* (Schreber).

This is regarded as the commonest British bat (Southern, 1964). There seems little doubt that many records of little bats seen flitting along hedges and over park ponds refer to this species. However, it has a great similarity to the Whiskered Bat in flight. Indeed, a few years ago a noted naturalist stated that the Whiskered Bat was the predominant bat on Esher Common, but in the five years under review here, despite frequent evening mist-netting sessions, the only bats caught there have been 17 Pipistrelles. This is an indication of the difficulty of flight identification of these creatures.

The Pipistrelle uses a large variety of roosts. It also flies at head height. It is thus one of the easier bats to find and catch.

E Epping Forest: 1 found behind loose bark of an oak in Monks Wood Aug. 25, 1962 (AL).
Ilford: 1 found dead on Feb. 6, 1964 (BTB).

H Rye Meads S.F.: Caught in mist-nets on the following dates, 3 on July 16, 4 on Aug. 2 and 1 on Sept. 23, 1962; 5 on Aug. 21, 1964 (RMRG).

K Lodge Farm: 1 found dead May 16, 1965 (PCT).

M Holland Park, Inner London: 1 found dead Mar. 27, 1962 (EPB, WGT).
Bushy Park: 3 caught in flight Aug. 2, 1963.

S Esher: Caught in flight as follows: 2 on July 25, 1963 and singles on Aug. 2 and 5, 1963. 2 on May 9, 1964; 2 on May 18, 1964; 1 on May 30, 1964; 2 on June 13, 1964 (PAM, DWY). 6 in June-July 1966 (HK).
Walton-on-Thames: 1 found by the Thames on Aug. 25, 1962. 1 on a wall Mar. 12, 1963. 2 caught in flight May 19, 1964.
Ewell: 1 flew in through an open bedroom window on Aug. 30, 1965 (IRB, LAB).
Beddington S.F.: 1 caught in flight June 30, 1964 (JAB, AMH).
Juniper Hall, Mickleham: several times in the house during the five years (JS).
Caterham Singles shot on Oct. 2 and 5, 1964 (RMcC).
Godstone Ponds: 4 caught in flight on May 22, 1964; 3 on May 28; 9 between June 1 and June 4 and 2 on June 24, 1964 (BDH, PJW *et al.*)

BARBASTELLE. *Barbastella barbastellus* (Schreber).

The two records of this rare bat are both from Surrey.
1 found in Juniper Hall, Mickleham in the summer of 1962 (JS) and 1 found hibernating near Cobham on Dec. 30, 1965.

LONG-EARED BAT. *Plecotus auritus* (L.).

This bat, perhaps the most striking of all the species found in the London Area, is the last of the four species recorded regularly hibernating in caves. This species is generally regarded as common in the British Isles (Southern, 1964), but this is not borne out by the London records, although they show a wide distribution. The total number of animals found hibernating in the caves in the London Area is far lower for this species than for the three *Myotis* species also found in these caves.

H Rye Meads S.F.: 1 caught in flight in May 1963 (JJW).

K Swanley: 1 found hibernating in a dene hole on Jan. 3, 1963 and 2 in the same place on Feb. 6, 1965 (JAB, Lew. NHS).
Plumstead: 1 found clinging to the front of a police car on Oct. 14, 1963 (RGR).

M Bushy Park: 1 caught in flight on Aug. 8, 1963.

S Godstone caves: 5 hibernating on Dec. 22, 1963. 2 on Jan. 18, 1964; 1 on Nov. 28 and 3 on Dec. 28, 1964. 3 on Jan. 1, 1966 and 1 on Dec. 10, 1966.
Chalk cave near Box Hill: 2 hibernating on Jan. 18, 1964.
Egham: 1 in a porch on Aug. 18, 1964 (DWY).
Juniper Hall, Mickleham: Found occasionally (JS).

DISCUSSION

Bats are probably the most difficult to identify of all the groups of British mammals and it is now generally recognised that sight identification in flight is well nigh impossible. This is not meant to discourage observers sending in records of unidentified bats. Indeed, the more of these that are received, the better, as it enables plans to be formulated for tackling the identity of these unknown bats.

Records of roost, hibernacula and breeding colonies are of the utmost value even when the species concerned has not been identified. Such records should be sent to the Mammal Recorder at once. Delay may prevent any useful action being taken.

It is clear from the records that much more remains to be discovered about the distribution of bats in the London Area. It should be emphasized that these records are those obtained over five years. Distribution maps for, say, the Whiskered Bat would currently show only three or four 1 km. grid squares occupied. There are over 3,000 1 km. grid squares in the London Area, of which half would probably be capable of supporting bats.

This is, perhaps, a measure of the challenge involved in the future study of London's bats.

It is interesting to speculate on the large number of records from the Esher area, which is intensively covered by P. A. Morris and D. W. Yalden, and the Godstone area, previously well watched by B. D. Hancock and latterly by P. A. Morris and D. W. Yalden.

Rye Meads, the home of a dedicated band of bird ringers produces as a by-product a considerable number of bat records. How useful it would be to have a few more people willing to look for bats scattered around the area, in particular, say, in Essex, Kent and West Middlesex.

SUMMARY

1. This paper gives an account of the bats recorded in the London Area for the period 1962-1966 inclusive.
2. The habits of the various species are discussed, with particular reference to the related problems of finding, catching and identifying them.
3. The various types of roosting localities are commented on and discussed with respect to the number of records.
4. Brief comment is made on the bats recorded in Inner London.
5. The relationship between bats and men is mentioned.
6. Detailed records of each species are given.
7. Brief comment is made on the comparative paucity of the number of records and on the possibilities for the future, given a few more observers covering one area thoroughly.

ACKNOWLEDGEMENTS

I must express my gratitude to all those people who have sent in records. I would particularly thank Pat Morris and Derek Yalden who have been responsible for developing my own interest in London's mammals, and who have given much constructive criticism for this paper. Together they have provided 60% of the records used here. John Burton has kindly given me full use of all records received by him as Mammal Recorder. John Sankey, Warden of Juniper Hall Field Studies Centre kindly gave me permission to use his records.

I would finally like to thank Terry Smeeton who typed the manuscript for me, thus saving me many anguished hours at a most unfamiliar keyboard.

LIST OF CONTRIBUTORS FOR PERIOD 1962-1966

J. Aylott, Miss B. T. Bayliss, I. R. Beames, Mrs. L. A. Beames, Miss E. P. Brown, J. A. Burton, Dr. G. B. Corbet, Dr. B. D. Hancock, A. M. Hutson, H. King, A. Leutscher, Lewisham N.H.S., N. A. Martin, E. Milne-Redhead, P. A. Morris, R. McCleane, R. G. Rigden, Rye Meads Ringing Group (per J. Crudass), J. Sankey, W. G. Teagle, P. C. Tinning, Dr. J. J. Walling, R. Warwick, P. J. Wilson, Dr. D. W. Yalden.

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Hemiptera-Heteroptera of the London Area

PART V

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

Sources of Records

The following are new sources of records:—

31. *The Entomologists' Monthly Magazine*, **1**→, 1833→ (Abbreviated to EMM in text for incidental references).
    (g) Andrewes, C. H., 1945, *Hemiptera-Heteroptera in Middlesex and Hertfordshire*, **81**, 163-164.
61. Richards, O. W., 1926. *Studies on the ecology of English Heaths*, III. *Animal communities of the felling and burn successions at Oxshott Heath, Surrey.* J. Ecol. **14**, 244-281.
62. Coulson, F. J., *The Hemiptera of Surrey.* A manuscript distribution list (compiled from the author's records and those of others) now deposited in the library of the South London Entomological & Natural History Society*.

Index to Recorders' Names

The following should be added to the index of recorders' names already given in Parts I-IV:—

E. E. Austen	(*EEA*)	A. Piffard	(*AP*)
O. G. Heath	(*OGH*)	O. W. Richards	(*OWR*)
Hugh Main	(*HM*)		

MIRIDAE (Capsid bugs)

Subfamily: Bryocorinae

Only two members of this mainly tropical and sub-tropical subfamily are native in Britain, both of which are found in the London Area. In addition, three alien species have occasionally been accidentally introduced from S. America, two of which have been reported in London.

Monalocoris filicis (Linn.) Sp. 225 p. 203
D&S p. 279 S p. 229 B p. 449 (Sp. 321)

Common and widely distributed throughout the London Area wherever its host plant bracken occurs. Adults are found from July onwards, flying freely in early autumn just before they go into hibernation.

Middx. Buckingham Palace grounds, 1962, on bracken, *TRES* (52); Cripplegate, City of London, 23.vii.55, on bracken growing in one derelict bombed basement-site only, *EWG* (25); 24.ix.55, *DGH* (57); Hampstead Heath, 12.vi.43, *CHA* (17); 1949, "on ferns everywhere", *DL* (1/1949-50, 36-38); 8.vi.50, in clearing on Sandy Heath, *DL* (HD); Ruislip L.N.R., 1955-58, especially in bracken in the N.E. heath area where adults have been taken from late May to mid-Sept., *EWG* (49); Hounslow Heath, 21.viii. and 5.ix.49, 8.vi.50, and 19.vii.52, *DL* (54); 26.vii.52 and 26.v.53, common on *Pteridium*, *GEW* (33b).

Herts. Wormley Wood, 4.viii.41, *HWJ* (43); Hatfield, 7.vi.64, *PLJR* (MM); Bricket Wood Common, 3.vii.56, *EWG* (24); and on the boundary at Chorley Wood. n.d., *EAB* (11) and (12); Chorley Wood Common, 27.v.63, *PSB* (16) and Kings Langley, x.18, n.c. (HD).

Essex. Woodford, 11.viii.25, *EAB* (BM); Epping Forest (Loughton), 3.ix.09, *EAB* (BM); on bracken, common, *CN* (35a); (High Beach),

*now to be styled the British Entomological & Natural History Society.

common, *CN* (35a); (Chingford), 18.vi.10, *EAB* (BM).

KENT. Lee, *JAP* (BM); Plumstead (Wickham Lane), 7.ix.1895, *WW* (60) (4) (39) (22); Blackheath, *AAA* (22); Abbey Wood, *WW* (39); Dartford Heath, 26.iv.62, *KCS* (14) (22); Darenth Wood, 20.v.05, *ECB* (NM); Joydens Wood, Bexley, 10.ix.60, *KCS* (14); Chislehurst (St. Paul's Cray Common). 16.ix.05, *HM* (1/**1905-6,** 52); Bromley *ES* (4) (22); Hayes Common, 23.xi.63, *KCS* (14) (48); Farningham Common, 23.ix.51, *SL* (1/**1951-52**, 81); Fawkham, 11.ix.54, *GGES HD*; Shoreham, 1.ix.61, *KCS* (14) (22); and Westerham (Hosey Common), 17.vi.51, *DL* (1/**1951-52,** 72).

SURREY. Dulwich *JAP* (BM); Richmond Park, 24.ix.02, *HStJKD* (HD); Shirley, *FPP* (HD); Shirley Common, ix.1893, *WW* (60); Wimbledon Common, 14.vi.55, *HDS* (60); 25.vi.55, *EWG* (24); Banstead Heath, 3.ix.62, *PSB* (16); Reigate district, by sweeping *J&TL* (32); near Godstone, 22.vi.63, *EL* (48); Epsom Common, 6.ix.53, *EWG* (24); Ashtead Woods, *FJC* (62); Headley Lane, 27.v.1900, *AJC* (HD); Boxhill, v.18, n.c. (HD); Ranmore Common, *FJC* (62); Bookham Common, 4.v.52, *DL* (54); 13.v.56, 12.viii.56 ♂, 16.viii.55, 13.ix.53 ♂ ♂ ♀ ♀, 4.x.53 and 9.x.56, *EWG* (24); West End Common, *FJC* (62); Oxshott Heath, 30.vi.51, *FJC* (1/**1951-52,** 73); 4.viii.55., *EWG* (24); *AAA* (51); Esher Common, *FJC* (62); and Weybridge ,30.vi.63, *PSB* (16).

BUCKS. Slough (ICBFS), 25.viii.32, *WHG* (41); (PILG), 14.vi.54, *GEW* (40); and just beyond the boundary in Hodgemoor Wood, w. of Chalfont St. Giles, 30.viii.52, *WJLeQ* (21).

Bryocoris pteridos (Fall.) Sp. 226 p. 203
D&S p. 277 S p. 228 B p. 450 (Sp. 322)

Local. Associated with the Male Fern (*Dryopteris filix-mas*), the Lady Fern (*Anthyrium filix-femina*) and other ferns in woods and damp shady lanes. Occasionally found in those gardens where clumps of ferns have been long established. The adults which may be either macropterous or brachypterous, are found in July and August.

MIDDX. Uxbridge (Colne Valley), 12.ix.35, a few on ferns, *DCT* (33a).

HERTS. Beyond the boundary at Harpenden (Rothamsted Expt. Station grounds), 28.v.53, larvae probably III and IV instars on *Anthyrium filix-femina* growing in Manor Wood; 9.vii.53 and 23.vii.53, numerous adults mostly brachypterous ♀ ♀ taken on same ferns; both records, *TRES* (EMM **90,** 75) and (1/**1953-54,** 43); 23.vii.53 *TRES*, presented by *DL* (HD); 2.vii.55, 13.vii.54, 17.vii.54 and 1.x.54, *GGES* (HD); vii.54, *AMM* (BM).

KENT. Lee, *JAP* (BM).

SURREY. Boxhill, 20.viii.52, on ferns but not on bracken, *AMM* (BM) and (MM).

BUCKS. Just outside the boundary at Hedgerley, 28.ix.57 on ferns, *GEW* (40); and beyond at Hyde Heath, 19.vii.53, on fern, *WJLeQ* (21).

Tenthecoris orchidearum (Reut.) Foreign species p. 313
T. bicolor Scott
T. colombiensis Hsiao & Sailer

These three S. American species have in the past occasionally been reported in this country on orchid plants (particularly of the *Cattleya* group) imported for cultivation in hot-houses. Conspiciously coloured bright orange-red or blue and yellow, these bugs breed freely in the

warmth and cause damage to the leaves by the blistering at the feeding puncture sites. Orchid culture in heated conservatories and glasshouses is not as widespread a practice nowadays as it was during the period of most of the known records (i.e. late 19th-early 20th Century). As Leston (EMM 88, 240ff) points out the restriction and guarantee currently in force on the importation of foreign orchid plants has now reduced the likelihood of these injurious capsids being again introduced. Two of the above species have been recorded from the London Area.

MIDDX (?). *T. bicolor*—London, viii.28, in orchids imported from Brazil (see Gimmingham, C. T., EMM **64**, 272, 1928).

SURREY. *T. orchidearum*—Kew Gardens (BM) (see Carvalho, JCM., *Ann. Mag. nat. Hist.* (12) **4**, 294-304 (1951).

Subfamily: DERAEOCORINAE

There are six species belonging to this subfamily of mirids occurring in Britain, 5 of which have been recorded in the London Area.

Deraeocoris lutescens (Schill.) Sp. 228 p. 205
D&S p. 448 (*Camptobrochis punctulatus*) S p. 258 (*C. lutescens*)
B p. 439 (Sp. 314, *C. lutescens*)

Commonly and widely distributed. A predaceous feeder occurring on various trees and shrubs particularly scrub oak, hazel and apple. Unlike other British species of this genus it hibernates as an adult. The larvae develop throughout the summer and early autumn, but the majority reach the adult stage by late August or early September. Obviously more widely spread in Herts, Essex and Bucks, than records available would suggest.

MIDDX. Buckingham Palace grounds, 1962, "exceptionally abundant on many trees (alder, beech, buckthorn, birch, hawthorn, hazel, holly, lime, oak, poplar (white and another), rhododendron and wych elm)", *TRES* (52); Finchley, 23.v.43, on oak, *CHA* (17); St. John's Wood (Finchley Road), N.W.8, 13.vii.52, 3.viii.51 and 16.vii.60. III-V instar larvae taken on Sycamore, field maple and lime *DL* (EMM **97**, 65), (HD) and (54); Hampstead, 23.v.43, on oak, *CHA* (17); Hampstead Heath, 19.iii.49, 6.vi.49, 14.viii.49, 5.ix.49 and 8.vi.50, "very common on oaks in summer and found on sunny days in February on trunks of various trees". "A cluster of about 50 found under oak bark in mid-October", *DL* (HD) (54) and (1/**1949-50**, 36-38); (Quarry Spaniards), 31.v.50, *DL* (HD); Highgate ii.1894, *EAB* (BM); Palmer's Green, 29.x.18, *EAB* (BM); Mill Hill, 23.ix.16, *EAB* (BM); Edgeware (Scratch Wood), 26.vii.60, adults and V and IV instar larvae, *DL* (EMM **97**, 65); Northwood, 21.viii.16, *EAB* (BM); 1.vii.29, *EEA* (BM); Ruislip L.N.R., 18.vi.57 ♀, on wild apple *EWG* (49); 9.viii.64, adults and larvae on oak, *RAPM* (49); Harefield, 26.viii.51, on willow and poplar, *WJLeQ* (21); Hounslow Heath, 22.ix.52, occasional on trees, *GEW* (33b) and (40).

HERTS. Cheshunt, 8.ix.11 and 14.ix.12, *EAB* (BM); Whetstone, 23.ix.60, a single ♂ taken in light trap, *PHW* (47); Bushey *JAP* (BM); Oxhey, 24.viii.16, *EAB* (BM).

ESSEX. Woodford, 7.viii.25, 14.viii.25 and 28.viii.25 *EAB* (BM); Buckhurst Hill, 18.viii.25, *EAB* (BM); Epping Forest, 30.xii.1900 and 14.ix.19, *ECB* (NM); 22.ix.17, on aspen, *EAB* (BM); 13.ii.16, *HM* in *EAB* coll. (BM); (Chingford) 18.ix.15 and ix.07, *EAB* (BM); *CN* (35a); (Hale End), 26.ix.16, on oak, *CN* (35a); (Loughton) 3.ix.15, *EAB* (BM).

KENT. Lee (Hither Green Lane), 1.viii. and 5.ix.1896, on oak *WW* (60) (4) and (39); Plumstead (Wickham Lane), 7.ix.1895, by beating oaks, *WW* (60) (4) and (39); Blackheath, 9.vi.1891, *AB* in *AJC* coll. (MD); 24.ix.97, *AJC* (HD); *WW* (4) (39); *AAA* (22); Abbey Wood, *WW* (39); Darenth, 28.v.1893, *AJC* (HD); 14.v.22 *PH* (BM); Fawkham, 11 and 12.ix.54, *GGES* (HD); Lewisham, 6.viii.1893, *AJC* (HD); *WW* in *PH coll.* (BM); Catford, 7.viii.1893 *AJC* (HD); Bromley, *ES* (37) (4) and (22); Chislehurst (St. Paul's Cray Common), 16.ix.05, HM (1/**1905-06,** 52); West Wickham Wood, 13.vi.1896, *WW* (60) (4) (39); Orpington xi.35 *E. Gowing-Scopes* (HD); Shoreham, 1.ix.61, *KCS* (14); and Westerham, 3.ii.23, *PH* (BM).

SURREY. Kew (grounds of Royal Botanic Gardens), 6.viii.60, on *Acer* and *Quercus spp.* near Temperate House, *HKAS and L. Watson* (7/**xxiv,** 1961: 169-191); Richmond, *JAP* (BM); Richmond Park, 15.iii.03, *AJC* (HD); 19.iii.05, *ECB* (NM); Wimbledon (grounds of Margin House, Marryatt Road), 28.ii.53, a single ♂ hibernating beneath bark of fallen elm trunk, *EWG* (24); Wimbledon Common, 3.v.1893, *AJC* (HD); 6.x.40, under bark, *FJC* (SL); Coombe Wood, *EAN* (3); Shirley Common, 25.ix.1897, on oak, *WW* (60) (62); Purley Downs, 25.viii.1896, *WW* (60) (62); Chipstead, 1.v.60, *KCS* (14); Reigate, *ES* (37) (3); Earlswood, 1.iv.29, *JLH* (SL); Godstone (Tilburstow Hill), 7.xi.59, *KCS* (14); Cheam (Nonsuch Park), 22.vii.55, *EWG* (24); Ewell, 10.ix.20, *EAB* (BM); Epsom Common, 6.ix.53, *EWG* (24); Ashtead Wood, 25.ix.60, abundant on various trees, *MGM* (1/**1960,** 94); Headley Lane, 8.x.1897, on maple, *WW* (SL) (60); Boxhill, 29.viii.1896, *WW* (60) (62); 7.x.09, *HStJKD* (HD); 29.viii.37, *ECB* (NM); 11.v.35, *FJC* (SL) (62); Bookham Common, 16.viii and 9.x.55, *EWG* (24); vii, viii, ix. and x., *DL* (34); Claygate, *JAP* (BM); Surbiton, *TAM* (37) (3); Esher, *JAP* (BM); *EAN* (3); Oxshott, 12.x.1900, *AB* in *AJC coll.* (HD); Weybridge, *JAP* (BM); on the boundary at Byfleet, 5.ix.13, *EAB* (BM); and just beyond at Woking, x.1890, viii.1900, and ix.02, *ES* (HD) (37) (3); and Chobham, viii.1876, *ES* (HD) (37) (3); 12.viii.1899, *AJC* (HD); 2.vii.33, *ECB* (NM).

BUCKS. On the boundary at Datchet, 3.iii.53, *GEW* (40); Slough (ICBFS), various dates from v.-vii.33 and v.-vi.34, found on Scots Pine, hawthorn, hazel and oak, *WHG* (41); (PILG), 26.vii.55, beaten from apple, *GEW* (EMM **92,** 35); and beyond at Amersham, 19.vii.57, *WJLeQ* (21); and Burnham Beeches, 22.vi.12, *EAB* (BM).

Deraeocoris ruber (Linn.) Sp. 229 p. 205
D&S p. 442 (*Capsus capillaris*) S p. 260 (*C. laniarius*)
B p. 440 (Sp. 315, *C. ruber*)

Common. Although occurring in many different trees, shrubs and herbs, it is perhaps more often found on aspen and on nettle in the wild; and on apple and various flower heads in gardens. The female is light-brown in colour while the male much darker, sometimes almost black. Both have the base of the cuneus bright red. It overwinters in the egg state and adults are found from June to September.

MIDDX. Cripplegate, City of London, 23.vii.55, ♂ swept from vegetation colonising a derelict bombed site, *EWG* (25); St. Johns Wood (Finchley Road), N.W.8, 1.vii, 19.vii and 24.vii.50, *DL* (54); Hampstead Heath, 29.vii.48, *DL* (HD) (54); 1949, in grass in August, *DL* (1/**1949-50,** 36-38); 26.vii.50, *DL* (HD) (54); 3.viii and 26.viii.50, *DL* (54); Hornsey (Crouch End), ix.09, ♂, *EAB* (BM); in garden at Weston Park, vii.03,

JAC (1/**1903,** 54); Finchley, 12.vii.43, on *Vicia*, *Carduus* and *Cytisus*, *CHA* (17); Edmonton, 4.viii.42, *HWJ* (43); Brentford, *JAP* (BM); Ruislip L.N.R., 24.v.52, 24.vii.56 and 29.vii.55 (all adults) and 24.v.52 (V instar larva), *EWG* (49); 9.viii.64, adults, *RAPM* (49); Pinner, vii.22, ♂ ♂ ♀ ♀, *OGH* (BM); Uxbridge, 23.viii.64, *PLJR* (BM); and Hounslow Heath, 19.vii.52 and 8.viii.53, a few adults taken by sweeping rank vegetation on a rubble tip, *GEW* (33b) (40).

HERTS. Waltham Cross (Goff's Oaks), 15.vii.60, in garden of a house in The Drive, *FB* (18); Hoddesdon (Rye Meads), 5.viii.65, *BSN* (58); Radlett, 10.viii.58, adult, *DL* (SL); 26.vi.60, V instar larva, *DL* (54); Brickett Wood Common, 3.vii.56, IV instar larva, *EWG* (24); and beyond the boundary at Redbourn, 23.vii.60, *DL* (HD).

ESSEX. Buckhurst Hill, 15.viii.25, ♂, *EAB* (BM); Epping Forest (Warren Pond), 20.viii,60, on *Cirsium arvense*, *FB* (18); (Hale End), n.c. on nettles and other plants, rather common, *CN* (35a); Theydon Bois, vii.22, V, IV and III instar larvae, *EAB* (BM); and Woodford, 5.viii.25 ♂, *EAB* (BM).

KENT. Forest Hill, *JAP* (BM); Lee, *WW* (4) (39) (22); Kidbrook, 1893, *WW* (SL); Plumstead, 14.vii.52 ♂ ♂ and ♀ ♀, *RGR* (WBM); Blackheath, 23.vii.1900, *AJC* (HD); viii., very local on brambles, *AAA* (51); Lewisham, 24.vii.1891, *AJC* (HD); *WW* (4) (39) (22); Darenth Wood, 10.vii.06, ♂ ♂ and ♀ ♀, *ECB* (NM) (22); 12.ix.48, by sweeping *AMM* (BM); 1.viii.49, on oak, *AMM* (BM); Swanscombe Park, 30.viii.07 ♂, *ECB* (NM); Wilmington, 10.viii.55, *KCS* (14) (22); Horton Kirby, 2.vii.61, *KCS* (14) (22); Longfield, 30.vii.50 and 22.vii.52, *GGES* (HD; Gravesend (Milton), 21.viii.51, very abundant on *Lamium album*, *TRES* (13); West Wickham Wood, 21.vii.1894, *WW* (60); and Westerham, 12.ix.51, *AMM* (BM) (22).

SURREY. Wandsworth, ♀, *JAP* (BM); Streatham, 18.viii.62, in garden of house in Mount Nod Road, *PSB* (16); Merton, *FJC* (62); Merton Park, *FJC* (62); Coombe Wood, viii.07 ♂, *EAB* (BM); Wimbledon Common, 31.vii.56, HDS (60); *FJC* (62); Putney, 1923 ♀, *HStJKD* in *EAB coll.* (BM); Carshalton, vii.39, in garden of house in Carshalton Park Road, ♂ and ♀ the latter on flowerhead of *Achillea filipendulina* "Gold Plate"; 7.viii.56 on foliage of plum; both records *EWG* (24); Purley (Smitham Downs), 4.viii.07 ♂, *ECB* (NM); Warlington (Halliloo Valley), 29.viii.64, *KCS* (14); Cheam (Nonsuch Park), 22.vii.55, *EWG* (24); Claygate, ♀, *JAP* (BM); Ashtead Common, 20.vii.46, *SL* (1/**1946-47,** 74); *FJC* (62); Reigate, *GBR* (62); Redhill, n.d., by sweeping nettles, *J&TL* (32); Headley Lane, 29.vii.33 ♂ and 25.viii.35 ♀, *ECB* (NM); Mickleham, *FJC* (62); Boxhill, 18.vii.37 ♀, *ECB* (NM); 27.viii.50, *DL* (HD); *WW* (62); Bookham Common, vii.19, *n.c. per DL* (54); vii and viii, *DL* (34); 29.vii.50, *DL* (1/**1950-51,** 76); Oxshott, 17.vii.60, on Scots Pine, *DL* (HD); *WW* (62); Esher Common, *JAP* (BM); 12.vii.52, *SL* (1/**1952-53,** 84); 4.viii.55 and 21.viii.54, *EWG* (24); on *Rubus* and various other herbs in deciduous woodland, *OWR* (61); West End Common, *FJC* (62); Weybridge, 21.vi.13, II instar larva, *EAB* (BM); and just beyond the boundary at Woking, ix.1888, *ES* (HD); Chobham, viii.1872 and vii.1892, *ES* (HD); 22.vii.33 ♂ and ♀ and 22.vii.34 ♂ ♂, *ECB* (NM); viii.54, *GEW* (40); and Outwood, 29.vii.51, from hedgerow herbage beneath oaks, *GBR* (45).

BUCKS. "Many localities in Bucks", *GEW* (40); on the boundary at Slough (ICBFS), 4.vii., 6.vii and 10.vii.33, on oak, birch, hazel and

thistle, *WHG* (41); (PILG), 3.vii.53, *GEW* (40); Stoke Common, 12.vii.64, *WJLeQ* (21); and beyond at Chesham (Cowcroft Wood), 4.ix.65, sweeping nettle, *WJLeQ* (21); Latimer, 21.viii.54, on nettle, *WJLeQ* (21); and Burnham Beeches, 22.vi.12, II instar larva, *EAB* (BM); 16.vii.55, on hawthorn, *WJLeQ* (21).

Deraeocoris scutellaris (Fab.) Sp. 230 p. 206
D&S p. 443 (*C.scutellaris*) S p. 261 (*C. scutellaris*)
B p. 443 (Sp. 316, *C. scutellaris*)

Very local. The adults which are predaceous feeders are associated with heather and hazel. They occur from mid-June until the end of July. Like the previous species this probably overwinters in the egg stage. Middlesex and Bucks records wanting.

HERTS. Beyond the boundary at Harpenden (Rothamsted Expt. Station), thirteen specimens taken in light traps (all adult ♂♂) on the following dates:—26.vi.47, 1.vii.47, 2.vii.47, 18.vi.48, 21.vi.48, 25.vi.48, 18.vii.48, 27.vi.49, 28.vi.49 and 6.vii.49, *TRES* (EMM **86**, 78); Harpenden, 28.vi.49, *TRES* in *AMM coll.* (BM); and at Royston, swept from *Calluna*, *MGM* (1/**1959**, 13).

ESSEX. Epping Forest (Monk Wood), on heath, rare, *CN* (35a); (Chingford), 8.vii.11, *EAB* (BM).

KENT. Dartford Heath, vii., a single specimen beaten from bramble flowers, *D&S* (28) (4) (37); Trottiscliffe, 9.vii.58, a single example (of the form with the red thorax) swept from a chalk-scrub vegetation area (including hazel) on the N. Downs, *KCS* (EMM **98**, 12) (22); *KCS* in *AMM coll.* (BM); and Shoreham, 13.vi.59, *MGM* (1/**1959**, 13) (22).

SURREY. Reigate, *ES* (37) (3); Mickleham, 9.vii.05, *ECB* (NM); Boxhill, 8.vii.16, in the field sweeping, *WW* (60) (62); 30.vi.18, *ECB* (NM); Bookham Common, 25.vii.64, Central Plain, in long grass, *PMB* (BM) (16); 21.vi.55, *EWG* (24); 15.vii.49, a single ♀ beaten from hazel, *FJC* (62) and (quoted by *TRES* in EMM **86**, 78); Oxshott, *TRB* (37) (3); and just beyond the boundary at Chobham, vi.1888 and vii.1892, *ES* (HD) (37) (3); vi.1880, *EAB* (BM); and Horsell, *JAP* (BM).

Deraecoris olivaceus (Fab.) Sp. 231 p. 206

Very local though perhaps spreading. First found in Britain in 1951 in Silwood Park, near Ascot, Berks. (*vide* SANDS, W.A., 1954, EMM **90**, 301). It has since been recorded in three of the Home Counties at widely separated localities. It is associated with hawthorn, but only on those bushes bearing abundant fruit.

MIDDX. Hounslow Heath, 14.vii and 8.viii.53, two adults beaten from hawthorn, *GEW* (33c) and (EMM **90**, 237); HH [presumably Hounslow Heath], 23.vi.53, presented by *GEW* (BM).

SURREY. Bookham Comoon, 11.vii.56, a single ♂ beaten from a large heavily-fruiting hawthorn, *GEW* (EMM **92**, 300); 16.vi.57, a single ♀ beaten from hawthorn, *EWG* (24). [Beyond the Society's boundary it has been taken at Chilworth, 18.vi.61, *AMM* (MM); Elstead Common, 12.vi.59, on old hawthorns in fruit, *AMM* (BM); and Witley, 18.vi.62, *AMM* (BM)].

BUCKS. Langley Park, 16.vi.55, beaten from well developed fruiting hawthorns growing in rough, uncut pasture, *GEW* (EMM **92**, 47); on the boundary at Ditton Park near Datchet, 1.vii.55, *GEW* (BM) (EMM **92**, 47); Slough, 7.vii.62, *AMM* (BM); and beyond at Hedgerley Park,

2.vii.55, *GEW* (EMM **92,** 47); and Burnham Beeches (Burnham Golf Course), 19.vii.54, beaten from well-grown fruiting hawthorns accompanied by numbers of *Atractotomus mali*, *GEW* (EMM **90,** 237); 16.vii.55, *WJLeQ* (21).

Alloeotomus gothicus (Fall.) Sp. 232 p. 206

Rare. First recorded in Britain from Oxshott, Surrey in 1951. Since then it has been found in five other counties including a further two in the London Area. This species is associated with plantings of Scots Pine (*Pinus sylvestris*) on which adults may be found during the months of July to September.

MIDDX. Hampstead Heath, 24.vii.57, *DL* (SL) (54).

KENT. Blackheath, at mercury vapour light, *AAA* (22).

SURREY. Headley Heath, 16.ix.52, on young *Pinus sylvestris* trees, HDS (EMM **89,** 64) and (1/**1952-53**); Boxhill, 10.viii.52 ♀ ♀, 20.viii.52 and 29.ix.59, beating young Scot's Pine *AMM* (BM); Oxshott Heath, 14.ix.51, by beating Scots Pine, *HDS* (BM) (EMM **88,** 273-5 and 96) and (1/**1952-53,** 2); 1963, *AAA* (51); 17.vii.60, *DL* (HD); Esher Common, 25.ix.51, a single ♀ from Scots Pine, *FJC* (SL) (EMM **88,** 273-5 and 96) and (1/**1952-53,** 2); West End Common, 20.viii.51, a single ♀ from Scots Pine, *FJC* (EMM **88,** 273-5 and 96) and (1/**1952-53,** 2); and just beyond the boundary at Egham, 6.viii.55, on pine, *GEW* (40); and at Chobham, 8.viii.56, *GEW* (40).

Subfamily: PHYLINAE

This subfamily of the Miridae has 63 representative species in Britain of which 57 have so far been recorded in the London Area.

Lopus decolor (Fall.) Sp. 233 p. 210

D&S p. 393 (*Oncotylus decolor*) S p. 297 (*Onychumenus decolor*)
B p. 498 (Sp. 378, *Onychumenus decolor*)

Frequent. Occurs throughout the London Area on commons, rough pastures, grassy banks and fields, and sometimes in damp meadows. It is associated with various grasses, particularly the bents, *Agrostis canina* and *A. tenuis*, and Yorkshire fog (*Holcus lanatus*) on which it feeds and lays its eggs. The adults are found during July and August, and rarely until early September.

MIDDX. Hampstead Heath, 5.viii.60, *DL* (HD) (54); Finchley 31.vii.43, swept in grass, *CHA* (17); Edgeware (Scratch Wood), 21.vii.57, mostly ♀ ♀ and a few spent ♂ ♂ *DL* (54); 18.viii and 22.vii.60, *DL* (HD); 18-26.vii.60, a single adult and 28 V instar larvae swept from grassland, *DL* (EMM **97,** 65); Ruislip L.N.R., 29.vii.55, by sweeping in the short grasses *Agrostis tenuis* and *A. canina*, *EWG* (49); Harefield, 8.vii.64, *WJLeQ* (21); Uxbridge, 23.vi.35, on *Holcus lanatus*, *DCT* (33a); Hounslow Heath, 14.vii. and 8.viii.53, locally common on seeding grasses on the Heath and on a rubble tip, *GEW* (33c) (EMM **91,** 54) and (40); 26.vii and 9.viii.53, *DL* (HD) (54).

HERTS. Chorleywood, 10.viii.16, *EAB* (BM) (11) (12); Bushey, 25.vii.43, *CHA* (17); Aldenham, 23.vii.61, *DL* (HD) (54) and Rickmansworth, 18.viii.16, *EAB* (BM).

ESSEX. Epping Forest, by sweeping in grassy places, *CN* (35a) (Chingford) 15.vii.11, *EAB* (BM); (Loughton) 30.vii.50, *DL* (HD); (High Beech) 21.vii.53, *DL* (HD); Purfleet, *RML* (5); and beyond the boundary at Danbury Common, nr. Chelmsford, 30.vii.60, *JHF* (42).

KENT. Blackheath, associated with *Agrostis tenuis*, *AAA* (51) (22); Eltham, abundant in a field by sweeping amongst short grass in July, *D&S* (28) (4) (22); Erith, *JAP* (BM); Dartford Brent, amongst ferns, etc., in August, *D&S* (28) (4) (22); Bexley (Joyden's Wood) 11.vii.64, *KCS* (14); Darenth, *D&S* (22); and Sevenoaks, 1.viii.57, sweeping grass, *AMM* (BM) (22).

SURREY. Wandsworth, *ES* (3) (37); Wimbledon, *EAN* (3); Merton Park, *FJC* (62); Ashtead Common, 1.viii.46, *FJC* (SL) (62); Epsom Common, *FJC* (62); Boxhill, 24.vi.51, *DL* (1/**1951-52,** xvi); Bookham Common, 29.vii.50, *FJC* (1/**1950-51,** 76) (62); vii., viii. *DL* (34); Esher Common, *JAP* (BM); West End Common, 21.vii.52 and 4.viii.53, *FJC* (SL); Egham, 21.vii.54, in swampy field, 'large numbers of larvae at bases of *Juncus* and grass tufts even where these were standing in water', *GEW* (EMM **91,** 54) (40); Chertsey, *TRB* (37) (3); on the boundary at Byfleet, 3.viii.1892, *AJC* (HD); and beyond at Chobham Common, *ES* (37) (3); vii.54, large numbers swept from sparse grass tufts on dry gravelly soil, *GEW* (EMM **91,** 54); Woking, viii.1900, *ES* (HD); Guildford, 16.vii.43, *ECB* (NM); Shalford *EAB* (3); Farley Heath, viii.1892, *EAB* (BM); Abinger, viii.1899, *EAB* (BM); and Gomshall, *EAB* (3).

BUCKS. On the boundary at Slough (ICBFS), 7.viii.31, a ♀ taken by sweeping, *WHG* (41); (PILG) vii.55, *GEW* (40); Chalfont St. Peter, 17.vii.25, adult and III instar larva, *EAB* (BM); and beyond at Whitend Park nr. Chesham, 20.vii.61, *WJLEQ* (21); and Beaconsfield, 8.ix.62, sweeping grass is cleared woodland, *GEW* (EMM **98,** 207).

Oncotylus viridiflavus (Goeze) Sp. 234 p. 210
D&S p. 385 (*Ahoterops setulosus*) S p. 297
B p. 499 (Sp. 379)

Occasional. Associated with Black Knapweed or Hardheads (*Centaurea nigra*) feeding mainly on the flower heads. This bug overwinters in the egg stage and the larvae hatch in late June or beginning of July. These become mature by the end of July or early August but die off soon after pairing. Essex records wanting.

MIDDX. Edgware (Scratch Wood) 17-25.vii.49, on *Centaurea nigra*, *CHA* (17); 18.vii.60, 22.vii.60 (adults, V and IV instar larvae) on knapweed, common, *DL* (HD) (EMM **97,** 65); 5.viii.56, *DL* (54); 26.vii.60, *DL* (HD) (54); Mill Hill, 15.viii.58, *DL* (SL); Ruislip LNR, 24.vii.56, V instar larva swept from short grass and herbs on chalk area, *EWG* (49); and Harefield, 22.vii.33, a single ♀ on *Ononis* and 27.vii.34 and 1.viii.35, common on *Centaurea nigra*, *DCT* (33a); 26.viii.51, *WJLeQ* (21).

HERTS. Near Whetstone, 17.vii.60, a single ♀ taken in light trap, *PHW* (47).

KENT. Otford, *AAA* (22); and on the boundary at Sevenoaks, *EAB* (4) (22).

SURREY. Banstead, 28.vii.55, *GEW* (40); Ashtead, *FJC* (62); Reigate, 6.viii.50, beaten from hedgebank, *GBR* (EMM **87,** 139) (62); Ranmore Common, 18.viii.10 and 30.vii.11, *WW* (1/**1910-11,** 123) (60) (62); Bookham Common, *FJC* (62); 29.vii., and 5. and 7.viii.50, nymphs and adults "the latter observed feeding on heads of *Centaurea nigra* just below the flowers", *DL* (1/**1950-51,** 13-14) (EMM **86,** xxxii) and (34); 5.viii.50, *DL* (SL) (HD) and (*WLJeQ* coll.); 29.viii50, *DL* (1/**1950-51,** 76); and Effingham, *FJC* (62).

BUCKS. Beyond the boundary at Wooburn Green nr. Beaconsfield, viii.54, on knapweed, *GEW* (40).

Conostethus griseus D&S Sp. 235 p. 211 (as *C. frisicus*)
S p. 300 (*C. salinus*) B p. 499 (Sp. 380, *C. salinus*)

Rare. Being a saltmarsh species it is in the London Area, confined to those two counties which have the appropriate maritime habitat, namely Essex and Kent. It has been taken on the Thames-side marshes in June by sweeping in marsh vegetation.

ESSEX. Beyond the boundary at Benfleet, 18.vi.50, sweeping in saltmarsh, *AMM* (BM); and on Canvey Island, 27.vi.14, *EAB* (BM) (NM in *ECB* coll.).

KENT. Abbey Wood (Erith) marshes, 31.viii.55, larva, *EWG* (24); and on the boundary near Gravesend, on *Arenaria maritima*, etc., *JAP* (36) (37) (3) (22).

Conostethus roseus (Fall.) Sp. 237 p. 211
D&S p. 398 S p. 301 B p. 501 (Sp. 382)

Local. Has occasionally been taken in the London Area from the end of May to early July where it is considered to be associated with papilionaceous plants especially clovers (*Trifolium spp.*) and rest-harrow (*Ononis spp.*). The late Dr. A. M. Massee took it some years ago on Gromwell (*Lithospermum officinale*) though its presence on that species of plant may have been only incidental. Bucks. records wanting.

MIDDX. Hampton Wick, *ES* (37); Hillingdon, 17.vi.33, in dry grass (33a).

HERTS. St. Albans, 24.vi.24, *PH* (BM); and beyond the boundary at Royston, vi.05, *EAB* (BM (NM in *ECB* coll.) (SL) (11) and (12).

ESSEX. Epping, *TAM* (5) (35a); Epping Forest, 22.vi.11, one specimen by sweeping, *CN* (35a).

[The record of W.A. Sands of *Conostethus salinus* Sahl. (= *C. griseus* D&S—the previous species) reported in Epping Forest, 1950 (see *Essex Naturalist* **28,** 296, 1951) is probably intended for this species].

KENT. Eltham, vi., abundant by sweeping amongst short grass etc., in a field, D&S (28) (4) (22) (37).

SURREY. Coombe Wood, *ES* (37) (3) (62); Wimbledon Common, *EAN* (3); 20.iv.49, *FJC* (SL) (62); Reigate, *ES* (37) (3) (62); Oxshott, *TRB* (37) (3) (62); Weybridge *JAP* (BM); *GCC* (37) (3) (62); and beyond the boundary at Woking, vi.1888, *ES* (HD) (37) (3) (62); Chobham Common, 18.vi.55, *GEW* (40); vii., a few swept from dry grass tufts, *GEW* (EMM **91,** 54); Virginia Water, 6.vi.55, on *Trifolium GEW* (40); Guildford, *GCC* (3); and Whitley Common, 12.vi.59, "associated with *Lithospermum officinale* L.", *AMM* (BM); v-vi.58 locally abundant, larvae and adults in short grass, *Trifolium arvense*, etc., *GEW* (Entom. **92,** 9, 1959).

Hoplomachus thunbergi (Fall.) Sp. 238 p. 212
D&S p. 396 S p. 301 B p. 502 (Sp. 383)

Local. This species, where it has been recorded on mainly Mouse-eared hawkweed (*Hieracium pilosella*), seems to occur only in situations where there are many of its host plants growing together in short turf (e.g. on chalk downland, commons, edges of golf courses), and where such colonies have been established some years. Overwintering in

the egg stage, the adults of this bug may be found in June and July.

MIDDX. Finchley, 8.vi.44, on *Hieracium auriantiacum* and *Leontodon sp.*, *CHA* (17) (EMM **81**, 163-4); 6.vii.46 and 8.vi.47, on *H. auriantiacum* *CHA* (17); Ruislip LNR, 27.vi.55, three adults swept from a large colony of *Hieracium pilosella* growing in short turf on bark of dry ditch, *EWG* (49) (24).

HERTS. St. Albans, 24.vi.24, *PH* (BM).

ESSEX. Beyond the boundary at Althorne, near Burnham-on-Crouch, 16.vii.50, in rough meadows behind the sea wall, *WAS* (35b).

KENT. Darenth Wood, *TRB* (4) (22); Birch Wood nr. Darenth Wood, vii., *JAP* (28 (36) (4) (22); and beyond the boundary at Burnham (Gt. Culand chalk pit) 26.vi.65 and 30.vi.65, on *H. pilosella*, abundant, *AMM* (BM).

SURREY. Coulsdon, 20.vii.07, *ECB* (NM); Reigate, *ES* (37) (3); Reigate district, *J&TL* (32); Boxhill, 28.vi.08, *WW* (60) (62); 18.vii.37, *ECB* (NM); 14.vii.51, *DL* (HD) (SL) (*WJLeQ* coll.); *AAA* (51); *DC* in *AAA* coll. (51); Ashtead Common, 10.vii.48, *FJC* (SL) (62); Bookham Common, 4.vii.54, associated with *Hieracium pilosella*, *AMM* (BM); on the boundary near Egham, vii and viii.64, on *H. pilosella* on dry bank, *GEW* (EMM **91**, 54); and beyond at Chobham Common, vii.1877, *ES* (HD) (3).

BUCKS. Beyond the boundary at Wooburn Green, 10.vi.53, on *Hieracium pilosella*, *GEW* (40); Booker, 19.vii.54, *GEW* (*WJLeQ* coll.); and Taplow, 7.vi.53, in a disused sand-pit, adults and larvae in some numbers on one large patch of *Hieracium pilosella*, *GEW* (EMM **89**, 232) (40) (*WJLeQ* coll.); 18.vi.54 ♂, *GEW* (SL).

Tinicephalus hortulanus (Mey.-Dür) Sp. 239 p. 212
D&S p. 394 (*Oncotylus tanceti*) S p. 303 (*Macrocoleus hortulanus*) B p. 504 (Sp. 386, *M. hortulanus*)

Occasional. Associated with the Common Rock-rose (*Helianthemum chamaecistus*), a plant essentially of the chalk areas particularly along the N. Downs, and in Herts. and Bucks. The adults of this bug may be found on its host during July and August.

HERTS. Beyond the boundary on Tring Hills, vii.1897, on *Helianthemum*, *AP* (HD) (11) (12) (37).

ESSEX. Purfleet, *RML* (4).

KENT. Darenth Wood, *JAP* (BM); *ES* (37) (4) (22).

SURREY. Caterham, *GCC* (37) (3); Chipstead, 11.vii.56, *GEW* (40); Banstead (Park Downs), 8.vii.55, a large number taken as adults and all larval stages on *Helianthemum chamaecistus* (primary food plant), *GEW* (EMM **92**, 48); Banstead Downs, *AAA* (EMM **95**, 96); Reigate Hill, vii.1873, on *Onosis* [*sic*], *ES* (HD) (BM) (37) (3); Mickleham Downs, *JAP* (BM); *ES* (37) (3); 17.vii.48, amongst *Helianthemum*, *FJC* (SL) (1/**1948**/**49**, 73); between Leatherhead and Mickleham, vii, sweeping amongst flowers, etc., on hedgebank, *D&S* (28) (3); Boxhill, 9.vi.17, III and II instar larvae, *EAB* (BM); *FJC* (62); Headley Lane, *ES* (36); and beyond the boundary at Shere, viii.1892, *EAB* (BM) (3); Abinger, 26.vi.15, *EAB* (BM); and Chobham, viii.1876, *ES* (BM).

BUCKS. Just outside the boundary at Latimer, 18.ix.34 on *Helianthemum*, *DCT* (12); and beyond at Wooburn Green, 10.vi.53, *GEW* (40 and Coombe Hill, 11.vii.54, by sweeping grass on chalk hillside, *WJLeQ* (21) (EMM **90**, 250).

Megalocoleus molliculus (Fall.) Sp. 240 p. 212
D&S p. 387 (*Macrocoleus molliculus*) S p. 303 (*Macrocoleus molliculus*) B p. 503 (Sp. 385)

Locally common. Another species confined to a single host plant, namely the Common Yarrow (*Achillea millefolium*). This bug overwinters in the egg stage; the larvae hatching in early June. Adults which may be taken by sweeping are found from July to September.

MIDDX. Cripplegate, City of London, 23.vii.55, IV and V instar larvae swept from vegetation colonizing a derelict bombed basement site, *EWG* (25); Hampstead Heath, 5.vii.52, 26.vii.53 and 15.viii.50, *DL* (54); Muswell Hill, viii.20, *EAB* (BM); Finchley, 20.vii.43, on *Achillea*, *CHA* (17); Edgeware (Scratch Wood), 22.vii.60, scarce, *DL* (HD) (54); Ruislip LNR, 29.vii.55, ♂♂♀♀ and 19.ix.56 on Yarrow, *EWG* (49); 8.viii.64, *RAPM* (49); Hounslow Heath, 14.vii.53, locally common on *Achillea millefolium* on the Heath and on a rubble tip, *GEW* (33c) (40); 9.viii.53, *DL* (54); 26.vii.53, *WJLeQ* (21); and West Drayton, n.d., *FPP* (HD presented 1909).

HERTS. Bushey, *JAP* (BM); 25.vii.43, *CHA* (17); Watford, 27.vi.60, adults swept from a dry bank with Yarrow, *DL* (54); and beyond the boundary at Berkhamsted, 31.vii.33, *DCT* (12); and Harpenden, 13.viii.34, *DCT* (12); 31.vii.37, *PH* (BM); 2.viii.54 and 1.ix.54, *GGES* (HD).

ESSEX. Purfleet, *RML* (5); near Grays, vii.38, abundant with *Megalocoleus pilosus* on *Achillea millefolium*, *DCT* (EMM **79**, 199); and beyond the boundary at Danbury, 18.vii.64, *PLJR* (MM).

KENT. Blackheath, *AAA* (22); Lewisham, 26.vii.1892, *AJC* (HD); Charlton, *AAA* (22); Birdbrook, near Kidbrooke, *JAP* (BM); Lee, *JAP* (BM); (Manor Farm Lane), 10.viii.1900, *WW* (60) (39); vii., *D&S* (28) (4); Plumstead, *AAA* (22); Bostal Woods, *AAA* (22); Gravesend, 9.viii.48, on dahlia and yarrow rubbish, *TRES* (13); Fawkham, 19.vii.52, *GGES* (HD); and Wickham Wood, 5.viii.02, on Yarrow, *WW* (SL).

SURREY. Cheam (Nonsuch Park), 22.vii.55, *EWG* (24); Ashtead, *FJC* (62); Boxhill, 8.vii.49, *FJC* (SL) (62); West End Common, 30.vii.51, *FJC* (SL); Surbiton, *ES* in *WW* coll. (60) (62); Weybridge, vii., *D&S* (28); and beyond the boundary at Woking, vii.1890 and viii.1900, *ES* (HD); and Maybury near Woking, *FJC*(62).

BUCKS. Langley, 1.viii.52, *GEW* (40); Gerrard's Cross, 27.vii.53, *GEW* (40); on the boundary at Fulmer, 30.viii.53, *WJLeQ* (21); Slough (PILG), viii.54, *GEW* (40); and Burnham Beeches, *WES* in *EAB* coll. (BM).

Megalocoleus pilosus (Schrank) Sp. 241 p. 213
S p. 303 (*Macrocoleus tanaceti*) B p. 502 (Sp. 384)

Rare. Most of the available records for this species are from Surrey, although it is probably more widespread as its host plant, Tansy (*Chrysanthemum vulgare*) (=*Tanacetum vulgare*), occurs within the London Area of all six Home Counties. Both larvae and adults feed on the buds, flowerheads and unripe fruits of the plant; the adults being found from July until the beginning of September.

ESSEX. Near Grays, vii.38, "abundant" [*sic*] with *Megalocoleus molliculus*, *DCT* (EMM **79**, 199); and beyond the boundary at Writtle, 29.vi.48, *AMM* (BM).

KENT. Lewisham, 26.vi.1892, *AJC* (HD); Bexley (Joyden's Wood),

11.vii.64, *KCS* (14); Ruxley gravel pit. 21.vii.63, *KCS* (14); and on the boundary at Gravesend (Milton), 21.viii.51, on Tansy, *TRES* (13).

SURREY. Bexhill, 30.viii.48, *FJC* (SL) (62); 27.viii.50, abundant [*sic*] on Tansy, *DL* (HD) (1/**1950-51,** 77); 25.vii.52, *DL* (HD) (*WJLeQ* coll.); 12.ix.53 on Tansy, *WJLeQ* (21); Surbiton, on *Achillea*, *ES* (37) (3); Oxshott Heath. 18.vii.53, common [*sic*] on Tansy near railway station, *FJC* (1/**1953-54,** 85-86); West End Common, *FJC* (62); and beyond the boundary at Chobham, viii.1875, viii.1876 and vii.1892 on *Tanacetum*, *ES* (HD) (36) (37); by the River Wey at Burnham near Guildford, 20.vii.43 ♂♂ & ♀♀, *ECB* (NM); 20.vii.45, *AMM* (BM); Gomshall, *FJC* (62); and Shalford, *EAB* (37) (3).

BUCKS. Langley, 20.viii.56, on Tansy, *GEW* (40); Slough (PILG), viii.53, "common" on *Tanacetum vulgare* on canal bank, *GEW* (EMM **90,** 40); and beyond the boundary at Amersham, 22.ix.56, *WJLeQ* (21).

Amblytylus delicatus (Perr.) Sp. 242 p. 213
S p. 304 B p. 505 (Sp. 387)

Rare. Only taken so far in Surrey (both records beyond the LNHS area). The adults should be searched for, from mid July to mid August, on its host plant cudweed (*Filago germanica*) which grows in dry situations. The bug overwinters in the egg stage.

SURREY. Beyond the boundary at Woking, viii.1888, *ES* (HD) (37) (3); and at Witley, 8.vii.58, *GEW* (40) (Entom. **92,** 9-10 (1959)).

Amblytylus brevicollis Fieb Sp. 243 p. 213
S p. 305 B p. 505 (Sp. 388)

Rare. A species occurring in dry grassland and taken by sweeping from late June to August. It is sometimes found in company with *Lopus decolor*, the males of which the male of *A. brevicollis* resembles.

MIDDX. Uxbridge, 27.vii.34, a single ♂ on *Holcus*, *DCT* (33a). (Mr. D. Leston (*in litt.*) considers that this record probably refers to the next species].

HERTS. Beyond the boundary at Harpenden, 15.vii.37, a single ♂, *BSW* in *AMM* coll. (BM).

KENT. Shooters Hill, 30.vii.1900, in shrubbery (60) (4) (39) (22).

SURREY. Chipstead, 16.vii.11, *ECB* (NM); Mickleham, *JAP* (BM); Boxhill, 18.vii.37, *ECB* (NM); Ranmore Common, 6.viii.05, by sweeping, *WW* (60) (62); Oxshott, *WW* (62); West End Common, 23.vii.11, *WW* (60) (62); on the boundary at Wisley Common, *WW* (62); and beyond at Woking, vii.1890, *ES* (HD) (BM) (37) (3); Chobham, vi.1876, *ES* (HD) (37) (3).

BUCKS. On the boundary at Slough (ICBFS), 19.vi.34, found on grass, *WHG* (41).

Amblytylus nasutus (Kirschb.) Sp. 244 p. 214
D&S p. 389 (*A. affinis*) S p. 305 (*A. affinis*)
B p. 505 (Sp. 389, *A. affinis*)

Local. Occasionally found on commons and wasteland where it feeds on meadow grass (*Poa pratensis*) and allied species. Overwintering eggs hatch in May and the larvae become adults from mid June. Their numbers have diminished by early August.

MIDDX. Cripplegate, City of London, 18.vi.55, swept from vegetation colonizing a derelict bombed basement site, *EWG* (25); Hampstead Heath,

20.vi.49, near Jack Straws, widespread, *DL* (HD) (*WJLeQ* coll.) (1)**1909-50,** 36-8); Finchley, 2.vii.44, on *Holcus lanatus*, *CHA* (17) (EMM **81,** 163-4); 1.vii.50, *DL* (SL); Ruislip LNR, 8.viii.64, amongst grass on chalk area, *RAPM* (49); Harefield, 26.vi.52, *WJLeQ* (21); Hounslow, Heath 14.vii.53, locally common on seeding grasses on a rubble tip and on the Heath, *GEW* (40) (33c) (EMM **91,** 54); 26.vii.53, *WJLeQ* (21).

HERTS. Rickmansworth, 4.vii.1900, *S. R. Ashby* in *WW* coll. (60); Bushey, 25.vii.43, *CHA* (17); Elstree, 22.vi.60, *DL* (HD) (54); Radlett, 20.vi.60, two adults and ten V instar larvae swept from grass in meadows, some found to be parasitized, *DL* (EMM **97,** 66) (HD) (54); and beyond the boundary at Harpenden, 3.vii.55, *GGES* (HD).

ESSEX. Beyond the boundary at Benfleet, 27.vi.14, *EAB* (BM); and at Writtle, 29.vi.48, by sweeping, *AMM* (BM).

KENT. Blackheath, on clover, *AAA* (51) (22); Abbey Wood, on clover, *AAA* (51) (22); Lee, *TRB* (37) (22); Eltham, vii, a single specimen by sweeping short grass, etc, *D&S* (28) (4) (22) (37) (36); Bexley (Joyden's Wood) 11.vii.64 and 3.vii.65, *KCS* (14); Ruxley gravel pit, 8.vii.67, *KCS* (17); Farningham Wood, 21.vi.49, 2.vii.61 and 5.vii.65, *KCS* (14) (22); and Westerham, *AAA* (22); and just beyond the boundary at Sevenoaks (Knole Park) 27.vii.63, *KCS* (14) (48).

SURREY. Riddlesdown, 20.vi.53, *EWG* (24); Reigate, *ES* (37) (3); Boxhill, 18.vii.37, *ECB* (NM); 24.vi.51, *DL* (1/**1951-52,** xvi); *FJC* (62); Cheam (Nonsuch Park), 8.vii.55, *EWG* (24); Ashtead, *GCC* (37) (3); *FJC* (62); Mickleham, *JAP* (BM); Bookham Common, 1.vii.49, *FJC* (SL) (62); vii, *DL* (34); 19.vii.64, *PSB* (16); Sunbury-on-Thames, 22.vi.52, by sweeping, *AMM* (BM); Weybridge, *JAP* (BM); on the boundary near Egham, 21.vii.54, in swampy field, "large swarms of larvae at bases of *Juncus* tufts and grasses even when these were growing in standing water", *GEW* (EMM **91,** 54) (40); and beyond at Woking, vi.1882, vii.1890 and vi.1892, *ES*)(HD) (37) (3); Chobham Common, vii.54, large numbers swept from sparse grass tufts on dry gravelly soil, *GEW* (EMM **91,** 54).

BUCKS. Slough, 23.vii.54, *GEW* (40); and beyond the boundary at Chesham Vale, 5.vii.52, *WJLeQ* (21); Amersham, 22. and 24.vii.56, 7.vii.51 and 18.vii.53, *WJLeQ* (21); Hawridge Common, between Chesham and Wendover, 23.vi.61, *WJLeQ* (21); Coombe Hill, 7.vii.63, *PSB* (16); and at many other localities in the country, *GEW* (40).

Macrotylus solitarius (Mey.-Dür) Sp. 245 p. 214
D&S p. 395 (*Oncotylus pilosus*) S p. 298
B p. 506 (Sp. 390)

Local, though not uncommon in some localities where its primary host, Hedge Woundwort (*Stachys sylvatica*) occurs particularly if such colonies of the plant are growing at the edges of woods. The adults may be found from July until the middle of August. Also stated to be on Black Horehound (*Ballota nigra*).

MIDDX. St. John's Wood (Finchley Road), N.W.8, 13.vi.52, in old bombed garden on *Stachys sylvatica DL* (HD) (54); 16.vii.52, *DL* (54); Finchley, 24.vi.44, on *Stachys*, *CHA* (17); Ruislip, 7.viii.44, *CHA* (17); Ruislip LNR, 24.vii.56, adults swept from *Stachys sylvatica EWG* (49); vi-vii.64, larvae on host plant, *RAPM* (49); Uxbridge, 27.vii.34 and 8.viii.36, common on *Stachys sylvatica* on the juices of which it will feed, *DCT* (33a).

HERTS. Bushey, 25.vii.43, *CHA* (17); Batchworth (Bishop's Wood), 14.vi.60, III-V instar larvae (the bulk which was large was in III and IV) on *Stachys sylvatica*, some parasitized, one bred out to adult 23.vi.60, *DL* (HD) (54) (EMM **97**, 66); Hatfield Forest, 24.vii.60, *DGH* (ST); and beyond the boundary at Harpenden, 18.vii.37, *BSW* in *PM* coll. (BM); 11.viii.37, *DCT* (12); 12.viii.55, *GGES* (HD); 23.vii.55, in light trap, *GGES* (HD); and Berkhamsted, 31.vii.33, *DCT* (12).

KENT. Charlton, *AAA* (22); Fawkham, 22.vii.56, *GGES* (HD); Gravesend, 4.viii.48, on *Ballota nigra*, *TRES* (13) (22); Eynsford, *AAA* (51); and beyond the boundary at Birling E. of Wrotham, 18.vii.54, *AMM* (BM) and *AMM* in *PLJR* coll. (MM); and Harvel, N.E. of Wrotham, 18.vii.54, both on flowers of woundwort, *AMM* (BM).

SURREY. Caterham, *GCC* (37) (3); Chipstead, 21.vii.12, *ECB* (NM); Reigate, *ES* (37) (3); locally plentiful a *Stachys sylvatica* being first seen on 2.vii.50 and finally disappearing after 14.viii.50, *GBR* (EMM **87**, 139); Mickleham, *JAP* (37) (3); Boxhill, *FJC* (60); Ashtead Common, 9.vii.47, abundant on *Stachys*, *FJC* (SL) (62) (1/**1907-48**, 57); Claygate, *JAP* (BM); Bookham Common, 16.viii.55, ♀, *EWG* (24); Oxshott, *FJC* (62); on the boundary at Effingham, 22.vii.49, *FJC* (SL) (62); and Egham, 21.vii.54, *GEW* (40); and beyond at Guildford, 27.vii.43, *ECB* (NM); Shere, *EC*, (37) (3); viii.1890, *EAB* (BM); viii.1892, *EAB* (BM), *EAB* in *ES* coll. (HD) and *EAB* in *ECB* coll. (NM); and Chilworth, 25.vii.44, *ECB* (BM).

BUCKS. Denham, 10.viii.58, *GEW* (40); on the boundary at Slough (PILG), 1953, several found on *Stachys sylvatica*, *GEW* (EMM **90**, 40); and beyond at Latimer Road, Chesham, 4.viii.65, sweeping in a field, *WJLeQ* (21); Latimer, 25.viii.51, *WJLeQ* (21); and Chesham Vale, 5.vii.52, *WJLeQ* (21).

Macrotylus paykulli (Fall.) Sp. 246 p. 214
D&S p. 388 (*Macrocoleus paykulli*) S p. 299
B p. 507 (Sp. 391)

Local. This species is associated with Rest-harrow (*Ononis repens* and *O. spinosa*), plants of dry situations such as on downland, waste ground and open banks. The adults are present on the host from June until August.

MIDDX. Enfield Chase (Hadley Wood), 25.vi.44, *CHA* (17); Harefield, 21.vi.52, *WJLeQ* (21).

HERTS. Barnet, viii.1885, *EAB* (BM); Chorley Wood, 16.viii.16, *EAB* (BM); St. Albans, 10.vii.24 and vii.25, *EAB* (BM); and beyond the boundary at Royston, 25.v.12, *EAB* (BM) (11); Wymondley, *EAB* (11); "widely distributed [*sic*] wherever *Ononis* its food occurs", *DCT* (12).

ESSEX. Woodford, 17.viii.25, *EAB* (BM): and beyond the boundary at Benfleet, 27.vi.24, *EAB* (BM).

KENT. Lewisham, 1896, *WW* (37); and beyond the boundary at Sevenoaks, *AMM* (22).

SURREY. [The record in Douglas & Scott (source 28 and repeated in source 3) under *Macrotylus solitarius* as "between Sanderstead and Addington, viii, a single specimen by sweeping amongst *Ononis spinosa* and c.," should obviously be referred to this species—E. W. G.]; Banstead Downs, *AAA* (51); Ashstead, *JLH* (62); Reigate Hill, vii.1873, *ES* (HD); Boxhill, *WW* (62); 17.vii.1895, *AJC* (HD); *AAA* (51); Headley Lane, *WW* (62); 10.viii.35, *ECB* (NM); Mickleham, 29.vi.11, *ECB* (NM); and beyond the boundary at Abinger 25.v.12, *EAB* (BM).

BUCKS. Just outside the boundary at Hedgerley, 17.vii.55, on Restharrow, *GEW* (40); and beyond at Coombe Hill, 11.vii.54 and 6.viii.60, on *Ononis*, *WJLeQ* (21).

Orthonotus rufifrons (Fall.) Sp. 247 p. 215
D&S p. 352 (*Byrsoptera caricis*) S p. 307 (*B. rufifrons*)
B p. 509 (*Sp. 393, B. rufifrons*)

Local. A species sometimes confused with *Mecomma ambulans* with which both sexes resemble. It is found on nettle particularly in those clumps growing in damp, shady situations. The adults which are present from July until September feed upon the flower buds and unripe fruit of the host plant.

MIDDX. Edgeware (Scratch Wood), 30.vii.44, on *Urtica*, *CHA* (17); Ruislip LNR, 29.vii.58, ♀, *EWG* (49).

HERTS. Barnet, viii.1885, *EAB* ♀; Chorley Wood, *EAB* (11); St. Albans, viii.1885, ♀, *EAB*; and beyond the boundary at Wymondley, viii.1880, ♂, *EAB* (BM) (11).

ESSEX. Theydon Bois, vii.12, adult ♀ and IV instar, *EAB* (BM); vii.22, by sweeping *CN* (32a); Epping Forest (Ivy Chimneys), 25.vii.59, *FB* (18); and Purfleet, *RML* (5).

KENT. Blackheath, vii, *D&S* (28) (4) (22); Abbey Wood, 30.vii.1898, by sweeping, *WW* (60) (4) (39) (22); Shoreham, 13.viii.22, ♂, *PH*; on the boundary at Sevenoaks (Knole Park), *AAA* (51); and beyond at Birling, 10.vii.54 ♂ and ♀, on nettle, *AMM* in *EWG* coll. (24).

SURREY. Wimbledon Common, 3.viii.32, *FJC* (SL) (62); Chipstead, 21.vii.12, *ECB* (NM); 28.vii.55, *GEW* (40); Redstone, near Reigate, in sandpit, *J&TL* (32); Oxted, 11.vi.1893, *AJC* (HD); between Leatherhead and Mickleham, vii, by sweeping in a hedgebank, *D&S* (28) (62); Boxhill, 4.viii.49 ♂, *FJC* (SL) (62); Bookham Common, 16.vi.57, V instar larva, *EWG* (24); vii, *DL* (34); Claygate, *JAP*, ♂ and ♀, (BM); Esher Common, 21.vii.52 ♂, 29.vii.53 ♀ and 30.vii.51 ♀, *FJC* (SL); Oxshott Heath, *FJC* (62); on the boundary at Egham, 21.vii.55, *GEW* (40); Byfleet, 15.viii.39, *FJC* (SL); and beyond at Virginia Water, 25.vii.56, *GEW* (40); Wisley, 9.vii.05, ♀, *WW* (SL) (60); Holmbury, viii.1892, *EAB* (BM); Shere, viii.1892, *EAB* (BM); Gomshall, viii.1892, ♀, *EAB* (BM); and Ewhurst, viii.1889, ♀, *EAB* (BM).

BUCKS. Langley, 24.vi.55, *GEW* (40); on the boundary at Datchet (Ditton Park), 3.vii.56, on nettle, *GEW* (40); Slough (PILG) 2.vii.53, *GEW* (40); and beyond at Latimer, 21.viii.54, on nettle, *WJLeQ* (21); Chesham Vale, 5.vii.52, on maple, *WJLeQ* (21); Amersham, 24.vii.56 and 16.vii.64, *WJLeQ* (21); 9.vii.49, *DL* (HD); Little Missenden, 13.vii.52, *WJLeQ* (21); and Burnham Beeches, 22.vi.12, V instar larva, *EAB* (BM).

Harpocera thoracica (Fall.) Sp. 248 p. 215
D&S p. 469 S p. 306 B p. 508 (Sp. 392)

Common. Found on oak. Eggs laid in May and June in the tissues of young oak, hatch early the following Spring. As soon as they emerge, the young larvae crawl beneath the newly unfolding bud scales. Later instars live amongst the young leaves, feeding mainly on the developing catkins. The adult stage is reached by the end of May; the males living for only about a week whilst the females, after egg laying, survive until mid-June.

MIDDX. Hampstead Heath, 23.v.43, on oak, *CHA* (17); 14.v., 15.v. and 31.v.49, on oak, *DL* (54) (1/**1949-50**, 36-38); 14.v.49, *DL* (SL); Mill Hill, N.W.7, 27.v.63, at light, *J. A. Grant* (BM); Stanmore Common, 30.v.60, a few adults still present, all ♀♀, *DL* (54); Ickenham Golf Course Nature Reserve, 30.v.54 ♂ and ♀, *EWG* (24); Northwood, 4.v.43, *PJLR* (20); Ruislip LNR, 25.v.64, adults actively flying, *WFS* (49); Uxbridge, 16-20.v.33 and 12.v.34 and Harefield, 5.vi.37, scattered but not rare, generally taken in sweeping *Urtica* and *Mercurialis perennis*, sometimes under oak trees, *DCT* (33a).

HERTS. Chorley Wood Common, 27.v.63, *PSB* (16); Hatfield, 6.vi.64, *PLJR* (MM); Rye Meads, near Hoddesden, 16.v.65, *BSN* (58); and beyond the boundary at Harpenden (Rothamsted Expt. Station grounds), 22.v.34, to light, "a very early species", *DCT* (12); and Royston 31.v.09, *EAB* (BM).

ESSEX. Waltham Abbey, 15.v.66, *PSB* (16); Walthamstow, vi.02, between St. Peters Church and the Waterworks, on hawthorn, *EAB* (BM) (32a); Epping Forest, v.04, *EAB* (BM); *AAA* (51); (Highams Park), vi.16, *CN* (32a).

KENT. Lewisham, v., not uncommon by beating bushes, *D&S* (28) (4) (39) (22); 25.v.1895, *AJC* (HD); Grove Park, *WW* (4) (39) (22); Lee (Hither Green Lane), 14.vi.1900, by beating oak, *WW* (1/**1900**, 76) (4) (39) (22); Hither Green, 28-31.v.1900, "from the little wood in the field near the railway", *WW* (60); Blackheath, *AAA* (22); Eltham, *D&S* (28) (4) (39) (22); Bexley, *D&S* (28) (4) (39) (22); Bromley, vi.1883, *ES* (HD) (4) (22); West Wickham Wood, *JAP* (BM); Abbey Wood, *WW* (39); Darenth Wood, 14 and 28.v.1893, *AJC* (HD); *AMM* (BM) (22); Gravesend v.46, sweeping herbage, *TRES* (13); and Westerham (Tower Wood), 17.vi.51, *DL* (1/**1951-52**, 72).

SURREY. Coombe, vii.1874, *ES* (HD); Dulwich Wood, London, S.E., 17.vi.04, *HStJKD* (HD); Shirley Common, 28.v. and 18.6.1898, *WW* (60) (62); Banstead, 16.v.52, in MV trap, *AEG* (SL); Ashtead, 4.vi.04, *AJC* (HD); 13.vi.06, *HStJKD* (HD); 9.vi.05, *ECB* (NM); 4.v.46, *FJC* (SL) (1/**1946-47**, 70); Reigate district, *J&TL* (32); Headley Lane, *WW* (62); Mickleham, v.17, *n.c.* (SL); Headley Lane, *WW* (62); Boxhill, 28.v.1895, *AJC* (HD); Ranmore Common, 29.v.04, beating oak, *WW* (60) (62); 30.v.1898, *n.c.* (SL); Claygate, *JAP* (BM); Bookham Common, 13.v.56, V and IV instar larvae, *EWG* (24); v. and vi., *DL* (34); *FJC* (62); Esher Common, *JAP* (BM); (Black Pond), *FJC* (62); Oxshott Heath, 28.v.1892 and 6.iv.1893, *AJC* (HD); 27.v.11, *EAB* (BM); 11.v.60, *DL* (HD); and beyond the boundary at Clandon, 21.v.60, *DL* (HD); Byfleet, 30.v.1891, *AJC* (HD); 20.v.16, *EAB*; Woking, v.1871, *ES* (HD); Chobham, vi.1876, *ES* (HD); 30.v.58, on oak, *GEW* (40); Horsell Common, *FJC* (62); by Basingstoke Canal, between Pirbright Bridge and Frimley Green, 1954-55, HDS (50); and Albury, vi.1900, *EAB* (BM).

BUCKS. Langley, 4.vi.55, *GEW* (40); on the boundary at Slough (ICBFS), 5.v. and 6.vi.33 and 15.v. and 22.v.34, on oak, *WHG* (41); (PILG), 3.vi.54, *GEW* (40); and beyond at Penn Wood, 1.vii.51, *WJLeQ* (21); and Coombe Hill, 6.vi.64, *PSB* (16).

Tytthus pygmaeus (Zett.) Sp. 249 p. 216

S p. 283 (*Cyrtorhinus pygmaeus*) B p. 480 (Sp. 352, *C. pygmaeus*)

Local. This bug inhabits damp marshy situations where it is found at the bases of *Juncus* and grasses. Both the adults (occurring from

July to early September) and larvae are predaceous on the eggs of leaf hoppers. There are as yet no London Area records from Essex or Kent.

MIDDX. Edgeware (Scratch Wood), 22.vii. and 23.vii.60, adults and V instar larvae, *DL* (54) (HD); Ruislip LNR, vii.64, adults in grass north of chalk area, *RAPM* (49); Harefield, 22.viii.16, *EAB* (BM); Hounslow Heath; 9.viii.53, *DL* (54) (HD) (SL); 26.vii.53, *DL* (HD) and *DL* in *WJLeQ* coll. (21); 19.vii.52 and 20.vii.53, fairly common in swampy area, *GEW* (40) (336) (33c); 23.vii.56, a number collected from *Juncus* tufts in a swamp, *GEW* (EMM **92,** 296).

HERTS. Barnet, viii.1885, *EAB* (BM) (37); North Mimms, *EAB* (11) (12); Batchworth Heath, 24.viii.16, *EAB* (BM); and Rickmansworth, 4.viii.57, *WJLeQ* (21).

SURREY. Wimbledon, *JAP* (BM); *ES* (37) (3); Bookham Common, 5.viii.50, "by searching at bases of rushes in damp meadow immediately N.E. of the railway station" "five specimens taken by two of us in an hour", *DL* (1/**1950-51,** 13-14) (EMM **86,** xxxii) (SL) and *DL* in *WJLeQ* coll. (21); 30.vii.51, *DL* (SL); vii and viii, *DL* (34); 13.ix.53 and 8.vii.56, *EWG* (24); Esher Common, 9.viii.08, *WW* (60) (1/**1908-9,** 69); *JS* (BM) (Lectotype of *Tytthus insignis* D&S); *TAM* (37) (3); West End Common, 23.vii.11, at roots of reeds, *WW* (60); Weybridge (Brooklands), 30.vi.63, *PSB* (16); on the boundary near Egham, 1954, in damp swampy field, *GEW* (EMM **91,** 54); 1.ix.55, *GEW* (40); and beyond at Chobham, *ES* (37) (3); viii. and ix.1882, *EAB* (BM); and Virginia Water, 22.vi.59, *GEW* (40).

BUCKS. On the boundary at Slough, vii.54, in damp field about one mile N. of the town, swept with *Poeciloscytus palustris* from *Galium palustre*, *GEW* (EMM **91,** 36); (ICBFS), 27.vi. and 14.vii.33 and 7.vi.34, on grass, *WHG* (41); Slough, ix.55, *GEW* (40).

Tytthus geminus (Flor) Sp. 250 p. 216

B p. 480 (Sp. 353, *Cyrtorhinus geminus*)

Rare. Inhabits damp situations similar to those of the previous species, even where the rushes may be in standing water. The adults occur later in the season than those of *T. pygmaeus*, being found from late August until October.

MIDDX. Hounslow Heath, 23.vi.56, a single ♂ taken with a number of *T. pygmaeus* from *Juncus* tufts in a swamp, *GEW* (EMM **92,** 296).

HERTS. Rickmansworth, 4.viii.57, *WJLeQ* (21); Broxbourne, 18.ix.09, *EAB* (12).

Brachyarthrum limitatu Fieb. Sp. 251 p. 217

B p. 510 (Sp. 394)

Very local. The adults of this bug occur from late June to the end of July and are associated with aspen (*Populus tremula*). It overwinters in the egg stage. The species should be searched for on these trees in Middlesex—the only Home County in which it is so far not yet recorded.

HERTS. Bricket Wood Common, 18.vii.38, *BSW* in *PM* coll. (BM); 21.vi.47, from aspen thicket, *CHA* (17) (EMM **96,** 91); and 3.vii.56, adults and V instar larvae on aspen, *EWG* (24).

ESSEX. Epping Forest (Monk Wood), 3.vii.15, in some numbers along with *Orthotylus bilineatus*, on aspen, *EAB* (BM) (60) (35a) (*Butler's Biol.* p. 511).

KENT. Blackheath, at mercury vapour light, *AAA* (22); and Westerham, 7.vii.22, *PH* (BM)(22).

SURREY. Just beyond the boundary at Chobham Common, 21.vi.60, larvae in numbers on aspen, GEW (EMM **96,** 152).

BUCKS. Beyond the boundary at Burnham Beeches, 7.vii.54, on aspen, *GEW* (40).

Phylus palliceps Fieb. Sp. 252 p. 217 (as *P. pallipes*)
D&S p. 355 S p. 308 B p. 511 (Sp. 395)

Local. Occurs on oak often in company with the next species. The adults are found from early June until the beginning of August.

MIDDX. Highgate, vi. and vii.1892 and vii.1885, Hampstead Heath, 30.v.43, on oak, *CHA* (17); Hounslow Heath, 19.vii.52, common on *Quercus* in scrub vegetation, *GEW* (40) (33c).

HERTS. Barnet, vii.1885, *EAB* (BM); Bricket Wood Common, 3.vii.56, *EWG* (24); St. Albans, 17.viii.34, *DCT* (12); and beyond the boundary at Berkhamsted, vii.36, on *Quercus*, *DCT* (12).

ESSEX. Epping Forest, Chingford, 5.vi.15, 10.vi.11, 14.vi.13, 26.vi.11, 3.vii.09 and vii.1892, *EAB* (BM); (Monk Wood), on oaks, *CN* (35a); (Buttonseed Corner) *CN* (35a).

KENT. Shooters Hill, 1901, *WW* (4) (39) (22); Blackheath, *AAA* (22); Abbey Wood, *AAA* (51); Darenth Wood, vi, sparingly on nut bushes, *D&S* (28) (4) (22); *JAP* (BM); Bromley, *ES* (4) (22); West Wickham Wood, 13.vi. and 27.vi.1896 and 7.vii. and 21.vii.1894, on oak and on hazel, *WW* (60); 7.vii.1894, *WW* (SL); and Westerham, 7.vii.22, *PH* (BM).

SURREY. Wimbledon Common, *FJC* (62); 25.vi.55, *EWG* (24); Croham Hurst, *JAP* (BM); Reigate, *GBR* (62); Reigate district, *J&TL* (32); Ashtead Wood, 20.vii.46, *FJC* (62) (1/**1946-47,** 74); Boxhill, *FJC* (62); Bookham Common, vi.18, on oak, n.c. (54); vii., *DL* (34); *FJC* (62); Arbrook Common, *FJC* (62); Esher Common, 11.vi.49, *FJC* (62) (1/**1949-50,** 75); Oxshott Heath, 6.vii.1895, *AJC* (HD); 11.vi.49, *FJC* (1/**1949-50,** 75); 15.vi.58, *EWG* (24); on the boundary at Byfleet, 24.vi.49, *FJC* (SL); and beyond at Woking, vii.1888, *ES* (HD); Chobham, vii.1892, *ES* (HD); and Shere, viii.1892, *EAB* (BM).

BUCKS. On the boundary at Slough (ICBFS), 16.vi.33 and 12. and 26.vi.34, on oak, *WHG* (41); (PILG), various dates, *GEW* (40); and beyond at Amersham, 18.vii.54, *WJLeQ* (21); Penn Wood, 7.viii.54, *WJLeQ* (21); and Burnham Beeches, 31.vii.54, *WJLeQ* (21).

Phylus melanocephalus (Linn.) Sp. 253 p. 217
D&S p. 355 S p. 308 B p. 512 (Sp. 396)

Locally common. Another species associated with oak. It overwinters in the egg stage and the adults, which are partly phytophagous and partly predaceous (on aphids, etc.), occur from about mid-June to early August.

MIDDX. Hampstead Heath, 30.v. and 20.vi.43, on oak, *CHA* (17); 10.vi, 11.vi, 23.vi. and 24.vi.49, on oak, *DL* (HD) (54) (1/**1949-50,** 36-8); 22.vi.50 ♀ and 5.vii.52, *DL* (HD) (54); vii.56, adult ♂ contained on dissection on Euphorine braconid larva, *DL* (EMM **94,** 35); 1.vi.50 V and IV instar larvae, two of which were parasitized, *DL* (EMM **97,** 66); Highgate, vi.1892, vii.1878, vii.1885, vii.1892, *EAB* (BM); Ruislip LNR, 1955-58, adults common on scrub oak from mid-June to late July, *EWG* (49); none seen after end of July, *RAPM* (49); Ruislip, vi.59, *C. Fellows*

(BM); Stanmore Common, 30.v.60, V instar larvae on oak, *DL* (EMM **97,** 66); Hounslow Heath, 19.vii.52, common on *Quercus* in scrub vegetation, *GEW* (40) 33*c*).

HERTS. Barnet, viii.1885, *EAB* (BM); Boreham Wood, 27.vi.60, *DL* (54); Radlett, 20.vi.60, on oak, *DL* (HD) (54); Bricket Wood Common, 14.vii.54, *TRES* in *WJLeQ* coll. (21); 3.vii.56, *EWG* (24); Whippendell Wood, 3.vi.60, V instar larvae (some parasitized), *DL* (EMM **97,** 66) (54); Rickmansworth, 1933-37, *DCT* (12); St. Albans, 1933-37, *DCT* (12); and beyond the boundary at Redbourn, 23.vii.60, *DL* (HD) (54); Harpenden, 1933-37, *DCT* (12); Berkhamsted, 1933-37, *DCT* (12); and Tring, 1933-37, *DCT* (12).

ESSEX. Epping Forest, 5.vii.63, *PSB* (16); 20.vi.64, *PLJR* (MM); (Chingford), 10 and 22.vi.11, *EAB* (BM); vii.1891, *EAB* (BM); (Buttonseed Corner), on oaks, *CN* (35a); (Monk Wood), on oaks, *CN* (35a).

KENT. Shooters Hill, 1901, *WS* (4) (39) (22); Blackheath, *AAA* (22); Abbey Wood, *AAA* (51); Darenth Wood, *JAP* (BM); 1893, *AJC* (HD); vi. not uncommon on nut-bushes, *D&S* (28) (4) (22); 16.viii.11, beating oak, *WW* (60); Birch Wood, *JAP* (BM); Farningham Wood, *KCS* (22); Bromley, *ES* (4) (22); West Wickham Wood, 27.vi.1896, on oak and hazel, *WW* (SL) (60); and Westerham, 7.vii.22, *PH* (BM).

SURREY. Wimbledon Common, 12.vi.48, *FJC* (SL); 25.vi.55, *EWG* (24); Riddlesdown, 20.vi.53 and 12.vii.58 ♂ and ♀, *EWG* (24); Croham Hurst, *JAP*, (BM); Reigate, *GBR* (62); Reigate district, *J&TL* (32); Ashtead Woods, *FJC* (62); Boxhill, 18.vii.37, *ECB* (NM); 8.vii.49, *FJC* (SL); Bookham Common, vi.18, n.c. (54); *DL* (34); 21.vi.55, 16.vi.57 ♀♀, and 10.vii.55, *EWG* (24); 9.viii.66, *PSB* (16); Arbrook Common, *FJC* (62); Esher Common, *JAP* (BM); 11.vi.49, *FJC* (SL) (1/**1949-50,** 75); Oxshott Heath, 24.vi.1897, *AJC* (HD); 7.vii.1900, *AB* in *AJC* coll. (HD); 30.vi.51, *FJC* (1/**1951-52,** 73); on the boundary at Byfleet, 2.vii.32, *FJC* (SL) (62); and beyond at Guildford, 28.vii.41, *ECB* (NM); Woking, vii.1888, *ES* (HD); Chobham, vii.1877, *ES* (HD); 17.vi.54 on oak, *GEW* (40).

BUCKS. On the boundary at Datchet, 10.vi.56, *GEW* (40); Slough (ICBFS), 6.vi. and 16 vi. 33 and 12.vi.34, on oak, *WHG* (41); (PILG) various dates, *GEW* (41); and beyond at Hodgemoor Wood, 11.vii.54 and 14.vii.51, on oak, *WJLeQ* (21); Penn Wood, 1.vii.51 and 7.viii.54, on oak, *WJLeQ* (21); and Burnham Beeches, 22.vi.12, *EAB* (BM); 31.vii.54, on oak *WJLeQ* (21).

Phylus coryli Linn. Sp. 254 p. 219
D&S p. 356 & 357 (*P. avellanae*) S p. 308
B p. 512 (Sp. 397 and var. *avellanae*)

Locally common on hazel, where the adults which are found from June until August, are predaceous on aphids and other small insects. Originally described from the black-bodied form, the paler varieties may be referred to the var. *avellanae* thought at one time to be a distinct species. Records for the variety have not been given separately here. Almost certainly in Essex, but no records at present available.

MIDDX. Hampstead Heath, 20.vi.43, *CHA* (17); Highgate, vi.1893 and vii.1885, *EAB* (BM); and Uxbridge, 23.vi.33, abundant on *Corylus*, *DCT* (33a).

HERTS. Chorley Wood, 11.viii.16 (BM), *EAB* (11) (12); Aldenham, 23.vii.61, on hazel, *DL* (HD) (54); Radlett, 20.vi.60, on hazel, *DL* (HD) (54); Shenley, 27.vi.60, on hazel, *DL* (54); and beyond the boundary at Harpenden (Rothamsted Expt. Station grounds), 8.viii.37, on *Corylus*, *DCT* (12); 15.vii.34, to light, *DCT* (12).

KENT. Blackheath, 30.vi.1895, *AJC* (HD); (Shooter's Hill), *WW* (4) (39) (22); Abbey Wood, 16.vii.1898, on elm, *WW* (60) (39); *AAA* (51); Darenth Wood, vi. and vii., common on nut-bushes, *D&S* (28) (4) (22); *JAP* (BM); 1.viii.49, on nut, *AMM* (BM); Bromley, vii.1887, *ES* (HD); West Wickham Wood, 27.vi.1896, on hazel, *WW* (60); 7.vii. and 21.vii.1894, *WW* (60); Farningham Wood, 25.vi.64, *KCS* (14); Eynsford, 15.viii.37, *SL* (1/**1937-38,** 50); Westerham, vii.1886, *TRB* (1/**1886,** 56); 12. and 17.vii.22, *PH* (BM); and on the boundary at Sevenoaks, *AMM* (22).

SURREY. Merton Park, S.W.20, *FJC* (62); Wimbledon Common, 25.vi.55, *EWG* (24); Riddlesdown, 12.vii.58 ♂♂ and ♀♀, *EWG* (24); Coulsdon (Farthing Downs), 4.vii.54, *EWG* (EMM **90,** xxxix) (24); Mickleham, 29.vi.11, *ECB* (NM); Boxhill, 8.vii.49, *FJC* (SL)(62); Ashtead Wood, 20.vii.46, *FJC* (SL) (1/**1946-47,** 74) (62); Claygate, *JAP* (BM); Bookham Common, vii, *DL* (34); *FJC* (62); Oxshott Heath, 6.vii.1895 and 20.vii.1897, *AJC* (HD); 7.vii.1900, *AB* in *AJC* coll. (HD); and beyond the boundary at Woking, 25.vi.09, on hazel in garden, *F. D. Morice* in *HStJKD* coll. (HD); and Chobham, vii.1892, *ES* (HD).

BUCKS. On the boundary at Chalfont St. Peter, 15.vii.25, *EAB* (BM); and Slough (ICBFS), various dates in vi. and vii.33 and vi.34, found on *Heracleum sphondylium*, *Urtica dioica*, hazel and oak, *WHG* (41); (PILG), various dates, *GEW* (40); and beyond the boundary at Amersham, 9.vii.49, *DL* (SL); 8.vii.51 and 2.viii.54 (on lime), *WJLeQ* (21).

Plesiodema pinetellum (Zett.) Sp. 255 p. 219
S p. 309 B p. 513 (Sp. 398)

Rare. This species is confined to Scots pine (*Pinus sylvestris*) and Spruce (*Picea spp.*). Formerly a northern species it has become more widespread southwards in Britain since afforestation of areas with conifers has become a more common forestry practice. The adults are found on the host from mid-June to the end of July.

MIDDX. Hillingdon, 26.vi.37, a single ♂ on *Pinus sylvestris*, *DCT* (33a).

HERTS. Beyond the boundary at Harpenden (Rothamsted Expt. Station grounds), 20.vi.36, eleven ♂♂ to light, ("this is the first record south of Northumberland in Britain . . . I have since taken it on *Pinus sylvestris* in both Middlesex and Surrey"—D. C. Thomas), *DCT* (12).

SURREY. Esher Common, 9.vii.51, *FJC* (SL); Oxshott Heath, 2.vii.55, on lowest branch of old Scots Pine, *GEW* (EMM **92,** 47); 11.vii.56, *GEW* (40); and beyond the boundary at Chobham Common, 25.vi.54, on old well grown Scots Pine, *GEW* (EMM, **90,** 205) (40).

BUCKS. Beyond the boundary at Amersham, 5.vii.53, on pine, *WJLeQ* (21); and Burnham Beeches, 30.vi.54, on old well-grown Scots pine (*Pinus sylvestris*), *GEW* (EMM **90,** 205); 24.vii.54, *WJLeQ* (40); 13.vi.55, *GEW* (40).

Before commencing with the next genus, *Psallus*, it is perhaps advisable to make the general observation that most of its species are somewhat difficult to identify. However with the help of the key given in South-

wood & Leston's book, pp. 220-223 (which itself is based on that of Woodroffe, G. E., 1957, EMM **93,** 258-271) and by taking careful measurements of the insect as required by that key, it should be possible to determine accurately most species of *Psallus* collected. The host tree on which they were found, if known is often a very good guide to identification.

Psallus betuleti (Fall.) Sp. 256 p. 223
D&S p. 404 (*Apocremnus ambiguus*) S p. 311
B p. 516 (Sp. 400)

Occasional, sometimes locally common. This species lives on birch, the eggs being laid on the young wood during June and July. These hatch the following Spring and become adult about the end of May or the beginning of June.

MIDDX. Hampstead Heath, 21.v.43, *CHA* (7); (West Heath), 10.vi.49, on birch in early summer, *DL* (HD) (54) (1/**1949-50,** 36-38); 22.vi.50, *DL* (54) (HD); Edgeware (Scratch Wood), 23.vii.60, *DL* (HD) (54); Ruislip LNR, 18.vi.57, 19.vi.58 and 24.vii.56, both sexes beaten from birch, *EWG* (49); 14.vi.64, a single ♂ on birch, *RAPM* (49); South Harefield, 5.vi.37, adults and V instar larvae swarming on *Alnus glutinosa*, *DCT* (33a); Uxbridge, 17.vi.33, common on *Betula*, *DCT* (33a); and Hounslow Heath, 26.v.53, abundant on *Betula* in scrub vegetation, *GEW* (40) (33c).

HERTS. Near Whetstone, 6.viii.60, a single ♂ taken in light trap, *PHW* (47).

ESSEX. Epping Forest (Loughton), v.1893, vi.02, vi.05, vi.20, and 10.vi.11, *EAB* (BM); (Chingford) 14.vi.13, *EAB* (BM); (Theydon Bois), vii.22, *EAB* (BU); and (Monk Wood) on birch, *CN* (35a).

KENT. Blackheath, *AAA* (22); (Shooter's Hill) *WW* (4) (39) (22); Lewisham, *WW* (39); Bexley (Joyden's Wood), 3.viii.65, *KCS* (14); Darenth Wood, 28.v.1893, *AJC* (HD); *D&S* (28) (4) (22); vi.14, *WW* (60); 17.v.50, *AMM* (BM); Birchwood, *JAP* (BM); West Wickham Wood, 7.vii. and 21.vii.1894 ♂ and ♀, on birch, *WW* (60) (4) (39) (22).

SURREY. Barnes (Sheen Common), 16.vi.65, *PSB* (16); Wimbledon Common, *FJC* (62); Carshalton, in mercury vapour light *DC* in *AAA* coll. (51); Reigate, *GBR* (62); Boxhill, 22.vi.1897, by beating birch, *WW* (60); Headley Lane, *WW* (62); Ashtead Common, 20.vii.46 ♀, *FJC* (SL) (1/**1946,** 74); Bookham Common, 21.vi.55, *EWG* (24); vii., *DL* (34); Arbrook Common, 3.vi.48 ♀, *FJC* (SL) (62); Esher Common, *JAP* (BM); 7.vi.49 ♂, *FJC* (SL); Oxshott Heath, 22.vi.25, a common feeder on young *Betula*, *OWR* (61); 30.vi.51, *FJC* (1/**1951-52,** 73); 15.vi.1893, *AJC* (HD); Weybridge, 21.vi.18, *EAB* (BM); on the boundary at Byfleet, 19.vi.15, *EAB* (BM); 20.v.16, III and II instar larvae, *EAB* (BM); 2.vii.24 and 3.vii.22, *FJC* (SL); and beyond at Virginia Water, 28.vi.57, on birch, *GEW* (40); Woking, 3.vi.1893, *AJC* (HD); Chobham, 11.vii.1895, *AJC* (HD); Abinger, 12 and 26.vi.15, *EAB* (BM); Albury, 1. and 17.vii.43, *ECB* (NM); Gomshall, 20.vi.44, *ECB* (NM); and Guildford, 13.vii.43, *ECB* (NM).

BUCKS. On the boundary at Slough (PILG), 14.vi.54, *GEW* (40); and beyond at Hodgemoor Wood, 7.vi.52, on birch, *WJLeQ* (21) (EMM, **90,** 250); 6.vi.53 and 11.vii.54, *WJLeQ* (21); and Stoke Common, 13.vi.54, on birch, *WJLeQ* (21).

Psallus ambiguus (Fall.) Sp. 257 (p. 223)
D&S p. 406 (*Apocremnus obscurus*) S p. 312
B p. 517 (Sp. 401)

Locally common. Occurs on hawthorn, sallow, alder, oak and apple trees. In addition to these usual hosts there is a recent record (Woodroffe, 1960, EMM **96** 128) of it having been found on heavily fruiting hornbeam (*Carpinus betulus*). The young hatch from the overwintering egg early in May. Both larvae and adults feed on aphids, mites and small insects as well as on the host tree. The adults are found from the end of May to August.

MIDDX. St. John's Wood (Finchley Road), N.W.8, 26 and 27.vi.50, and 1.vii.50 all on apple, *DL* (54) (HD); 1.vii.54, on apple, *DL* (54); Hampstead Heath, 6.vi.53, on *Malus*, *CHA* (17); 11.vi.49, *DL* (HD)(54); Highgate, 28.vii.46, *CHA* (17); Finchley, 26.vi.43, *CHA* (17); Enfield, vii.05, *EAB* (BM); Edgeware (Scratch Wood), 26.vii.60, on *Salix*, *DL* (54); Ruislip LNR, 18.vi.57, V and IV instar larvae beaten from mixed oak/hawthorn/sallow scrub, *EWG* (49); Hounslow Heath, 22.vi.54, on alder, *GEW* (40).

HERTS. Rickmansworth, 11.vi.50, *DL* (HD) (54); Bricket Wood Common, 14.vii.54, *GGES* (HD); Elstree, 5.vii.58, a single ♂ taken on hawthorn found on dissection to be parasitized, *DL* (EMM **95**, 97) (54); and beyond the boundary at Harpenden, 1.vii.55 and 5.vii.54, *GGES* (HD); and Letchworth, *RP* (11) (12).

ESSEX. Epping Forest (Chingford), 15.vi.12, 26.vi.11 and vii.1892, *EAB* (BM); (Monk Wood) on various trees, *CN* 35a); and at Purfleet, *RML* (5).

KENT. Blackheath, 9.xi.1895, *AJC* (HD); *AAA* (22); Kidbrooke, *WW* (4) (39) (22); Eltham, *D&S* (4) (22); Plumstead, *WW* (39) (22); Bostal Wood, *WW* (39) (22); Abbey Wood, *AAA* (51); Ruxley Gravel pit, 8.vii.67, *KCS* (14); Darenth, *JAP* (BM); Bromley, vii.1887, *ES* (HD); Brasted, 29.vi.22, *PM* (BM); Westerham, 12.vii.22, *PM* (BM); and on the boundary at Sevenoaks, *AMM* (22).

SURREY. Carshalton, at M.V. light, *DC* in *AAA* coll. (51); Riddlesdown, *AAA* (51); Boxhill, *WW* (62); 8.vii.49, *FJC* (SL); 24.vi.51, *DL* (1/**1951-52,** xvi) and *DL* in *WJLeQ* coll. (21); Headley Lane, *WW* (62); Arbrook Common, 3.vi.48, *FJC* (SL); Bookham Common, 29.vi.18, on oak, *WJA* (SL); vii., *DL* (34); Weybridge, *JAP* (BM); on the boundary at Byfleet, 19.vi.15, *EAB* (BM); and beyond at Woking, vii.1888, *ES* (HD); Chobham, vii.1888 and vii.1892, *ES* (HD); 17.vi.54, on apple and alder, *GEW* (40); Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954-55, *HDS* (50); Guildford, 30.vi.41 ♀♀ and 28.vi.43 ♂, *ECB* (NM); Abinger, 12 and 26.vi.15, *EAB* (BM); and Leith Hill, 10.vi.16, *EAB* (BM).

BUCKS. On the boundary at Datchet, 24.vi.54, *GEW* (40); Slough (ICBFS), 26.vi.33, on hazel and apple, *WHG* (41); (PILG), 14.vi.54, *GEW* (40); 26.vii.55, between 10-30 specimens beaten from apple, *GEW* (EMM **92,** 35); and beyond at Chesham, 7.vii.51 and 4.vii.53, (on alder), *WJLeQ* (21); Amersham, 11.vii.53, on willow and on hornbeam, *WJLeQ* (21); Latimer, 25.viii.51, on alder, *WJLeQ* (21); Burnham Beeches, 22.vi.12, *EAB* (BM); and Gt. Missenden, 13.vii.52, *WJLeQ* (21).

As there existed in the past some confusion regarding the identity of the next four species it is necessary before enumerating the distributional

records to give some clarifying comment on this group now forming, together with *P. guercus*, the subgenus *Hylopsallus*. Only two species to this group were formerly recognised in Britain, namely, *variabilis* and *quercus*. As a result of a critical revision of the whole of the British *Psallus* by Woodroffe in 1957 (EMM **93,** 258-271) it was found that the common oak-inhabiting species was *perrisi* (and not *variabilis*), being occasionally accompanied by the less common *wagneri*. The true *variabilis*—an uncommon species confined to sallow and aspen—had for many years been considered by British hemipterists, albeit incorrectly, as the var. *simillimus* of Douglas & Scott. The true var. *simillimus* of D&S is, in fact, a good species, now known as *assimilis* which occurs fairly commonly on Field Maple. Thus apart from *P. quercus*, the four other currently recognized members of this subgenus—*perrisi*, *wagneri*, *variabilis*, and *assimilis*, have all in the past found their identity under *variabilis* in both collections and literature. As Woodroffe points out (*loc. cit.*), because of this former confusion, previous records under *variabilis* as evidence of distribution must be regarded as valueless until such time as voucher material (if it still exists) can be checked by critical examination. The records that here follow are only for those specimens whose identity has been confirmed as a result of such study.

Psallus perrisi Muls. & Tey Sp. 258 p. 224

Common. Occurs on oak and hawthorn. Adults found from June to August.

MIDDX. Hampstead Heath, 1.iv.60, adults and V instar larvae, *DL* (EMM **97,** 66); 9.vi.57, adults, *DL* (54); 16.vi.60, adults with the ♀♀ outnumbering the ♂♂, *DL* (54) (EMM **97,** 66); Hounslow Heath, 26.v.53, common on *Quercus* scrub vegetation, *GEW* (33c, recorded therein as *P. variabilis*) (40); and Staines, 10.vi.55, on oak, *GEW* (40).

HERTS. Whetstone, 30.vi.60, a single ♀, and 1.viii.60, a single ♂ and ♀, taken in light trap, *PHW* (47); Whippendell Wood, 3.vi.60, a single adult and two larvae, *DL* (54) (EMM **97,** 66); and beyond the boundary at Harpenden, 29.vi. and 1.vii.55, *GGES* (HD); and at Ashridge Park, Ivinghoe, 28.vi.64, *PSB* (16).

ESSEX. Epping Forest, 15.vi.53, *AMM* (BM) and *AMM* in *EWG* coll. (24) (EMM **95,** 72); and on the boundary at Stondon Massey, 22.vi.53, *AMM* (BM) (EMM **95,** 72).

KENT. Blackheath, *AAA* (51) (22), wrongly ascribed therein to *AMM*; Darenth Wood, 28.v.1893, *AJC* (HD); *AMM* (22) (EMM **95,** 72); Farningham Wood, 18.vi.61 and 21.vi.59, *KCS* (22) (14); and on the boundary at Sevenoaks (Knole Park), *KCS* (22); 4.vii.65, *KCS* (14).

SURREY. Richmond Park, 18.vi.05, *AJC* (MD); Caterham, 13.vi.18, on apple, *WJA* (SL); Epsom Common, 27.v.60, *DL* (HD); Reigate vi.1892, *ES* (HD); Godstone, 22.vi.63, *KCS* (14) (48); Bookham Common, 21.vi.55, *EWG* (24); Oxshott Heath, *AAA* (51); and beyond the boundary at Woking, vi.1888, vi.1892, vii.1871 and vii.1888, *ES* (HD); Chobham, vi.1875, vii.1874 and vii.1888, *ES* (HD); and Milford, 13.vii.63, *PSB* (16).

BUCKS. On the boundary at Datchet, 15.vi.54, *GEW* (40); Slough (PILG) various dates, *GEW* (40); and beyond at Amersham, 7.vi.52 ♂ and 22.vi.51 ♂, *WJLeQ* (21); and Penn Wood, 1.vii.51 ♂, *WJLeQ* (21).

Psallus wagneri Ossian Sp. 259 p. 224

Local. Occurs on oak, hawthorn and birch. Adults are found in

June and July. Herts. and Kent records wanting.

MIDDX. Ruislip LNR, 18.vi.57 and 19.vi.58, adult ♂♂ beaten from scrub oak, *EWG* (49).

ESSEX. On the boundary at Stondon Massey, 22.vi.53, on birch. *AMM* (BM) (EMM **95,** 72).

SURREY. Bookham Common, 10.vii.55 ♀, *EWG* (24).

BUCKS. On the boundary at Slough (PILG), 21.viii.56, on hawthorn. *GEW* (40); and beyond at Stoke Common, 7.viii.54 ♂ on Aspen, *WJLeO* (21).

Psallus assimilis Stichel Sp. 260 p. 224

D&S p. 410 (*Apocremus simillimus*)

Local. Occurs on Field Maple. Adults found in June and July. Middlesex and Kent records wanting.

HERTS. Elstree, 5.vii.58, *DL* (SL).

ESSEX. Epping Forest, 15.vi.53, *AMM* (BM) (EMM **9d,** 72); and on the boundary at Stondon Massey, 22.vi.53, (BM) (EMM **95,** 72).

SURREY. Reigate, vi.1892, *ES* (HD); Riddlesdown, *AAA* (51); Egham, 30.vi.54, *GEW* (40); and beyond the boundary at Englefield Green, 10.vi.55, on maple, *GEW* (40).

BUCKS. On the boundary at Ditton Park, Datchet, 24.vi.54, *GEW* (40); and beyond at Amersham, 14.vii.51 ♂ on hazel, *WJLeQ* (21).

Psallus variabilis (Fall.) Sp. 261 p. 225

D&S p. 408 (*Apocremnus variabilis*) S p. 313 pp.

B p. 518 (Sp. 402 pp.)

Local. Associated with sallow and aspen on which hosts the adult may be found during June and July.

MIDDX. [Woodroffe (in litt.) says he knows of no true *variabilis* for Middlesex].

HERTS. Radlett, 20.vi.60, on maple [*sic*], *DL* (HD) (54); Whippendell Wood, 23.vi.58 on *Crataegus* [*sic*], *DL* (HD).

KENT. Bromley, vii.1886, *ES* (HD).

SURREY. Bookham Common, 10.vii.55, *EWG* (24); and beyond the boundary at Woking, vii.1888 and vi.1892, *ES* (HD).

BUCKS. On the boundary at Slough (PILG), 1.vii.60, *GEW* (40); and beyond at Burnham Beeches, 7.vii.54, *GEW* (40).

Psallus quercus (Kb.) Sp. 262 p. 225

D&S p. 409 (*Apocremnus quercus*) S p. 313

B p. 519 (Sp. 403)

Local. Found on oak with the adults being present from late June until early August.

KENT. Blackheath (Shooter's Hill), *WW* (4) (22); Darenth Wood, vi., a few examples on oak, *D&S* (28 (4) (36) (37) (22); 28.v.1893, *AJC* (HD); Farningham Wood, 17.vi.67, *KCS* (14); Bromley, vii.1885, *ES* (HD) (4).(39) (22); and West Wickham Wood, 27.vi.1896, *WW* (SL) (4) (39) (22); 21.vii.1894, *WW* (60).

SURREY. Croham Hurst *JAP* (BM); on the boundary at Byfleet, 2.vii.32, *FJC* (SL); and beyond the boundary on the Basingstoke Canal between Pirbright Bridge and Frimley Green, 1954-55, *MDS* (50); and at Clandon, *ES* (3).

BUCKS. Beyond the boundary at Burnham Beeches, 25.vi.56 and 30.vi.54, *GEW* (40); and at Hodgemoor Wood, 7.vi.52 ♂♂ and ♀♀ on oak, *WJLeQ* (21) (EMM **90**, 250).

Psallus roseus (Fab.) Sp. 263 p. 225

D&S p. 412 (*P. querceti*), p. 413 (*P. sanquineus* and p. 417 (*P. roseus* and *dilutus*)

S p. 317 (*P. sanquineus*) B p. 525 (Sp. 410)

As *P. alni* Fab in Woodroffe's revision (EMM **93**, 258-271).

Local. On sallow, hazel and apple. Adults found from end of July to the beginning of October.

MIDDX. Hampstead, 4.viii.43, on *Salix*, *CHA* (17); Edgeware (Scratch Wood), 12.viii.56, on *Salix*, common, *DL* (54); 22. and 26.vii.60, adults and larvae on *Salix*, *DL* (54); 23.vii.60, *DL* (HD); Ruislip LNR, 18.vii.64, first generation adults fairly common on *Salix*, *RAPM* (49); 1.ix.55 and 9.ix.58 adults (probably second generation) on *Salix*, *EWG* (49); Harefield, 12.vii.52 and 26.viii.51, on *Salix*, *WJLeQ* (21); and Hounslow Heath, 14.vii.53, common on *Salix* on the Heath and in the swampy ground, *GEW* (40) (33c, recorded therein incorrectly as *P. salicellus*).

HERTS. Rickmansworth, 18.viii.16, *EAB* (BM); Barnet viii.1885, *EAB* (BM); Bushey, 23.vii.44, *CHA* (17); Chorleywood, 11.viii.16, *EAB* (BM) (11) (12); and beyond the boundary at Wymondley, *EAB* (11) (12).

ESSEX. Epping Forest (Loughton), 11.ix.11, *EAB* (BM); Buckhurst Hill, 15.viii.16, *EAB* (BM).

KENT. Blackheath, *JAP* (BM); Lee, *JAP* (BM); Lewisham, *D&S* (4) (22); *JAP* (BM); *WW* (4); Abbey Wood, 9.vii., 16.vii. and 30.vii.1898, *WW* (60); and Westerham, 12.ix.51, on sallow, *AMM* (BM) (22).

SURREY. Wimbledon Common, ix.1875, *ES* (HD); *FP* (HD, presented 1909); 3.viii.22, on sallow, *FJC* (SL); Bookham Common, 16.viii.48, *FJC* (SL); 29.vii.50, on sallow, *DL* (1/**1950-51**, 76); vii., viii., and ix., *DL* (34); 16.viii. and 9.x.55, *EWG* (24); Oxshott Heath, *AAA* (51); and beyond the boundary at Woking, viii.1890, *ES* (HD); Chobham, 19.ix.39, *ECB* (NM); Wisley, 4.ix.10, on sallow round the lake, *WW* (60); by Basingstoke Canal between Pirbright Bridge to Frimley Green, 1954-55., *HDS* (50); and Guildford, 13.viii.41, *ECB* (NM).

BUCKS. On the boundary at Slough (ICBFS), 17 and 18.vii.33 and 30.vii.34, on hazel and *Salix sp.*, *WHG* (41); (PILG), 8.viii.53, on sallow, *GEW* (40); and beyond at Amersham, 13.vii.52, 25.viii.51 and 22.ix.56 on willow, *WJLeQ* (21); Chesham, 5.ix.53, on *Salix purpurea*, *WJLeQ* (21); Latimer, 20.vii.52 and 25.viii.51, *WJLeQ* (21); and Holmer Green, 27.vii.52, on *Salix*, *WJLeQ* (21).

Psallus flavellus Stichel Sp. 264 p. 225

S p. 315 (*P. lepidus var. minor*) B p. 520 (Sp. 404, var. *minor*)

Local. Occurs on ash. Adults present for only a short period during the middle of July. Middlesex and Essex records wanting.

HERTS. Barnet, viii.1885, *EAB* (BM).

KENT. Blackheath. *AAA* (51); Westerham, *AAA* (51); and beyond the boundary at Birling, 10.vii.54, on ash, *AMM* (BM).

SURREY. Boxhill, *AA* (51); and beyond the boundary at Chobham, vii.1871 and vii.1881, on ash, *ES* (HD); Virginia Water, 10.vii.54, on ash, *GEW* (40); and at Shere, viii.1900, *EAB* (BM).

BUCKS. Horton, 12.ix.54, *GEW* (40); on the boundary at Slough (PILG), various dates, *GEW* (24); Amersham, 16.vi.64, on sycamore, *WJLeQ* (21); and Coleshill, 14.vii.51 ♀♀, on ash taken with *Psallus lepidus*, *WJLeQ* (21).

Psallus lepidus Fieb. Sp. 265 p. 225
D&S p. 416 S p. 315 (p.p.) B p. 520 (Sp. 404)

Locally common. Occurs on ash with the adults being present from June to early September. Essex records wanting.

MIDDX. Hampstead Heath, 20.vi.43, on ash, *CHA* (17); 26. and 30.vi.58, *DL* (SL); 10.vi.59 and 1.vi.60, adults and larvae (some parasitized) *DL* (EMM **97**, 66); Edgeware (Scratch Wood) 22.vii.60, *DL* (54); Ruislip LNR, qi.vii.64, a few adults on ash, *RAPM* (49).

HERTS. Barnet, viii.1885, *EAB* (BM); Elstree, 6.vii.58, 2-3 dozen adults taken on ash, two males of which were found to be parasitized, *DL* (EMM **95**, 97); Boreham Wood, 27.vi.60, *DL* (54); Radlett, 20.vi.60, *DL* (64); Whippendell Wood, 3.vi.60, adults but mostly V instar larvae (some parasitized), *DL* (54); Chorley Wood, 10.viii.16, *EAB* (BM) (11) (12); Chenies, 19.viii.16, *EAB* (BM); and beyond the boundary at Harpenden, 5.vii.55, *GGES* (HD).

KENT. Blackheath, 13.vii.1895, *WW* (60); *AAA* (22); Dartford, *D&S*, on ash, (36) (4) (22); Abbey Wood, *WW* (4) (39) (22); Bromley, viii.1887, *ES* (HD) (4) (22); and West Wickham Wood, 27.vi.1896, *WW* (60).

SURREY. Croydon, vi. and vii., abundant on ash trees, *D&S* (28); Reigate, on ash, *ES* (36); Boxhill, 29.viii.1896 and 2.vii.16, *WW* (SL); 8.vii.49, *FJC* (SL); 7.viii.37, *ECB* (NM); Headley Lane, 2.viii.1897, *WW* (60); Arbrook Common, 30.vi.52, *FJC* (SL); Esher Common, 7.vi.49, *FJC* (SL); and beyond the boundary at Woking, *FJC* (62); Chobham, vii.1874, vii.1879, and vii.1888, on ash, *ES* (HD) (36); Gomshall, 20.vi.44, *ECB* (NM); Godalming, 11.vi.11, *ECB* (NM); Chilworth, 31.vii.44, *ECB* (NM); Albury Heath, viii.1892, *EAB* (BM); Abinger, 12.vi. and 26.vi.15, *EAB* (BM); and Shere, viii.1892, *EAB* (BM).

BUCKS. On the boundary at Slough (PILG), various dates, *GEW* (24); and beyond at Latimer, 7.vii.51 ♀, *WJLeQ* (21); and Coleshill, 14.vii.51 ♀, *WJLeQ* (21).

Psallus falleni Reut. Sp. 266 p. 226
D&S p. 415 (*P. salicis*) S p. 314 B p. 522 (Sp. 406

Locally common. Associated with birch on which the adults are found from July until September.

MIDDX. Buckingham Palace grounds, 1962, common on birch, *TRES* (52); Hampstead Heath (West Heath), 15.viii.50, on silver birch, *DL* (HD); and Ruislip LNR, 2.viii.64, adults fairly common on birch, *RAPM* (49).

HERTS. Barnet, viii.1885, *EAB* (BM); Whetstone, vi., viii., and ix.60, 60, ♂♂ and ♀♀ taken on various dates during these months in in light trap, *PHW* (47); Oxhey, 24.viii.16, *EAB* (BM); and beyond the boundary on Berkhamsted Common, 26.vi.33 on *Fraxinus* and 20.vii.36 on *Betula*, *DCT* (12).

ESSEX. Epping Forest (Chingford) 15.vii.11, *EAB* (BM); (Monk Wood) *CN* (35a).

KENT. Blackheath, *AAA* (22); (Shooter's Hill), *AAA* (22); Lewisham, *WW* (39) (4) (22); Plumstead, *WW* (39); Lee (Hither Green Lane), 11.viii.1894, *WW* (60); and Farningham Wood, 9.vii.63, *KCS* (14).

SURREY. Wimbledon Common, 11.ix.51, *HDS* (SL); Norwood, *JAP* (BM); Croydon, vi. and vii, not uncommon on ash trees, *D&S* (28); Shirley Common, ix.1893, *WW* (SL) (60); 1.ix.94, 26.vii.1895, 14. and 28.viii.1897, all on birch, *WW* (60); Ashtead, *FJC* (62); Boxhill, 29.viii.1896, *WW* (60); Mickleham, 6.x.15, n.c. (SL); Claygate, *JAP* (BM); Bookham Common, 9.x.55, by beating *Betula*, *EWG* (24); Esher Common, *JAP* (BM); Oxshott Heath, vi.1880, *ES* (HD); 30.viii.03, *ECB* (NM); *AAA* (22); on the boundary at Egham, ix.55, *GEW* (40); Byfleet, 19.vi.15, V instar larva, *EAB* (BM); and beyond at Woking, viii.1888 and ix.1888, *ES* (HD); and Chobham, viii.05, *ES* (HD).

BUCKS. On the boundary at Slough (PILG), various dates, *GEW* (40); and beyond at Latimer, 20.vii.52, on birch, *WJLeQ* (21) (EMM **90,** 250).

Psallus alnicola D&S. Sp. 267 p. 226

D&S p. 414 (*P. alni*) S p. 315 B p. 521 (Sp. 405)

Local. Found an alder. The adults occur on the host tree from the end of July until September.

MIDDX. Buckingham Palace grounds, 1962, abundant on alder, *TRES* (52); Hampstead, 15.viii.43, on *Alnus*, *CHA* (13); Uxbridge, 27.viii.35, on *Alnus*, *DCT* (33a); Stanmore, 4.viii.46, *CHA* (17); Hounslow Heath, 8.viii.53, a single adult on *Alnus* north of the Staines-Hounslow Road (A.315), *GEW* (40) (33c).

HERTS. Rickmansworth, 26.viii.16, *EAB* (BM); Cheshunt, 14.ix.12, *EAB* (BM).

ESSEX. Lea Valley marshes between Cheshunt and Broxbourne, *AAA* (51).

KENT. Blackheath, *AAA* (51); Lewisham, ix, not uncommon by beating alders, *D&S* (27); 1897, among alders, *WW* (1/**1897,** (2) 140); n.d. *J. W. Douglas* per *WW* (1/**1897** (2), 140); 16.ix.10, on alders in recreation ground, *WW* (60); Catford, 1903, *WW* (4) (39) (22); between Catford and Ladywell, 7.viii.1897, on alder, *WW* (SL); and on the boundary at Sevenoaks, *JAP* (BM).

SURREY. Wimbledon, *WW* (62); Coulsdon, 18.vi.11, *ECB* (MN); Reigate, *ES* (3); Boxhill, 14.viii.39, *ECB* (NM); Oxshott, 6.viii.1900, *AB* in *AJC* coll. (HD); Arbrook Common, *FJC* (62); Esher Common, *JAP* (BM); ix.1875, on alder, *ES* (HD) (3) (36) (37); on the boundary at Egham, 12.ix.54, *GEW* (40); Byfleet, 20.v.16, *EAB* (BM); Woking, viii.02, *ES* (HD) (37) (3); Chobham, viii.1876, *ES* (BM); viii.05, *ES* (HD) (37) (3); Ripley, viii.1900, *EAB* (BM); and Shalford, *EAB* (37) (3).

BUCKS. Horton, 12.ix.54, on alder, *GEW* (40); and beyond the boundary at Chesham, 20.v.51, on alder, *WJLeQ* (21).

Psallus diminutus (Kb.) Sp. 268 p. 226

S p. 316 B p. 524 (Sp. 408)

Local. Occurs on oak, poplar and aspen. The adults are found from mid-June until the end of July.

MIDDX. Finchley, 17.vi.45, *CHA* (17); Ruislip LNR, 18.vi.57, 19.vi.58 and 24.vii.56, adults beaten from oak in mixed *Quercus/Ulmus/Betula* scrub of West Thicket, *EWG* (49).

HERTS. Barnet, viii.1885, *EAB* (BM) (37); and beyond the boundary at Little Gaddesden, 19.vii.36, on *Quercus*, *DCT* (12); and Harpenden, 29.vii.34, on *Quercus*, *DCT* (12).

ESSEX. Epping Forest (Chingford), 15.vi.12 and 22.vi.11, *EAB* (BM); (Monk Wood), vii., on oak, *CN* (35a).

KENT. Blackheath, on ash, *AAA* (22) (51); Bexley (Joyden's Wood), 3.vii.65, *KCS* (14); and on the boundary at Sevenoaks (Knole Park), 4.vii.65, *KCS* (14).

SURREY. Tooting Bec., 10.vii.24, *EAB* (BM); Wandsworth, vii.1875, on oak, *ES* (HD); Cheam (Nonsuch Park), 8.vii.55, *EWG* (24); Bookham Common, 28.ix.31, *FJC* (SL) (62); Oxshott, *TRB* (37); on the boundary at Egham, 12.ix.54, *GEW* (40); Virginia Water, 10.vii.54, on oak, *GEW* (40; and beyond at Woking, *ES* (37); Chobham, vii.1874 and vii.1892, on oak, *ES* (HD) (37); Ewhurst, viii.1889, *EAB* (BM) (37); Leith Hill, 10.vi.16, *EAB* (BM); and Holmwood, *JAP* (BM).

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

Psallus albicinctus (Kb.) Sp. 270 p. 226
S p. 316 B p. 525 (Sp. 409)

Rare. Adults have been taken on oak, poplar and sallow from the beginning of June until early July.

ESSEX. Beyond the boundary at Gt. Braxted, 19.vi.53, on oak *AMM* (BM).

KENT. West Wickham, *Chaney* (4) [There is some doubt as to the validity of this record, although accepted by Massee (see Source 22)—E.W.G.].

SURREY. Barnes Common, 25.vi.48, *FJC* (SL); Chessington, *FJC* (62); Arbrook Common, 3.vi.48, *FJC* (SL) (62); and beyond the boundary at Chobham, vii.1892, a single ♀ beaten from *Salix*, *ES* (37) (3) (quoted in EMM **91,** 65).

BUCKS. On the boundary at Datchet (Ditton Park), 10.vi.54, three adults on suckers of Grey Poplar (*Populus canescens*), *GEW* (EMM **91,** 65).

Psallus varian (H.-S.) Sp. 271 p. 227
D&S p. 418 (*P. varian* and *P. distinctus*) S p. 316
B p. 523 (Sp. 407)

Locally common. Associated with oak on which the adults occur from early June until September.

MIDDX. Hampstead, 23.v.43, on oak, and 15.viii.43, *CHA* (17); Hampstead Heath, 1949, widespread [on the Heath], *DL* (1/**1949-50,** 36-38); 9.vi.57, adults and V instar larva ♀ (found to be parasitized), *DL* (54) (EMM **94,** 35); 26.vi.58, 2 ♂♂ collected on *Quercus petraea* (found to be parasitized), *DL* (EMM **95,** 97); 1.vi.60, adult ♂♂ and ♀♀ and larvae, both plentiful, *DL* (54); Highgate, vii.1892, *EAB* (BM); Edgeware (Scratch Wood), 10.vii.48, *CHA* (17); Harefield, 21.vi.52,on sallow, *WJLeQ* (21); Ruislip LNR, 9.ix.55, adult ♂♂ beaten from mixed *Salix/Quercus/Populus tremula* scrub, *EWG* (49); Ruislip vi.59, *C. Fellowes* (BM); Hounslow Heath, 26.v.53, common on *Quercus* in scrub vegetation, *GEW* (40) (33c).

HERTS. Barnet, viii.1885, *EAB* (BM); Radlett, 20.vi.60, on oak, *DL* (HD); Elstree, 6.vii.58, ♂ and ♀ on oak, both found on dissection

to be parasitized, *DL* (EMM **95,** 97); Boreham Wood, 27.vi.60, *DL* (HD); and beyond the boundary at Harpenden 29.vi.55, *GGES* (HD); 1933-37, abundant and widely distributed on *Quercus*, *DCT* (12); and Ashridge Park, 28.vi.64, *PSB* (16).

ESSEX. Epping Forest (Theydon Bois), vii.1872, *EAB* (BM); (Chingford) 5.vi.15, 10.vi.11, 15.vi.12 and 18.vi.10, *EAB* (BM); Epping Forest, on oak, common everywhere, *CN* (35a); *AAA* (51); 15.vi.57, *WJLeQ* (21); 5.vii.63, *PSB* (16); 15.vi.53, *AMM* (BM); and on the boundary at Stondon Massey, 22.vi.53, on oak, *AMM* (BM).

KENT. Blackheath, *AAA* (51); (Shooter's Hill), 12.vi.13, beating oak, *WW* (60) (4) (22); *AAA* (51); Plumstead (Wickham Lane), 30.vi.1894, on oak, *WW* (60); Abbey Wood, *WW* (39); Darenth Wood, vi., abundant on birches, *D&S* (28); *AAA* (22); Gravesend, 21.vii.48, on sallow, *TRES* (13); Farningham Wood, 2.vii.61, *KSC* (14) (22); Bromley, *ES* (4) (22); West Wickham Wood 6 and 13.vi.1896, *WW* (60); and Westerham, 12.vii.22, *PH* (BM); *AAA* (51) (22).

SURREY. Kew Gardens, *JAP* (BM); Wimbledon (town), *FJC* (62); Wimbledon Common, *FJC* (62); Tooting Bec., 10.vii.24, *EAB* (BM); Tooting Common, 30.vii.24, *HStJKD* (HD); Shirley Common, *FJC* (62); Cheam (Nonsuch Park), 22.vii.55, *EWG* (24); Banstead, 16.vi.1900, *SL* 1/**1900,** 11-14); Coulsdon, 18.vi.11, *ECB* (NM); Riddlesdown, 20.vi.53, *EWG* (24); Reigate, *GBR* (62); Redstone near Redhill, by sweeping, *J&TL* (32); Godstone, 22.vi.63, *KCS* (14) (48); Oxted, 5.viii.1891, *AJC* (HD); Princes Coverts, Chessington, *FJC* (62); Ashtead Wood, 20.vii.46, *SL* (1/**1946-47,** 74); Claygate, *JAP* (BM); *FJC* (62); Ranmore Common, vii.1898, *WJA* (SL); Boxhill, *FJC* (62); 24.vi.57, *WJLeQ* (21); Bookham Common, vii.15, *WJA* (SL); 8.vii.56, *EWG* (24); Arbrook Common, 16.vi.52, *FJC* (SL) (62); West End Common, 9.vii.51, *FJC* (SL); Oxshott Heath, 30.vi.51, *FJC* (1/**1951-52,** 73); Weybridge (Brooklands) 20.vi.64, *PSB* (16); *JAP* (BM); on the boundary at Egham 26.vi.54, *GEW* (40); Byfleet, 19.vi.15, *EAB* (BM); 2.vii.32, *FJC* (SL); and beyond at Woking vi.1892, *ES* (HD); and Chobham, vii.1874 and vii.1888, *ES* (HD).

BUCKS. On the boundary at Datchet, 15.vi.54, on oak, *GEW* (40); Slough (ICBFS), 6 and 16.vi.33 and 7.vi.34, on oak, *WHG* (41); (PILG) 26.vii.55, a few beaten from apple but probably casual strays, *GEW* (EMM **92,** 35); and beyond at Chalfont St. Peter, 15.vii.25, *EAB* (BM); Amersham, 7.vi.52, 7.vii.51, 14.vii.51 (on hazel), 2.viii.54 (on spruce), *WJLeQ* (21); Latimer, 20.vii.52, on birch, *WJLeQ* (21); Penn Wood, 1.vii.51, *WJLeQ* (21); Coleshill, 14.vii.51, on hornbeam, *WJLeQ* (21); Hodgemoor Wood, 7.vi.52, *WJLeQ* (21); Stoke Common, 22.vi.52, on *Pinus*, *WJLeQ* (21); and Burnham Beeches, 11.vi.12, *EAB* (BM).

Phoenicocoris obscurellus (Fall.) Sp. 272 (as *Psallus obscurellus*) p. 227
D&S p. 436 (*Atractotomus pini*) S p. 312
B p.517 (Sp. 401)

Local. Found on Scots Pine. The adults occur from June until August.

MIDDX. St. John's Wood, N.W.8, *JAP* (BM); Hampstead Heath, 8.viii.43, *CHA* (17); 19.vii.52 and 24.vii.57, *DL* (SL); (West Heath), 22.vi.50, *DL* (HD); Hillingdon, 8.viii.36, common on *Pinus sylvestris*, *DCT* (33a).

HERTS. Whetstone, 7.vi.60, a single ♂ taken in light trap, *PHW* (47); Elstree, 16.vii.44, *CHA* (17); and beyond the boundary at Harpenden

(Rothamsted Expt. Station grounds), 31.vii.36, to light, *DCT* (12).

ESSEX. Epping Forest (Chingford), 15.vii.11, *EAB* (BM).

KENT. Blackheath, *AAA* (22); Dartford Heath, vii., abundant on *Pinus sylvestris*, *D&S* (28) (4) (39); Bostall Wood *WW* (4) (39) (22); Eltham, *WW* (39); Bromley, *ES* (4) (22); West Wickham Wood, *WW* (4) (39) (22); and on the boundary at Sevenoaks (Knole Park), *KCS* (22); 22.vii.61, *KCS* (14).

SURREY. Croydon, viii.1879, *ES* (HD); Shirley, vii, abundant on *Pinus sylvestris D&S* (28); 13.vii.12, on Pines, *WW* (60) (62); Reigate, *GBR* (62); Mickleham, *JAP* (BM); Boxhill, 16.vi.17, IV and III instar larvae, *EAB* (BM); *WW* (62); 14.viii.39, *ECB* (NM); Bookham Common, 3.viii.58, *DL* (SL); Esher, *JAP* (BM); Oxshott Heath, 7.vii. and 6.viii.1900, *AB* in *AJC* coll. (HD); 28.vii. and 2.ix.51, *DL* (HD); 17.vii.60, on Scots pine, *DL* (HD); 2.vii.55, on lowest branch of old Scots pine, *GEW* (EMM **92,** 47); *AAA* (51); Ockham Common, *FJC* (62); Weybridge, *JAP* (BM); and beyond the boundary at Virginia Water, 28.vi.57, on pine, *GEW* (40); Woking, vii.1890, *ES* (HD); and Chobham, 2 and 3.viii.1895, *ES* (HD).

BUCKS. On the boundary at Slough (PILG), *GEW* (40); and beyond at Amersham, 25.viii.51, on fir, *WJLeQ* (21); 5.vii.53, *WJLeQ* on pine (HD).

Pityopsallus luridus Reut. Sp. 273 (as *Psallus luridus*) p. 227
B p. 523 (Sp. 406a)

Rare. Only reported from two of the Home Counties, though it may occur elsewhere. Should be searched for from mid-June until August wherever its host, larch, grows—especially on the younger trees.

HERTS. Rickmansworth, 18.viii.16, *EAB* (BM) (12) (Butler's *Biol.* p. 523).

SURREY. On the boundary at Callowhill, south of Egham, 26.vi. and 10.vii.54, on young larch tree by sandpit surrounded by woodland, two adults and one larva subsequently reared, *GEW* (EMM **90,** 233); 4.vii.59, on larch, *GEW* (40).

Coniortodes salicellus (H.-S.) Sp. 274 (as *Psallus salicellus*) p. 227
D&S p. 411 S p. 317 B p. 527 (Sp. 412)

Local. Found on sallow, hazel, alder, apple and bramble. The adults which are predaceous on mites and small insects are found from the end of July until October.

MIDDX. Finchley, 13.viii.43, on *Corylus*, *CHA* (17); Ruislip, 7.viii.44, *CHA* (17); Ruislip LNR, 16.vii.64, a single ♂ on goosefoot near bramble, *RAPM* (49). [The Hounslow Heath record for this species of Woodroffe's (see source 33c) is incorrect and should be *Psallus roseus* (q.v.)—*vide* G. E. Woodroffe *in litt.*].

HERTS. Chorleywood, 11.viii.16, *EAB* (BM) (11) (12); Rickmansworth 18.viii.16, *EAB* (BM) (11) (12); and beyond the boundary at Harpenden, 8.viii.37, on *Corylus* and *Acer*, *DCT* (12).

ESSEX. Buckhurst Hill, 20.viii.25, *EAB* (BM); Purfleet, *RML* (4); and beyond the boundary at Widford near Chelmsford, 28.vii.60, *JHF* (42).

KENT. Blackheath, *JAP* (BM); *AAA* (22); Lee *WW* (4) (39) (22); Hither Green Lane, 8.ix.1894, on hazel, *WW* (60); Lewisham, *WW* (39); Kidbrook Lane, 25.vii.1896, elm hedges, *WW* (60); Birch Wood, *TAM* (37); Darenth, GCC (37); vii. and ix., not uncommon by beating nut bushes,

D&S (28) (4) (22); Downe, *AAA* (51); Wickham Wood, 22.viii.1896, on hazel, *WW* (60); Wickham viii and ix, not uncommon by beating nut bushes, *D&S* (28) (4) (22) (37).

SURREY. Wimbledon Common, viii.1890, ix.1876 and 14.viii.1896, *ES* (HD) (37); Merton Park, 26.vii.51, *FJC* (SL); Caterham, *GCC* (37); Banstead Wood, 28.vii.55, common on *Corylus*; *GEW* (EMM **92,** 48) (40); Reigate, *ES* (37); Headley Lane, *TRB* (37); Boxhill, 31.viii.1898, on hazel, *WW* (60) (62); 4.viii.49, *FJC* (SL); Ranmore Common, 30.vii.11, on hazel, *WW* (60) (62); Ashtead Woods, 13.ix.48, *FJC* (SL) (62); Bookham Common, 6.viii.1895, on hazel, *WW* (SL) (60) (62); 3.viii.58, *DL* (SL); vii., *DL* (34); Esher Common, 12.vii.52, *FJC* (SL) (1/**1952-53,** 84) and beyond the boundary at Woking, viii.1890, *ES* (HD) (37); Guildford, 14.viii.41, *ECB* (NM); Chiddingfold, 16.viii.36, *ECB* (NM); Chilworth, 31.vii.44, *ECB* (NM); and Leith Hill, viii.1895, *EAB* (BM).

BUCKS. On the boundary at Slough (PILG), various dates, *GEW* (40); and beyond at Burnham Beeches, 22.vi.12, *EAB* (BM); 22.viii.65, on *Stachys WJLeQ* (21); Jordans, 6.viii.50, on hazel, *DL* (HD) (SL); Chalfont St. Peter, 17.vii.25, V instar larva, *EAB* (BM); Hodgemoor Wood, 30.viii.52, two adults swept from bramble, *WJLeQ* (21) (EMM **90,** 21); Latimer, 16.viii.52, a single adult swept from bramble, *WJLeQ* (EMM **90,** 21) (21); and south of Beaconsfield, 9.viii.55, "enormous numbers on bramble", *GEW* (EMM **92,** 48).

More Flies of the Cripplegate Bombed Site, City of London

By L. Parmenter

WITH the rebuilding of the Barbican area about St. Giles, Cripplegate, the area is almost back to the fully built-up state of pre-war, but with great changes in the height and acreage of the buildings of the area. The district was severely bombed in 1940 and 1941 and the sites partially cleared so that by 1946 when members of the Ecology Section of the Society first visited the site, many plants had appeared and insects were present. Visits were paid in subsequent years until 1956 when the new building had so altered the area and destroyed much of the flora and fauna that it was decided to end the regular visits.

A list of the flies identified from the area by 1953 was published in *London Naturalist* **33** in 1954. Further species were found and in all 294 species were seen at least once. Additional species are listed below together with further data on some of the species mentioned in the 1954 List. Some account of the habits of the flies and their possible method of colonisation was discussed in the earlier paper. The intensive study of the drone flies (*Eristalis*) was made by Mr. A. W. Jones in 1954 and published in 1955, *London Naturalist*, **34**.

During the period 1946-56 the flora of the area changed considerably. The grasses, at first almost restricted to the northern edge of the area, probably seeding from fodder of horses resting about Whitbreads' stables, spread to form patches of closed grassed areas throughout the district. The plants of disturbed ground gradually became overcome and smothered by the more robust species. In 1947, Oxford ragwort *Senecio squalidus* and thistles were present and a patch of 800 square yards was almost entirely covered by *Diplotaxis tenuifolia* which was also scattered throughout the area. Bracken was well distributed, and as the years passed covered more ground. Sallows spread and increased in size and were joined by other trees. By 1951, an area of *Atriplex patula* and *Chenopodium album* in 1948 had been taken over by *Sisymbrium orientale* with stands of *Pteridium aquilinium*, *Diplotaxis tenuifolia*, *Chamaenerion angustifolium* and *Artemisia vulgaris*. A year later, *Sisymbrium orientale* was replaced in this area by *Pteridium aquilinum*, *Diplotaxis tenuifolia* and *Artemisia vulgaris*. Many of the plants appeared for a year or two. Some lasted longer, gradually increasing, others eventually were squeezed out.

The most abundant plants in 1949 were: *Pteridium aquilinum* (L.) Kuhn, *Diplotaxis tenuifolia* (L.) D.C., *Sisymbrium orientale* L., *Sagina apetula* L., *S. procumbens* L., *Chenopodium polyspermum* L., *C.album* L., *C.rubrum* L., *Parietaria diffusa* Mert. & Koch, *Plantago major* L., *P. lanceolata* L., *Senecio squalidus* L., *Erigeron canadensis* L., *Cirsium vulgare* (Savi) Ten., *C.arvense* (L.)Scop., *Lolium perenne* L., *Poa annua* L., *P. pratensis* L., *Hordeum murinum* L., *Holcus lanatus* L.

By 1955 the following: *S.apetula*, *C.polyspermum*, *C.album C.rubrum*, *P.major* and *P. lanceolatus* had diminished in importance and had been replaced by the following among the most abundant species: *Cerastium vulgatum* L., *Stellaria media* (L.)Vill., *Trifolium repens* L., *Chamaenerion angustifolium* (L.)Scop., *Epilobium obscurum* Schreb., *Oenothera* sp., *Linaria*

purpurea (L.)Mill., *Sambucus nigra* L., *Tussilago farfara* L., *Artemisia vulgare* L., *Hypochaeris radicata* L., *Dactylis glomerata* L., *Anisantha sterilis* (L.) Nevski, *Agrostis alba* agg.

These changes affected the habitat of flies. The number and growth of the plants affected the micro-climates. The annual collapse of the plants and their rotting increased the humus and the pupal habitats of many species. The plant eaters, whether as grubs or adults, depend on particular species of plants in many cases and always on their abundance; the floral changes affecting their colonisation. The other biotic factors controlling the colonising flies are their predators and parasites and the other creatures on which flies feed. Of predators, birds were less numerous and consequently less important than they are in suburb and country. Various insect eaters passed through the area on migration or as winter wanderers but had little effect. Of the residents Pied Wagtails and Black Redstarts must have fed many insects especially flies to their young. The breeding House Sparrows may have also have taken some flies. They were numerous, as many as 430 in 1947 at one time, whilst in 1948 over 200 were counted at a summer roost. Insect predators appeared to be few and the only hymenopterous parasites found to reduce the fly population were those that attacked the abundant leaf-miners. Spiders never seemed to be of great importance. Snails and slugs were few, five species, but the garden snail *Helix aspersa* Müll. first seen in 1949 increased rapidly. *Hydromyza dorsalis* F. found in 1953 was the only snail attacker and the normal food of the larvae are the water snails, so it may have been a wanderer. Aphides were numerous and provided food for larvae of *Syrphidae* as early as 1947.

Just as certain plants appeared for a short time and faded out, so did many insects. Being more mobile, temporary invasion by individuals each year was noted. Of the 294 species found in the area during the 11 years, 141 were seen in one year only and only 46 were resident during the whole period. Admittedly my visits were irregular, at times few, during the period but the annual total of species seen during the 11 years varied from 93 to 118 but dropped to 75 when in 1955 some of the area became cleared for building or was actually built over. The high score of 118 was due to 17 species of Agromyzidae noted in 1953 only. This was partly due to the flora then being suitable for many species to have colonised and to the encouragement by Prof. E. M. Hering to make a special study of the family. It will be readily understood that more visits might have caused damage to food plants and, by treading, to the larvae and pupae in the ground. The collection of "rare" species could prevent colonisation in this island area so far from real countryside. Mr. A. W. Jones made daily visits of 40 minutes during 1953 for observation only and directed to a few species.

The resident species were probably species normally found in London's inner area before the war. These were: *Limonia* (*Dicranomyia*) *chorea* Mg., *Platypalpus minutus* Mg., *Phora aterrima* F., *Lonchoptera lutea* Mg., *Eristalis arbustorum* L., *E. tenax* L., *Platycheirus albimanus* F., *P.scutatus* Mg., *Sphaerophoria scripta* L., *Syrphus balteatus* Deg., *S. luniger* Mg., *S. ribesii* L., *Syritta pipiens* L., *Piophila vulgaris* Fall., *Spilographa zöe* Mg., *Terellia serratulae* L., *Trypeta ruficauda* F., *Xyphosia miliaria* Schrk., *Calliopum aeneum* Fall., *Minettia rivosa* Mg., *Thaumatomyia notata* Mg., *Scatophaga stercoraria*, L., *Calliphora erythrocephala* Mg., *Egle radicum* L., *Hydrophoria linogrisea* Mg. and *Pegohylemyia fugax* Mg.

Comments on some species, supplementary to the earlier paper (1954, *London Naturalist* **33**, "The Flies of the Cripplegate Bombed Site, City of London).

TIPULIDAE. It was curious that *Tipula oleracea* and *T.paludosa* faded out so soon (1947 and 1949 respectively) despite the steady increase of grassed areas. *T. marmorata* recorded from 1946 to 1949 reappeared in 1955.

Culex pipiens was found only in the years 1948-1950 despite its residential status in London inner zone.

Thereva nobilitata. Adults were found from 1950 onwards about the elder tree near the Lord Mayor's Coach House. Bushes of elders are often favoured by this species. Indeed it is chosen, possibly as shelter from the wind, at the sea coast. Larvae were found in the humus on wall ledges of the open basements close to the tree.

Eristalis pertinax. In Britain this species is generally as widely spread and as abundant as *Eristalis tenax* but at Cripplegate it was not noted until 1954 and only a few in that and following years.

Helophilus pendulus like *Eristalis pertinax* breeds in habitats similar to those used by *E. tenax*, but was only noted in 1948 and 1955.

Scaeva pyrastri is a well known migrant and adults were reared from the area. However it never became a permanent resident being seen only in 1946, 1947, 1950 and 1955.

Palloptera muliebris possibly arrived in 1954, for several adults were found on the elder tree used by *Thereva nobilitata* in 1955 and again were restricted to the same tree in 1956.

PIOPHILIDAE. *Piophila vulgaris* remained a resident but *P. nigrimana* was last seen in 1950, *P.nigricornis* in 1949 and *P.varipes* was only seen in 1947.

TRYPETIDAE. The *Senecio* plants provided homes for the larvae of *Spilographa zöe* and the thistles were well tenanted during the period by *Xyphosia miliaria*, *Trypeta ruficauda* and *Terellia serratulae*. *Urophora stylata* was noted from 1948 to 1952 but *U. cardue* never seemed to gain a hold for its conspicuous galls should have been seen even if the adults were not apparent.

SAPROMYZIDAE. Besides the resident species, *Sapromyza obsoleta* was reared in 1951 and may have been overlooked in other years. The other species of the family were noted only in one or two years.

Hydromyza dorsalis. This is considered to have been a wanderer when found in 1953 for the larvae feed on *Lymnaea palustris* Müll. and *L. peregra* Müll. and is not known to attack the five species of snails and slugs found by Lt. Col. C. J. F. Bensley in the area. He made a special search for water snails in the pools present on his two visits in 1951.

SEPSIDAE. It was surprising that none of the six species were able to maintain themselves as did the common dung-fly *Scatophaga stercoraria.* The absence of cow manure was obviously overcome by the more adaptable *S.stercoraria.*

Chyromya flava was first noted in 1950 and until 1955 was restricted to the above mentioned elder tree, a regular House Sparrow roost. The larvae live in bird dung.

AGROMYZIDAE. Although adults were noted from 1947 to 1956, no attention was paid to leaf mines until 1949. The main study was started in 1953 through the co-operation of Prof. E. M. Hering when the variety

of plants was most evident. In 1950 the mines of *Phytomyza atricornis* were abundant in the leaves of *Senecio squalidus* in sheltered areas especially about the foot of walls in the open basements. The Braconid parasites took a heavy toll in later years.

Madiza glabra was present from 1946 and at times was an abundant visitor to the flowers of *Diplotaxis tenuifolia* which as early as 1947 had colonised large portions of the bombed area. It seemed to be restricted to yellow flowers.

CHLOROPIDAE. Apart from the residential species *Chloropisca glabra*, *Oscinella frit* and *Thaumatomyia notata* the other species were seen in only one to two years but *Thaumatomyia trifasciata* was found in 1948-1950.

TACHINIDAE. Of the 23 species recorded, 11 were seen in 1947. Of these *Blepharidopsis nemea* and *Nemorilla floralis* continued to 1948, *Bucentes geniculata*, *Meigenia bisignata*, *M.mutabilis*, *Thelaira leucozona* until 1950 and only *B. cristata* until 1955. Other species were noted in single years with the exception of *Compsilura concinnata* seen in 1946 and 1949, *Lydella grisescens* found in 1949 and 1950, and *Ernestia radicum* first seen in 1950 and still present in 1956.

MUSCIDAE. Of the 34 species, 19 were found only in one of the eleven years, four in two of the years and none throughout the whole period.

ANTHOMYIIDAE (until recently classified under MUSCIDAE). Of the three residents, *Egle radicum* and *Pegohylemyia fugax* are abundant well distributed species in this country. But *Hydrophoria linogrisea* is not wide-spread. Although I have found it from Kent to Northumberland, all localities have been on the east side of Britain. *Hydrophoria conica* is normally more abundant and widespread but was only noted at Cripplegate in 1955. *Chirosia setifemur* was definitely found from 1953 to 1956 and presumably was the causer of the leaf mines in bracken which were very numerous in 1954.

I would like to extend my thanks to Messrs. E. B. Basden, R. L. Coe and J. C. Deeming for assistance in identification of certain Drosophilidae, Pipunculidae and Sphaeroceridae in addition to those mentioned in the 1954 paper.

Nomenclature is as before except when mentioned or as revised in: Coe, R. L., 1966. *Diptera, Pipunculidae*. Handbooks for the Identification of British Insects, **10**, Pt. 2c. Royal Ent. Soc. Lond.

Fonseca, E.C.M.d'A., 1965. A short key to the British Drosophilidae (Diptera) including a new species of *Amiota*, *Trans. Soc. Brit. Ent.* **16.**

Collin, J. E. (1961). *British Flies* **6**. *Empididae*. Camb. Univ. Press. (but *Platypalpus* substituted for *Tachydromia*).

SYSTEMATIC LIST

Part I—Species additional to those listed in 1954, *London Naturalist*, 33.
Months of occurrence shown in brackets. May=(5).

ORTHORRHAPHA—NEMATOCERA
TIPULIDAE
Erioptera (*Symplecta*) *hybrida* Mg. (8).
Limonia (*Dicranomyia*) *mitis* Mg. (5).
Limonia (*Dicranomyia*) mitis var. *lutea* Mg. (7, 9).
Nephrotoma cornicina L. (9).
N. flavipalpis Mg. (8).
N. guestfalica Westh. (7).

DROSOPHILIDAE
Scaptomyza flava Fall. [=*apicalis* Hardy] (7, 8, 10).
S. montana Wheel. (5).

CHLOROPIDAE
Meromyza saltatrix L. var. *femorata* Macq. (7).
Meromyza saltatrix L. var. *nigriventris* Macq. (5).
Oscinella vastator Curtis (5, 7).
Siphonella oscinina Fall. (9).

AGROMYZIDAE
Agromyza alni-betulae Hend. (7) (empty mines).

SCATOPSIDAE
Scatopse notata L. (4).

ORTHORRHAPHA—BRACHYCERA

THEREVIDAE
Thereva bipunctata Mg.

EMPIDIDAE
Crossopalpus nigritella Zett. (7).
Platypalpus fasciata Mg. (7).
P. interstincta Coll. (7).
Tachypeza nubila Mg. (5).

DOLICHOPODIDAE
Medeterus truncorum Mg. (6, 8).

CYCLORRHAPHA—ASCHIZA

LONCHOPTERIDAE
Lonchoptera furcata Fall. var. *rivalis* Mg. (9).
L. lutea Panz. var. *palustris* Mg. (4, 5, 10).
L. lutea Panz. var. *trilineata* Zett. (6, 8).

PHORIDAE
Megaselia (*Megaselia*) *giraudii* Egg. (6).

PIPUNCULIDAE
Eudorylas obscurus Coe (5, 8).
Verrallia aucta Fall. (6).

SYRPHIDAE
Eristalis pertinax Scop. (6).
Merodon equestris F. (4).
Sphaerophoria rueppelli Wied. var. *nitidicollis* Zett. (5).
S. scripta L. var. *dubia* Lw. (4, 6, 7).
Xanthogramma pedissequum Harris (6).

CYCLORRHAPHA—SCHIZOPHORA—ACALPTRATAE

PALLOPTERIDAE
Palloptera muliebris Harr. (8).

TRYPETIDAE [TEPHRITIDAE]
Paroxyna bidentis R.D. (6).
Philophylla heraclei L. (7) (empty mines).

SEPSIDAE
Themira minor Hal. (7).

SCIOMYZIDAE
Hydromyza dorsalis F. (4).

SAPROMYZIDAE
Calliopum simillimum Coll. (7).

SPHAEROCERIDAE
Limosina clunipes Mg. (5).
L. silvatica Mg. (5).

EPHYDRIDAE
Hydropota griseola Fall. (5, 7).
Philygria stictica Mg. (6, 9).
Psilopa compta Mg. (9).
Scatella (*Lamproscatella*) *sibilans* Hal. (7, 9, 10).
S. (*Scatella*) *stagnalis* Fall. (5-7).
A. ambigua Fall. (5).
Ceradonta denticornis Panz. var. *nigroscutellata* Strobl (8).
Liriomyza tanaceti de Meij. (7) (empty mine).
Melanagromyza beckeri Hend. (7) (empty mine).
Phytomyza cirsii Hend. (larvae in 6 and 7).
P. ranunculi Schrk. var. *albipes* Mg. (6).
P. spondylii R.D. (7) (empty mine).
P. tanaceti Hend. larvae and pupae in 7).
Pseudonapomyza altra Mg. (pupae in 5).

HELEOMYZIDAE
Trixoscelis canescens Lw. (5).

CYCLORRHAPHA—SCHIZOPHORA—CALYPTRATAE

CORDILURIDAE [SCATOPHAGIDAE]
Scatophaga litorea Fall. (4).

TACHINIDAE
Dinera grisescens Fall. (7).
Winthemia quadripustulata F. (7).
Zenillia vulgaris Fall. (9).

CALLIPHORIDAE
Rhinophora lepida Mg. (7).

ANTHOMYIDAE (PREVIOUSLY INCLUDED IN MUSCIDAE)
Chirosia setifemur Ringd. (5).
Craspedochaeta pullula Zett. (4-9).
Delia brunnescens Zett. (6).
D. exigua Meade (7).
Egle aestiva Mg. (4).
Emmesomyia socia Fall. (6).
E. varipes Strobl (7)
Hydrophoria conica Wied. (5).
Lasiomma eriophthalma Zett. (4).
L. meadei Kow. (4, 7).
Nupedia dissecta Mg. (4, 7).
N. infirma Mg. (9).
Pegohylemyia gnava Mg. (7).
Pegomyia rufipes Fall. (7).
P. hyoscyami Panz. form *chenopodii* Rond. (larvae in 7 and 8).

MUSCIDAE
Azelia triquetra Wied. (7).
Coenosia infantula Rond. (5).
Fannia armata Mg. (5-7).
F. fuscula Fall. (7).
F. similis Stein (5).
Helina arctata Coll. (5).
H. communis R.D. (7).
Hydrotaea meteorica Fall. (6).

SYSTEMATIC LIST

Part II.—Additional months of occurrence for species listed in 1954.

TIPULIDAE
Limonia (*Dicranomyia*) *chorea* Mg. (5, 7).

EMPIDIDAE
Platypalpus flavicornis Mg. (7).
Sicodus arrogans L. (6).

LONCHOPTERIDAE
Lonchoptera lutea Panz. (7).

SYRPHIDAE
Eristalis tenax L. (7).
Helophilus pendulus L. (4).
Melanostoma scalare F. (4).
Syrphus albostriatus Fall. (9).
S. luniger Mg. (5).

TRYPETIDAE [TEPHRITIDAE]
Oxyna parietina L. (6)
Urophora cardui L. (6).

SAPROMYZIDAE
Calliopum aeneum Fall. (5).
Sapromyza sordida Hal. (8).

SEPSIDAE
Nemapoda nitidula Fall. (6).
Sepsis cynipsea L. (7, 8).
S. fulgens Mg. (9).
S. nigripes Mg. (4, 8).

HELEOMYZIDAE
Tephrochlamys rufiventris Mg. (7).
CHYROMYIDAE
Chyromya flava L. (8).

OPOMYZIDAE
Geomyza tripunctata Fall. (5).
SPHAEROCERIDAE
Paracollinella curvinervis Stenh. (7).

DROSOPHILIDAE
Drosophila forcipata Coll. (8, 9).
(previously recorded as *fenestrarum* Fall).

AGROMYZIDAE
Phytomyza atricornis Mg. (10).
P. nigra Mg. (6).
P. robustella Hend. (9).

CHLOROPIDAE
Oscinella frit L. (7).

TACHINIDAE
Ernestia (*Varichaeta*) *radicum* L. (9).
Siphona [*Bucentes*] *cristata* F. (7, 9).
Styloneuria [*Protachaeta*] *discrepans* Pand. (7)

CALLIPHORIDAE
Calliphora erythrocephala Mg. (3).
Lucilia caesar L. (7).
Protophormia terrae-novae R.D. (8).

ANTHOMYIIDAE
Anthomyia pluvialis L. (5, 6).
Delia cilicrura Rond. (4-7, 9, 10).
D. longula Fall. (6, 8).
D. trichodactyla Rond. (7).
Egle radicum L. (6, 10).
Hydrophoria linogrisea Mg. (6, 9).
Pegohylemyia fugax Mg. (4, 5, 7-9).

MUSCIDAE
Fannia canicularis L. (4, 5).
Helina duplicata Mg. (7).
Hydrotaea dentipes F. (6).
Limnophora vana Zett. (5, 7).
Schoenomyza litorella Fall. (7).

Leaf mines of Lepidoptera and Hymenoptera at Cripplegate.

The identification of the miners was made by Prof. E. M. Hering.

LEPIDOPTERA
Mompha raschkiella Z. mining leaves of *Chamaenerion angustifolium* in 1949, 1950.
Gnorimoschema (*Phthorimaea*) *acuminatella* Sircom. mining leaves of *Cirsium vulgare* Ten. in 1952, 1953, 1955.

HYMENOPTERA—SYMPHYTA
Fenusa pusilla Lep. mining leaves of *Betula verrucosa* Ehrh. 1950, 1955.
Heterarthrus microcephalus Klug mining leaves of *Salix* sp. 1954.
Scolioneura betuleti Klug mining leaves of *Betula verrucosa* Ehrh. in 1954.

Survey of Bookham Common

TWENTY-SIXTH YEAR

Progress Report for 1967

GENERAL (G. Beven)

In November Mr. C. P. Castell became seriously ill, but he is now slowly recovering and it is hoped that he will soon be able to resume his activities in connection with the survey.

Since April 1967 a Hayter Rotary grass mower has been used by the Keeper to cut short the grass on the paths. This has considerably increased the area of short grass on the common, an important factor in the feeding ecology of rabbits and birds. During 1967 the Box Hill and Headley Rabbit Clearing Society started operations on the common and have been making vigorous attempts to reduce the high rabbit population there.

VEGETATION (C. P. Castell and F. C. Reeves)

The re-survey of the "Long Grass Quadrat" (120 × 100 feet) on Central Plain, which was started in 1966, was completed. The vegetation of South-east Pond was examined to determine the extent of regeneration occurring since 1963, when it had been cleaned out by the Conservation Corps. On Central Plain regeneration was also studied by line transects of areas cleared of shrubs by the Conservation Corps in 1959-62. A beginning has been made on a revision of the plant list published in 1954. There is thus a great deal of work to be done and more botanists are urgently needed.

MYXOMYCETES ON BOOKHAM COMMON (P. C. Holland)

Previously published reports of myxomycetes on Bookham Common include a list of eight species in the *London Naturalist* for 1946 (Castell, 1947), an addition of one species in the same journal two years later (Castell, 1949) and references to a further nine species in Ing's "Handlist" (1965). A number of records for the Common went unmentioned in the latter paper because the author did not set out to quote localities for all the commonest and most widely occurring species. He has, however, been kind enough to supply me with a list of species compiled by him from his own searches during conservation work on the Common and from records sent to him by other workers. This brings the total for the Common up to 31 species and one variety as at the end of 1963.

During my own visits in July 1965, March 1966, June 1966, February 1967 and April 1967, I was able to find, with the help of C. P. Castell and other members, 24 species including nine not previously reported. One of these, *Physarum psittacinum*, was also a first record for vice-county 17 (Surrey). The specimen, found on fallen oak bark in Hollow Wood in February 1967, was in poor condition. It is normally thought of as a summer species but it is difficult to believe that this specimen had survived since the previous season, weathered though it was. Another species worthy of mention, *Licea minima*, was collected unknowingly with a gathering of *Physarum leucophaeum* overgrowing a resupinate fungus, *Stereum* sp., in April 1967. It was not until the specimen was being examined under a binocular microscope some months later than the minute, dark, lobed sporangia of the *Licea* were noticed among the relatively gigantic fruiting structures of the *Physarum*.. The species is

usually recorded on coniferous wood, but also on fungi as in this case. It is easily overlooked on account of its dark colour and small size. The largest sporangia in this collection were 0·2 mm. across.

A number of common species undoubtedly occur on the Common but have so far escaped detection. One of these is *Trichia affinis*. Among my collections made on dead oak-wood from Central Wood in February 1967 is one with spores tending towards *T. affinis*, but corresponding to *T. persimilis* in all other respects. These two and a third, *T. favoginea*, are considered distinct species in Europe but Farr (1958) after examining some 200 specimens concluded that they were merely phases of one species, *T. favoginea*.

In the complete list of species which follows, the nomenclature is that adopted by Ing (1965). The majority of the collections were made in and around Bayfield Plain, Central Plain, Central Wood, Eastern Plain, Hill Wood, Hollow Wood and South East Wood, though to save space the precise localities have not been included in the list.

Arcyria cinerea (Bull.) Pers.	xii.61, viii.62, x.63
A. denudata (L.) Wettst.	several records
A. ferruginea Sauter	ii.67
A. incarata (Pers.) Pers.	several records
A. nutans (Bull.) Grev.	viii.62, vii.65, iii.66
A. pomiformis (Leers) Rost.	viii.62, vii.65, vi.66
Badhamia capsulifera (Bull.) Berk.	iii.66
B. nitens Berk.	ii.63
B. utricularis (Bull.) Berk.	xii.62
Ceratiomyxa fruticulosa (Mull.) Macbr.	iii.61
Comatricha alta Preuss	iv.67
C. elegans (Racib.) Lister	iii.61
C. nigra (Pers.) Schroet.	frequent records
Craterium minutum (Leers) Fr.	xi.44
Diderma floriforme (Bull.) Pers.	ii.67
Didymium nigripes (Link) Fr.	xi.44
D. squamulosum (Alb. & Schw.) Fr.	xii.62
Enerthenema papillatum (Pers.) Rost.	x.63
Enteridium olivaceum Ehr.	x.63
Hemitrichia stipitata (Sow.) Macbr.	x.63
Licea minima Fr.	iv.67
Leocarpus fragilis (Dicks.) Rost.	xi.41, x.44, x.63
Lycogala epidendrum (L.) Fr.	several records
Mucilago spongiosa (Leyss.) Morg.	x.45, vii.63
Physarum cinereum (Batsch) Pers.	iii.66
P. leucophaeum Fr.	x.63, iv.67
P. nutans Pers.	frequent records
P. nutans var. robustum Lister	x.63
P. psittacinum Ditm.	ii.67
P. vernum Somm. ex Fr.	xii.62
P. viride (Bull.) Pers.	x.63
Reticularia jurana Meylan	viii.62
Stemonitis axifera (Bull.) Macbr.	x.63
S. fusca Roth.	ix.46, vii.65
Trichia botrytis (Gmel.) Pers.	several records
T. contorta (Ditm.) Rost.	iii.66

T. decipiens (Pers.) Macbr.	xi.62, xii.62, vii.65
T. floriformis (Schw.) G. Lister	several records
T. persimilis Karst.	several records
T. scabra Rost.	vii.65, ii.67
T. varia (Pers.) Pers.	several records

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INSECTS—COLEOPTERA (G. Beven)

Dr. A. M. Easton has made an interesting study of beetles attracted to a dead fox *Vulpes vulpes* placed in the north-east corner of Bookham Common (grid reference 51/132570) in an area of mixed deciduous woodland, when freshly dead in November 1964. The beetles were collected at intervals during the following 12 months. In all a total of 1,967 individuals of 87 species were taken. Two of the species were new to Britain, *Acrotrichis platonoffi* Renk. and *Acrotrichis arnoldi* Rossk. There are also some notes on the rate of decomposition of the corpse of the fox! (1967 *Ent. mon. Mag.*, **102:** 205-210).

J. L. Henderson has discovered on the common, seven specimens of a beetle *Chaetocnema aerosa* Letzner (Chrysomelidae), another species new to Britain (1961 *Ent. mon. Mag.*, **97:** 259).

D. G. Hall has contributed the following list of beetles he has recorded on the common including only those species which are not mentioned by F. J. Coulson (*Proc. S. Lond. Ent. Nat. Hist. Soc.* 1941, **42,** p. 51-61) and L. G. Payne (*Lond. Nat.*, **24,** 31, 1944).

Harpalus rufipes (Degeer)	8.vii.51
Hydroporus gyllenhalii (Schioedte)	12.iv.53
Enochrus affinis (Thunberg)	8.vii.56
Berosus luridus (Linnaeus)	8.vii.56
Xylodrepa quadripunctata (Linnaeus)	8.v.49
Scaphisoma agaricinum (Linnaeus)	13.ii.49 and 14.viii.49
Bledius subterraneus Erichson	14.viii.49
Stenus brunnipes Stephens	13.iii.49
Lathrobium rivicola Czwalina	13.ii.49
Philonthus laminatus (Creutzer)	13.iii.49
Lordithon trinotatus (Erichson)	10.ii.57
Tachyporus scutellaris Rye	13.ii.49
T. solutus Erichson	13.ii.49
Drusilla canaliculata (Fabricius)	13.ii.49
Zyras cognatus (Maerkel)	13.iii.49
Lathridium nodifer Westwood	10.ii.57
L. bifasciatus Reitter	8.v.55
Scymnus haemorrhoidalis Herbst	8.v.49
Thea vigintiduopunctata (Linnaeus)	8.vii.56

Nomenclature is according to Kloet and Hincks *Check List of British Insects* 1945.

INSECTS—LEPIDOPTERA (C. B. Ashby)

Limited sampling of the moths of Western Plain, the coppices of the Isle of Wight and the western fringes of Central Wood was continued in 1967 by operating a mercury vapour trap from the Survey Hut. On the night of September 30 one each of the following species new to Bookham arrived at the trap:—

277 – *Agrotis segetum* Schiff. (Turnip dart)

286 – *A. ipsilon* Hufn. (Dark sword grass or Dark dart)

Agrotis segetum is such a common species all over most of the London Area that its non-appearance hitherto at Bookham is in some respects more noteworthy than its eventual recognition. In agricultural areas the larvae are at times a pest in root crops but they will feed also in the roots of wild carrot and *Rumex*. *Agrotis ipsilon* occurs through much of Britain, the larvae feeding on *Brassica*, *Lactuca* and goosefoot, but it is also well known as an immigrant species from the Continent.

FRESHWATER INVERTEBRATES (G. Beven)

J. W. Coles has contributed the following list of species he collected from the Isle of Wight Pond on July 29, 1967.

TURBELLARIA (FRESHWATER TRICLADS
(determined by S. Prudhoe)

Dendrocoelum lacteum (O. F. Müller)

Dugesia lugubris (O. Schmidt)

HIRUDINEA (FRESHWATER LEECHES)
(determined by E. G. Easton)

Helobdella stagnalis (L.)

Erpobdella testacea (Savigny)

CRUSTACEA

OSTRACODA
(determined by M. V. Hounsome)

Herpetocypris reptans (Baird)

Cypridopsis vidua (Müller)

CLADOCERA
(determined by W. A. Smith)

Simocephalus velulus (O. F. Müller)

COPEPODA-CYCLOPOIDA
(determined by W. A. Smith)

Eucyclops agilis (Koch)

Macrocyclops albidus (Jurine)

(For a previous list of species of aquatic Crustacea collected on the Common, see C. P. Castell, 1958, *Lond. Nat.*, **37**, 57-58).

FISH (G. Beven and John Cooper)

Very little has been written in these reports about the fish of Bookham Common. The following is a brief summary of the records.

Goldfish *Carassius auratus* (L.). John Cooper caught two small fishes about one inch long on July 17, 1966, and another on September 1, 1967 in the Isle of Wight Pond. These are still living in his aquarium and have grown up to 2½ inches long and are of a bronzy-green colour. He considers they are feral Goldfish and David Marlborough, the Recorder for Fishes for the Society, agrees that this is probable. Thus it seems that Goldfish are breeding in this pond.

Tench *Tinca tinca* (L.). W. H. Spreadbury (1957, *Lond. Nat.*, **36,** 55) states of Sheepbell Pond before 1914, "here on several occasions we caught some fine Tench". There is a further "doubtful record in Sheepbell Pond" by P. W. E. Currie (D. Marlborough, 1963, *Lond. Nat.*, **42,** 65).
Minnow *Phoxinus phoxinus* (L.). Noted in Isle of Wight Ditch May 27, 1944 (C. P. Castell).
Rudd *Scardinius erythrophthalmus* (L.). Found in Isle of Wight Pond during 1966-67 (E. F. Youngman). Nine young specimens one inch long, caught by John Cooper and confirmed by J. Chambers, Dept. Zool. B.M.N.H. Isle of Wight Pond, September, 1 1967.
Three-spined Stickleback *Gasterosteus aculeatus* L. Upper Eastern Pond 1944, 1946, Isle of Wight Ditch 1944 and Central Ditch 1955 (C. P. Castell). Noted Isle of Wight Pond 1963-64 (anonymous angler) and one caught in this pond by John Cooper, September 1, 1967.

[We have been told of the introduction into the Isle of Wight Pond of Carp *Cyprinus carpio* L. (in 1955) and Roach *Rutilus rutilus* (L.) (in 1955) and also Bream *Abramis brama* (L.) and Perch *Perca fluviatilis* L. but we have no records of these fish being caught.]

REPTILES. Grass Snake (G. Beven)

The Grass Snake *Natrix natrix* (L.) seems to be generally distributed and "is as common as could be expected so near to London" (A. L. Panchen, 1951, *Lond. Nat.*, **30,** 42). This snake is still quite numerous. We have 41 records for the 10 years 1948 to 1957 and 19 records for the period 1958 to 1967. An examination of the occurrences shows that it has been seen during the summer between mid-March and mid-October, the earliest records being March 12, 1961 and March 14, 1943, and the latest October 11, 1953. Of 54 dated records two were in March, 14 in April, 14 in May, five in June, nine in July, six in August, one in September and three in October. Even allowing for the fact that different habitats are not searched equally intensively, the distribution of the records is of interest, 21 were found in grassland scrub, 14 in wet herbage in or near ponds or ditches and 23 in dense oakwood. In two instances the habitat was not given. The high proportion found in dense oakwood is perhaps surprising. Malcolm Smith indicates the habitat as mainly open woodlands, hedgerows and marshy country (1951, *The British Amphibians and Reptiles*, London). Presumably the snakes hunt for young birds and small mammals in the woods. The Grass Snake swims well and regularly enters the water in search of frogs, newts, fish and tadpoles. On May 9, 1954 one was seen swimming in the Isle of Wight Pond for several minutes with its head well out of the water, holding in its mouth a frog with a leg waving; it was swallowed after a short struggle (E. W. Groves). A dead one found on April 13, 1956 had clearly been a victim of a grassland and scrub fire. The following observers have contributed the above records: G. Beven, Miss E. P. Brown, J. A. Burton, C. P. Castell, S. H. Chalke, E. M. Forsyth, K. A. Gold, E. W. Groves, Miss E. M. Hillman, A. M. Hutson, P. C. Le Masurier, P. A. Morris, L. Parmenter, L. G. Payne, F. C. Reeves, D. Yalden.

BIRDS (G. Beven)

Oakwood (*Eastern Wood*)

The breeding season census was repeated in this 40 acre sample of dense interior oakwood. The numbers of territories of singing males in the years 1963, 1964, 1965, 1966 and 1967 respectively were as follows: Starling 5, 5-6, 10, 6, 8, Chaffinch 5½, 7, 8, 7, 6, Nuthatch 2, 5, 5, 5, 7, Great Tit 12, 17, 17, 12, 16, Blue Tit 19, 19, 22, 17, 16, Coal Tit 2, 5, 4, 3, 8, Marsh Tit 3, 1, 1, 3, 3, Longtailed Tit 0, 0, 1, 2, 2, Chiffchaff 2, 5, 7, 6, 6, Willow Warbler 2½, 1½, 4, 4, 2, Garden Warbler 2, 2, 4, 1, 1, Blackcap 5, 3, 4, 7, 6, Mistle Thrush 1½, 2, 3, 2, 1, Song Thrush 4, 7, 7, 8, 10, Blackbird 8, 10, 12, 11, 12, Robin 21½, 32, 37, 37, 42, Dunnock 4, 5, 5, 4, 8, and Wren 1, 5½, 11, 17, 25.

The main changes in population after a very mild winter were increases in Robins and Wrens both reaching the highest figures obtained since the census began about 20 years ago. Recently there has been opportunity to look into the past records of the Woodpeckers in Eastern Wood. Since 1949 the numbers of pairs of Green Woodpecker has varied from nil to three and there has been one pair in most years since 1958 including one in 1967. During the period 1950 to 1954 there were two or three pairs each year, so it may be that the numbers of this species have declined somewhat in recent years. Since 1949 there have usually been two pairs of Great Spotted Woodpecker each year, occasionally one, but three pairs in 1953, 1954 and 1967. There is no evidence of a decline in this species. The Lesser Spotted Woodpecker is easily overlooked and the records are probably unreliable—there seems to have been one pair in 1954, 1955, 1963, 1964, 1965 and 1967, but it may well be a fairly regular inhabitant of the wood in the spring.

Scrub and Grassland

The spring census of the number of territories of singing males was again made on 96 acres of scrub and grassland in 1967. W. D. Melluish reports the following numbers of territories on 61 acres (Western, Isle of Wight and Bayfield Plains) during 1963, 1964, 1965, 1966 and 1967 respectively: Chaffinch 9, 10, 9, 9, 9, Reed Bunting 2, 3, 1, 2, 4, Yellow Hammer 5, 7, 5, 5, 5, Willow Warbler 8, 7, 8, 10, 12, Whitethroat 8, 6, 9, 8, 7, Song Thrush 0, 3, 4, 3, 5, Blackbird 5, 8, 5, 8, 11, Robin 4, 6, 8, 5, 9, Dunnock 7, 5, 7, 6, 10 and Wren 1, 1, 2, 5, 5.

A similar census was made again in Central Plain, a further 35 acres of scrub and grassland. The numbers of territories of singing males in 1964, 1965, 1966 and 1967 respectively were as follows: Chaffinch 8, 4, 4, 5, Reed Bunting 0, 1, 3, 1-2, Yellow Hammer 2, 2, 4, 2, Willow Warbler 13, 6, 9, 15, Whitethroat 6, 8, 9, 15, Song Thrush 5, 4, 4, 5, Blackbird 7, 3, 5, 6, Robin 17, 15, 10, 12, Dunnock 6, 7½, 7, 7½ and Wren 1, 1, 4, 5. The chief interest in these figures is to note that the Willow Warblers and Blackbirds have now recovered their numbers after the decrease following the extensive fire involving 20 acres on March 13, 1965. The Whitethroats which increased after the fire have built up their numbers still further. There was a little more scrub clearance on Central plain during 1967 so that about 12 acres have cleared since the winter of 1963-64. In addition about eight acres of Bayfield and Isle of Wight plains were largely cleared of scrub by the National Trust during 1967.

Other notes on the Birds

Two pairs of Little Grebe again nested successfully on Isle of Wight pond. There was at least one pair of resident Kestrels and a Water Rail was noted on October 8. A pair of Coot nesting on the Isle of Wight Pond had two broods, while one pair had a nest with four young on Lower Eastern Pond. This was a good year for Woodcock, three or possibly four birds being seen "roding". A pair of Collared Doves *Streptopelia decaocta* claimed a territory near Bayfield Pond from June to August (W. D. Melluish). This is the first record of Collared Doves on Bookham Common. On August 13 a Turtle Dove was put off a nest seven feet up in hawthorn on Central Plain. The nest was constructed very largely of thin plastic-covered copper wire (single strand) and contained two small young. An empty second nest six feet up in the next hawthorn bush was also made largely of this wire together with some hawthorn twigs. Up to two Barn Owls were recorded in April, August and September. A census of Tawny Owls heard hooting was made on April 15, September 30 and October 28; there appeared to be possibly eight birds on or near the Common. Three or four of these were heard hooting from different parts of the 250 acres of oakwood (in 1965 there were four and in 1966 four). A pair of Swallows had nested in an old barn by the keeper's cottage regularly for years. They had barely completed a nest and had not laid on May 20, 1967 when the National Trust had the old barn pulled down. Within two days the Swallows had started building in a garage close by, and they built two nests simultaneously on the same beam. They reared three young in one nest and subsequently three young in the other next.

A pair of Willow Tits may well have nested in or near Eastern Wood, a bird being heard singing in May and a family party being present in June. The number of pairs of Longtailed Tits in the spring in an area of about 120 acres of grassland with thick scrub during 1962 was six, in 1963 nil, 1964 three, 1965 four, 1966 four and 1967 six. Three Nightingales were singing in May and four singing male Grasshopper Warblers were present in the spring. Goldcrests seemed unusually numerous in the autumn, 27 being counted on the Common on November 12. A female or first year male Great Grey Shrike was seen on March 12 and another or the same bird on April 9 but no Redbacked Shrikes were recorded in 1967. One or two Siskins were noted in January and February. There were four territories of displaying male Redpolls on the plains in 1967 (up to 1962 there were none, 1963 one, 1964 two, 1965 two, 1966 three to four). A Corn Bunting *Emberiza calandra* was seen singing by K. A. J. Gold on August 13 (the first record for the Common). A Tree Sparrow was noted on the roof of the keeper's cottage on July 9.

ERRATUM. Birds feeding on plant galls. On page 114 in *Lond. Nat.*, **46,** 1967, the scientific name of the Marble Gall should have been *Andricus kollari* (Hartig), not *A. collaris* (Hartig) as stated, although the larvae of the latter are recorded as eaten by tits (M. Betts, 1955, *Jour. Anim. Ecol.*, **24,** 288).

MAMMALS (G. Beven)

Perhaps the most important mammal record in 1967 was the discovery of Roe Deer *Capreolus capreolus* (L.) on the common. Since John Burton had drawn the distribution map showing several records just to the west

of the River Mole (*Lond. Nat.*, 1966, **45**, 38), it had seemed inevitable that this species would soon wander on to the common. During June Roe Deer slots were found at the edge of Central Wood (548) and D. Macer-Wright confirmed the identification by making plaster casts and comparing them at the British Museum (Nat. Hist.). Since then a party of three deer has been observed in September, November and December on Bayfield Plain, Mark Oak Path and near the Isle of Wight, while they were seen on Eastern Plain in January, 1968 (D. Macer-Wright and E. F. Youngman). In the early morning of October 1, 1967, one was heard barking near the Isle of Wight (G.B.). The party, if it is always the same, seemed to consist of a buck, a doe and a kid.

Grey Squirrels *Sciurus carolinensis* Gm. were observed stripping bark from trees in the oakwood in early June. In Eastern Wood on June 24, 1967 at least nine birches, one oak, one beech and one hazel had been attacked, the bark being stripped off the trunk or large branches over lengths of 5-10 feet, often above 15 feet and up to 50 feet from the ground, but sometimes at the base of the tree. The trunk or branch was usually completely "ringed" and most subsequently died above that level. On January 14, 1968 after a heavy snowfall three of these stripped branches on birch were found to be broken across at the lowest point of stripping. The last time when similar bark stripping was noticed was in 1961, when it was more extensive (1962, *Lond. Nat.*, **41**, 73). This habit is said to be aggravated by dry weather and the late spring of 1961 was very dry. It is true that June, 1967 was also dry (rainfall 75% normal), but May was the wettest for nearly 200 years (rainfall 219% normal).

On December 10 a bird's nest (probably of a Linnet) was found on Central Plain (8848) in a small hawthorn bush about 6 feet high. The nest was $3\frac{1}{2}$ feet above ground and was covered with snow; under the snow were found large numbers of rose hip seeds with a few fresh pieces of the bright red outer fleshy covering of the hip. Most of the seeds had been opened by a small rodent, almost certainly a Wood Mouse *Apodemus sylvaticus* (L.), which must have collected the hips from nearby rose bushes and carried them up to the nest. There were mouse droppings present among the seeds. A similar feeding site and store of rose hips in an old Bullfinch's nest found on February 10, 1952, also on Central Plain, has been described by E. W. Groves (1958, *Lond. Nat.*, **37**, 75-66).

Twenty-five years of the Bookham Common Survey, including a Note on the Increase of of Scrub on Grassland

By Geoffrey Beven

(*Based on the Presidential Address delivered on December 7, 1967*)

IN 1941 a modest note appears in the *London Naturalist*:—"In view of the transport and other difficulties associated with war time conditions, the Society's Survey of Limpsfield Common has been suspended, but in order to maintain some form of activity in the field among members of the Ecology Section, it has been decided to make a study of the flora and fauna of Bookham Common, Surrey, an area of about 380 acres". (This area was chosen for convenience from a total of 438 acres for the whole common). Field activity has been maintained for 25 years during which time 63 papers on the flora and fauna of the common have been published in the *London Naturalist*, as well as several in other journals, and there have been 24 annual reports, a total of about 530 pages.

There has been a general tendency in recent years for ecological studies to become more intensive and scientific and to be largely the work of professional naturalists. This trend is inevitable since the amateurs with their limited time and resources find increasing difficulty in producing comparable work. Nevertheless the role of the amateur is surely not yet finished. He can still make useful contributions, especially perhaps in the conduct of long term surveys such as this. The length of our survey is in itself a remarkable achievement but the real value of such an investigation lies in studies of the natural changes in the area. These changes must be recorded in detail, to try to determine the rate of change and the factors involved.

A great deal has been learnt about ecological succession, especially by the botanists, but it would be of great interest to repeat these studies to investigate further changes. With so much already on record our Society has an opportunity, perhaps unique, of answering some of these problems. This challenge must surely not be neglected. Workers are badly needed at Bookham Common in every branch of natural history. In some groups such as Ants, Bees, Sawflies and Grasshoppers, very little or even nothing has been published, not even a list of species with habitat preferences, the basis on which most ecological work is built. On the other hand the intensive searches on the Common have revealed the presence of a number of rare species, some new to Britain, others indeed new to Science!

During this long period many expert naturalists have visited the common, it therefore is impossible to mention every name. Leonard Parmenter when secretary of the Ecology Section was largely responsible for the inauguration of the survey and is well-known for his thorough investigation of the flies (Diptera). Soon after the start however, Parmenter was called away for military service and the continuation of the survey was largely due to the energies of L. G. Payne and especially to C. P. Castell who became leader of the survey and who has maintained his special interest in it ever since. The Society owes these members a very great deal particularly Cyril Castell, whose continuing enthusiasm

and devotion has kept the survey very much alive and active all these years. He created the detailed map, first used in November 1941, on which all the work has been based; he has written wholly or partly at least 11 papers and a large part of each of the 24 annual progress reports.

A great variety of species has been recorded with notes on their ecology:—about 500 species of flowering plants were listed by A. W. Jones and the names of E. B. Bangerter, C. P. Castell, E. W. Groves and B. Steele must especially be linked with the botanical studies. J. R. Laundon notes some 75 species of lichens, C. P. Castell 342 species of fungi, including one discovered by A. H. Norkett on decaying bramble leaves in a pond and which proved to be *Aegerita alba*, a species new to Britain. A. H. Norkett also records 81 species of Algae. Eighteen species of aquatic Molluscs were recorded by Colonel C. J. F. Bensley and Dr. (now Professor) J. L. Harrison, while A. E. Ellis has found 30 species of land molluscs. W. A. Smith recorded 24 species of aquatic Crustacea and six species of Woodlice have been noted. A. E. Le Gros has already listed 100 species of spiders but since then he has found another 70! Of the insects, 257 species of Butterflies and Moths are recorded by A. S. Wheeler and C. B. Ashby. It was indeed fortunate that two well-known authorities on the Diptera worked at Bookham for 25 years; Leonard Parmenter and Montague Niblett between them amassed the astonishing total of 1,200 species of flies, more than from any other comparable area of the country! M. Niblett who died during 1967 was one of our most distinguished members; his work on flies especially the gall-causing *Cynipidae* is of international importance and includes some remarkable achievements in breeding fly larvae from many plants. It is, therefore, gratifying to note that of the four species of Diptera new to Science, found on Bookham Common, one, a species of *Agromyzidae*, has been named after him, *Melanagromyza nibletti* (Spencer).

Over 600 species of beetles are mentioned by Dr. A. M. Easton, but the list is not yet complete, D. Leston notes 150 species of heteropterous bugs and R. M. Payne 16 species of Dragonflies. M. Niblett together with H. J. Burkill, another well-known authority, lists 236 species of plant galls. Three reptiles and five amphibians are recorded by A. L. Panchen. Studies on some of the hundred species of birds have been published by G. Beven, L. I. Carrington, C. P. Castell, S. H. Chalke, P. W. E. Currie, W. D. Melluish and A. R. Wilton. Leonard Manns has studied the seasonal variations of leaf litter fauna of oakwood in relation to bird populations. There are papers on the 22 species of Mammals by J. L. Harrison, John Lord and K. A. J. Gold. Only those who have written reports have been mentioned, but of course there have been many other enthusiastic members who have toiled at Bookham month after month to collect the information required for these studies. Their work has been an essential part of the Survey.

Many of the papers have emphasised ecological aspects and as C. P. Castell and R. M. Payne have written—"the outstanding need . . . is a fuller appreciation of the significance of ecology as a particular branch of natural history and a realisation that a more intensive scheme of study is required than the mechanical compiling of lists of species". In 1947 C. P. Castell remarked "the systematic investigation of problems rather than casual collecting and observation is an encouraging sign". E. B. Bangerter described how "habitat and biotic factors are considered,

populations and associations dealt with and inter-relationships between different branches of natural history studied".

In 1963 the National Trust appointed a keeper for the common and erected a cottage for him in the Isle of Wight enclosure. In 1964 the Trust readily gave permission for our Society to erect a hut to serve as a field centre, and we are most grateful to the local committee who generously leased a site in the keeper's garden for a nominal rent. The hut was purchased by the Society, £100 being given towards the cost by an anonymous donor. The hut, containing furniture, heating, lighting and a small library represents an important "landmark" in the history of the Survey and has already greatly improved the facilities for field studies.

The Spread of Scrub over the Grassland

In 1941 C. P. Castell wrote "more than half the common is covered by the typical semi-natural pedunculate oakwood of clay soils; the rest is wet grassland with local rush communities and hawthorn and bracken fringing the woodland. There are some 15 more or less permanent ponds with about three acres of water". Undoubtedly the most important change in the natural history of the common since then has been the remarkable increase in the growth of scrub on the grassland. To understand this it is helpful to delve a little into history.

J. H. Harvey describes how the common was "wasteland" of the original Saxon settlement of Bocham "the village of the beeches" (there are beeches on the chalk in the south of the parish). No doubt in prehistoric times the whole common was covered by oakwood but the early settlers cut timber and cleared some woodland, allowing their domestic animals to graze on the resulting grassland. Constant grazing prevents regeneration of seedling trees and shrubs. Great and Little Bookham were already distinct in the Domesday Survey of 1086; Great Bookham became a market town in monastic times. Much timber was taken from the common for the building of Nonsuch Palace in 1538 and even 75 years later it is recorded that there were no longer any good timber trees on the common. The inhabited area in the centre of the common, the Isle of Wight, was enclosed mainly between 1550 and 1615. The Isle of Wight pond was almost certainly a fish pond, a relic of monastic times, when the monks of Chertsey required large supplies of fish.

According to W. H. Spreadbury, before 1914 the grassy plains were partly gorse covered and were frequent camping grounds for gipsies. The common was extensively grazed by cows, horses, geese and sheep which even invaded the woodland. This grazing and trampling by large domestic animals probably kept the grasslands open and clear of scrub and bracken for centuries. After the First World War, however, grazing on a large scale decreased and when the whole common was acquired by the National Trust by 1925 grazing almost ceased apart from a very few cows which were finally removed in 1949.

Since then the grass, dominated by Tufted Hair Grass *Deschampsia caespitosa*, has become tall and tussocky while there has been a vast increase of shrubs (hawthorn, sloe and rose), bracken and saplings of trees (oak, birch and ash) all over the grasslands and the oakwood creeps steadily outwards, now occupying some 250 out of the 380 acres of the common. The rate of increase of the shrubs has been estimated by the botanists led by C. P. Castell who, in 1952, 1956 and 1966 carefully

recorded the number of, and the canopy cover of all the shrubs in two "quadrat" areas (measuring 3,600 and 12,000 square feet). Between 1952 and 1966 it was found for example, that the total number of hawthorn plants increased by about 50% in one quadrat and 20% in the other, while the hawthorn scrub canopy cover increased by five times in one area and ten times in the other, and oak canopy cover by about 12 times. At first the growth of the shrubs seemed slow but in the nineteen-fifties there appeared almost a population explosion.

Although the main cause of this regeneration was the removal of the domestic grazing animals, it is of interest to consider the part played by a smaller grazing mammal, the wild Rabbit *Oryctolagus cuniculus*. Despite its abundance throughout most of this period, the rabbits clearly found it impossible to keep down the growth of shrubs once the larger animals had gone, doubtless because woody and spiny plants such as hawthorn, bramble and rose have comparative immunity from rabbit nibbling. They are thus able to establish themselves in places forming thickets which may protect other trees growing among them. In one extensively grazed warren on Bank's Plain the rabbits did seem to be preventing the spread of shrubs, until in 1954 myxomatosis almost exterminated the rabbits. It was about three years before they became numerous again and by then many hawthorn seedlings had become sufficiently large and woody to withstand their attacks, although browsing takes place on the lower leaves within reach. In 1956 there were marked changes on Central Plain, in the percentage of herbaceous plants, especially grasses, including a remarkable increase of *Arrenatherum elatius* at the expense of *Agrostis*, *Festuca* and *Holcus*, probably resulting from the reduction in rabbit grazing. Myxomatosis struck again in 1966, but this time the population was only slightly reduced and rapidly recovered in the next few months. Rabbits prefer to graze on the finer grasses and very young shrub seedlings and tend to avoid the coarse grasses such as *Deschampsia caespitosa*, although this is sometimes eaten. They may browse anywhere on the common, but feeding is concentrated on certain areas, such as those recently cleared of shrubs (thus assisting in maintaining cleared areas), also on the tops of the hill nests of Yellow Ants *Acanthomyops flavus* and on the footpaths where the grass is kept short by human trampling or mowing. When, in April 1967, a new grass cutting machine was used on the footpaths, the area of short grass increased, making an added attraction for the rabbits. Within six months the marked evidence of rabbit grazing and the abundance of fresh droppings on these paths, suggested a possible increase in population, perhaps a result of this extension of favoured feeding areas.

If this natural regeneration is allowed to proceed unchecked, the whole common will in time be covered by oakwood. The National Trust is anxious to preserve some open spaces for amenity value, and the naturalist prefers a variety of habitats to conserve a large variety of organisms. In 1959 representatives of the National Trust, the Nature Conservancy, the Council for Nature's Conservation Corps and of our Society met together on the common. It was decided to make the common the site of a pilot scheme of experimental and controlled scrub clearance, with the aid of the Conservation Corps. It is hoped that our Society will investigate and record changes in natural history as a result of scrub clearance. Bruce Ing has described how the Conservation Corps pulled up smaller bushes with a monkey winch, cutting down others and

treating the stumps to prevent regrowth. Some thickets and trees have been left as sanctuaries for wild life. Vegetation was also cleared from various ponds which had become overgrown. However, it soon became clear that the Conservation Corps could not prevent the major part of the grassland from becoming covered with scrub, so in 1963 the National Trust started using larger machines to drag up and cut down scrub on a greatly increased scale. So far much of the scrub has been removed from 12 out of 35 acres of Central Plain—a little each year—and the clearing continues by stages. How much will this clearance affect the wild life of the Common? What is the size of area best cleared each year in order to preserve the common as we would wish but with minimal loss of wild life? There is a great deal of important work still to be done on Bookham Common.

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FIELD MEETING REPORTS (List compiled by E. W. GROVES).

A list of reports, published in the *Proceedings of the South London Entomological and Natural History Society*, of field meetings held by the Society on Bookham Common. The year of the volume is followed by the page reference, then by the date on which the Field Meeting took place. Following this is listed all those orders or groups of species which are recorded in the report. A species name alone indicates that only one record of that particular family or group was noted that day.

1902 : 41-2	10. 5.02	Birds. Flowering plants and non-flowering plants. *Equisetum limosum.* Diptera. Caddis fly *Limnophilus auricula.* Hymenoptera. Lepidoptera. Aquatic Mollusca. Smaller pond life (Rotifers, etc.).
1904-05 : 28-9	4. 4.04	Flowering plants and non-flowering plants. *Equisetum limosum. Ophioglossum vulgatum.* The fungus *Epichloe typhina.* Lepidoptera and larvae. Neuroptera. Diptera. Orthoptera. Coleoptera. Aquatic Mollusca. Smaller pond life (Cyclops, etc).
1927-28 : 78-9	14. 5.27	Lepidoptera. The Bristly Millipede *Polyxenus lagurus.*
1930-31 : 40	17. 5.30	Lepidoptera.
1934-35 : 17-19	9. 6.34	Lepidoptera. Odonata. Coleoptera. Homoptera. Plant Galls. The ponds were remarked upon as being "in a dried up condition".
1935-36 : 17-19	6. 7.35	Lepidoptera. Coleoptera.
1937-38 : 35-6	17. 4.37	Lepidoptera. Coleoptera.
1938-39 : 38-9	2. 4.38	Lepidoptera. Coleoptera. Medicinal Leech *Hirudo medicinalis* in "Bookham Pond" [presumably I.O.W. pond].
: 57-8	15.10.38	Lepidoptera. Coleoptera. All ponds were reported as "quite dry".
1939-40 : 35-6	24. 4.39	Lepidoptera. Birds. Coleoptera. The sawfly *Abia lonicerae.*
1940-41 : 33	11. 8.40	Ova and young larvae of *Pygaera curtula.* Pond (presumably I.O.W. pond) reported dry and *Nonagria typhae* pupae collected from *Typha.*
1945-46 : 56	16. 9.45	Lepidoptera. Flowering plants. Fungi.
1948-49 : 74	7. 8.48	Lepidoptera.
1949-50 : 77	13. 8.49	Lepidoptera. Coleoptera. Family of stoats observed. Growth of waterside plants on the increase "since measures were taken to prevent the ponds drying up in summer".
1950-51 : 75-6	29. 7.50	Lepidoptera. Coleoptera. Heteroptera. Hymenoptera. The greater amount of water present in the ponds at this time of the year since repairs to the embankment, is commented upon. The top pond [=Upper Eastern Pond] is described as "much overgrown with reeds and having little open water". The marked increase in the growth of bracken elsewhere on the Common is also mentioned
1951-52 : 76	12. 8.51	Lepidoptera. Flowering plants. Birds. The beetle *Metoecus paradoxus*, and the fungus *Russula pectinata.*
1952-53 : 75	4. 5.52	Lepidoptera. Coleoptera. The water-scorpion *Nepa cinera* from I.O.W. pond, and the woodlouse *Playyarthrum hoffmanseggei* from beneath grass tuft.
: 81	22. 6.52	Lepidoptera. Diptera. Coleoptera and a hornet *Vespa crabro.* Birds.
1953-54 : 87-9	15. 7.53	Lists of Lepidoptera, Coleoptera, Diptera and Heteroptera. Several flowering plants, plant galls and leaf miners, and fungi noted. Single specimen of the Field Cockroach *Ectobius lapponicus.*
1954-55 : 79	2. 5.54	Leaf-mining Diptera.
-1955 : 77	3. 7.55	Lepidoptera. Diptera particularly leaf-miners.
1956 : 76	9. 6.56	Lepidoptera. Coleoptera. A single example each of the grasshopoer *Tetrix subulata;* the Field Cockroach *Ectobius lapponicus;* and the sawfly *Tenthredo temula.*
1957 : 71	13. 7.57	Lepidoptera. Coleoptera. The fly *Psectrosciara soluta.* Flowering Plants. Birds.
1958 : 81	14. 9.58	Lepidoptera.
1960 : 75	10. 4.60	Lepidoptera larvae. Coleoptera. Diptera. The Plecopetron *Nemoura variegata.* Flowering plants. Fungi and the moss *Dicranoweisia cirrata.* Birds.
: 89	14. 8.60	Flowering Plants. Fungi and the hepatic *Calypogeia trichomanis.*
1962 : 103	22. 9.62	Microlepidoptera. Flowering plants. Fungi.
1967 : 85	9. 4.67	Diptera. The hepatic *Riccia fluitans* noted on I.O.W. Pond and the millipede *Polyxenus laguras* found under bark of dead hawthorn.

Working Party on Mapping

Progress Report for 1967

THE Working Party made substantial progress during 1967 and its meetings were well attended. J. Burton's experimental distribution maps of mammals in the *London Naturalist* in 1966 aroused much interest and the discussion of readers' comments led to general agreement on the design of maps intended for publication in the *London Naturalist*. The recommendations concerned the selection of symbols for the maps and the choice and scale of the base map for recording and publishing. The Working Party recognised that where grid squares are used for recording, the recorder's base map is a polygon, though published maps will, of course, continue to show the circle with a radius of 20 miles from St. Paul's Cathedral. It would be helpful for all recorders to keep to the same polygon and the one adopted by the Plant Mapping Scheme of the Botany Section was approved by the Working Party which recommends its future use. Any members or sections engaged in mapping are invited to write to the Map Officer for details of these recommendations and, of course, are welcome at future meetings of the Working Party.

The Map Officer also has available upon application a list of maps held in the Society's Library and at the Ealing Reference Library together with details of borrowing and copying facilities. The liaison with the Ealing Reference Library has proved most helpful and the Working Party is exploring the possibilities of an exchange of ideas and information with neighbouring societies.

H. A. SANDFORD

Obituary

MONTAGUE NIBLETT 1878-1967

WITH the death of Montague Niblett in October 1967, the Society lost one of its most distinguished honorary members. Niblett had served as Chairman of the Plant Galls Section before its amalgamation with the Entomological Section. He joined the Society in 1926 and regularly attended both indoor and outdoor meetings of the Plant Galls Section, taking a leading role. With H. J. Burkill and J. Ross the section continued for many years with work on gall causers that had been started by E. B. Bishop, L. J. Tremayne and H. J. Burkill when they formed the section in 1917. Towards his later days he supported the Bookham Common meetings of the Ecological Section.

His many articles brought him a world-wide circle of friends and an international reputation for original work on rearing small insects of the orders Diptera and Hymenoptera and especially in experimental work on the alternate generations of the gall-causing Cynipidae. He was always

ready to help others in their studies. A fly of the genus *Melanagromyza* bred by him from Bookham Common was named after him in appreciation of his field work.

His son and daughter survive him and to them our deep sympathy is tendered.

L. PARMENTER

[A longer appreciation appeared in the *Entomologist's Record* of December 15, 1967].

Survey of Ladybirds occurring in the London Area

THE Entomological Section is conducting a study of six common species of ladybirds which occur in the London area. The species being studied are *Coccinella 7-punctata* L., *C. 11-punctata* L. *Adalia bipunctata* L., *A. 10-punctata* L., *Propylea 14-punctata* L. and *Thea 22-punctata* L. In common parlance these may be described as the 7, 11, 2, 10, 14 and 22 spot ladybirds.

The primary objects of the survey are to map the distribution of each species and to investigate whether these species have preferences for particular plants. Since ladybirds feed almost entirely on aphids, and most species of aphids are confined to a single plant or group of related plants, if the ladybirds can be shown to be found on certain plants more often than on others it might indicate that the ladybird larvae prefer to feed on the aphids associated with those plants.

Any conclusions arrived at will be valid only if *large* numbers of records are received. No detailed knowledge of entomology is required and all members are invited to participate by sending records to:—

Mr. D. G. Hall, 7 Sutherland Avenue, Cuffley, Herts.

The following details should be included: name of species (send specimen if in doubt), locality (give four figure grid reference, if possible), name of plant the ladybird was on (if not on a plant, state circumstances), number of specimens and date of observation.

Aids to the identification of the six species to be studied have been set out in a pamphlet available from Mr. Hall.

The more records that are received, the more value the survey.

D. G. HALL

Requests for Information———

1. Rusts and Smuts in the London Area

Bruce Ing and Peter Holland are collecting records, specimens and other information about the occurrence of Uredinales and Ustilaginales within a 20 mile radius of St. Paul's Cathedral, to be collated into a further section of the *Handlist of the Plants of the London Area.* Specimens and other information will be gratefully received by Bruce Ing, Chorleywood Rural Studies Centre, Rickmansworth, Herts., or Peter Holland, 28 Hetherington Road, S.W.4.

2. Ergot of Grasses

The common ergot of grasses, *Claviceps purpurea*, is widespread on a large number of grass hosts, in the inflorescence. Information is being sought on the distribution and host preference in the London Area. Data required are: locality (with grid reference), host, date and habitat. Information please to Bruce Ing (address above).

3. Witches' Brooms

Information about these curious galls is sought from the London Area and especially from Hertfordshire. Brooms on cherry, hornbeam and birch are common, but pine, larch, spruce, beech, lilac, privet, thyme, rest-harrow, etc. are also affected, though rarely. Data required are: locality, plant with brooms, whether broom is upright or hanging (on trees) and size and number of brooms. Small brooms, such as those on thyme, may be sent for confirmation to Bruce Ing (address above). All help will be acknowledged.

Statement of Accounts for the

GENERAL

1966 £ s. d.	Receipts	£ s. d.	1967 £ s. d.
1,945 17 1	Subscriptions Current	2,012 19 2	
23 4 0	Subscriptions Arrears	15 15 0	
41 10 0	Subscriptions Advance	87 16 6	
52 5 0	Entrance Fees	63 5 0	
2,062 16 1			2,179 15 8
114 17 0	Donations		137 8 11
2 12 6	Interest £75@3½% War Stock	2 12 6	
5 8 0	Interest £180@3½% Savings Bond 60/70	5 8 0	
149 13 1	Interest Deposit Account	163 17 6	
			171 18 0
94 5 9	Bird Film Receipts		14 13 9
— — —	Tax recovered Deeds of Covenant		70 0 10
15 4 5	Sundries		— — —
51 4 8	Balance in Hand 31.10.66		140 3 4
— — —	Excess of Payment over Receipts		8 19 2
£2,496 1 6			£2,722 19 8

PUBLICATIONS

111 15 7	Sale of Publications		125 12 11
29 16 0	Advertisements		26 10 0
9 2 11	Balance of *London Bird Report* Reserve No. 30		— — —
1,316 9 9	Transfer from General Account		1,635 11 7
£1,467 4 3			£1,787 14 6

LIBRARY AND

200 0 0	Balance 31.10.66 for Printing Catalogues		200 0 0
19 1 9	General Account for Books		55 6 11
£219 1 9			£255 6 11

PREMISES

1,500 0 0	Balance 31.10.66		1,700 0 0
90 0 0	Transfer from General Account (Int.)		102 0 0
110 0 0	Transfer from General Account		— — —
£1,700 0 0			£1,802 0 0

BOOKHAM COMMON (Reserve

— — —	Balance at 31.10.66		— — —
— — —	Transfer from General Account		50 0 0
			£50 0 0

LIFE COMPOSITION

	Balance 31.10.66		400 0 0

"BIRDS OF THE LONDON (Ornithological

18 17 9	Royalties of 2nd Edition		4 15 11
6 18 10	Interest		4 15 1
168 18 4	Balance 31.10.66		194 14 11
£194 14 11			£204 5 11

Audited and found correct
November 17, 1967

Year ended 31st October, 1967

ACCOUNT

1966			Payments	1967		
274	17	0	Hire of Rooms and Halls	277	17	3
3	18	6	Bookham Research Centre	—	—	—
44	13	3	Printing and Stationery	63	7	9
200	0	0	Honoraria, General Secretary, Programme Secretaries	245	16	8
29	2	2	Telephone	26	4	10
38	7	0	Subscriptions to other Societies	41	6	6
113	15	11	Sectional Grants and other Expenses	94	12	6
—	—	—	Rules Expenses	37	12	9
55	4	8	Postages	70	7	8
35	10	4	Bird Film Payments	—	—	—
—	—	—	Covenant expenses	6	18	10
19	1	9	Grant to Library Account	55	6	11
24	17	10	Sundries	15	16	5
90	0	0	Transfer to Premises Account (6% on £1,700)	102	0	0
110	0	0	Transfer to Premises Account	—	—	—
—	—	—	Transfer to Bookham Common Research Centre Reserve	50	0	0
1,316	9	9	Grant to Publications Account	1,635	11	7
140	3	4	Balance in Hand 31.10.67	—	—	—
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ACCOUNT

182	15	0	Programme	177	1	0
627	13	10	*London Naturalist* No. 46	816	4	4
—	—	—	*London Naturalist* No. 46 Reserve for Reprints	55	8	3
500	0	0	*London Bird Report* No. 31 Reserve	550	0	0
56	5	6	Addressing and Wrapping	51	18	0
100	9	11	Postages	91	12	8
—	—	—	*London Bird Report* No. 30 Excess Expenditure over Reserve	45	10	3
£1,467	4	3		£1,787	14	6

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19	1	9	Purchase of Books	55	6	11
200	0	0	Balance 31.10.67 for Printing Catalogues	200	0	0
£219	1	9		£255	6	11

ACCOUNT

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£1,700	0	0		£1,802	0	0

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—	—	—	Balance at 31.10.67	50	0	0
				£50	0	0

ACCOUNT

			Balance 31.10.67	400	0	0

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194	14	11	Balance on Deposit Account 31.10.67	204	5	11
£194	14	11		£204	5	11

R. W. HALE, *Hon. Auditor*
J. W. CAMPLIN, *Hon. Auditor*
A. J. BARRETT, *Hon. Treasurer*

Books

A Field Guide to the Mammals of Britain and Europe, by F. H. van den Brink. London, Collins, 1967. 221 pages, 32 plates. Price 30s.

Concise, well-illustrated field guides, written for the converted naturalist rather than the layman, are a remarkably recent phenomenon in natural history publication, even in the most popular fields such as ornithology. This guide is the only such work in the English language that deals with all European mammals with illustrations and distribution maps, and as such it will prove an indispensible tool for all mammal-minded visitors to the continent as well as for those who simply want to consider our local British mammals in a wider context. In contrast to the situation in birds, the proportion of European species of mammals that are on the "British list" is very small and therefore such a field guide contains much that is unfamiliar and not readily available to the British reader. The original Dutch edition, published in 1955, has already been well used by British mammalogists in spite of the language difficulty.

The number of species dealt with is 184 (including 31 whales), not 231 as stated on the front of the jacket, nor 137 as stated on the front flap! All are illustrated in colour except for a few marginal species and the cetaceans which are in monochrome. Small maps show the outline of the distribution of each species and most species are also illustrated by photographs of the skull. Brief paragraphs deal, for each species, with identification, habitat, habits and comparison with similar species.

The book as a whole has suffered from rather too close imitation of the bird guides. Most of the smaller mammals simply cannot be identified "in the field" either because they are strictly nocturnal or because the diagnostic difference between species can only be seen with the animal in the hand (and in some cases but even then without either dissection or considerable experience). This problem is tackled to some extent by drawings of teeth, e.g. of some bats and voles, of nose-leaves of horseshoe bats etc., but this aspect could usefully have been amplified to include other detailed characters that are nevertheless of use when handling animals in the field. Such items could usefully have replaced some of the coloured illustrations of what are, superficially, virtually identical species, especially in view of the rather poor colour reproduction of some of the plates.

One most unfortunate aspect of this book is the use of an unorthodox taxonomy in several groups, e.g. the splitting of the genera *Myotis* and *Apodemus* and the recognition of two species of *Arvicola* in Britain. The last is based on the flimsiest of evidence and, along with the other unorthodoxies, seems out of place in a concise field guide where the reasons, even if valid, cannot be adequately explained and documented. These items are discussed briefly in a section of taxonomic notes, but no bibliographic references are given for the many papers quoted in that chapter.

Provided it is appreciated that many species of the smaller European mammals are indeed little known either from the taxonomic or ecological aspects, and that any statement in a book such as this must be a brief generalisation that will be more or less true in a particular case, then this

book should play an important part in stimulating the kind of observation that will help to fill the many gaps in our knowledge.

G. B. CORBET

Tracks, by E. A. R. Ennion and N. Tinbergen. 63 pages. Clarendon Press; Oxford University Press, 1967. 25s.

This, the product of two eminent field naturalists, is not another field guide to animal tracks and signs. It is essentially a picture book in which art and natural history are cunningly blended. Professor Tinbergen's camera has skilfully reproduced the work of many animal action-artists, the exciting and ephemeral track patterns left on wide bright canvasses of snow, sand or glistening mud.

These photographs, besides being beautiful in themselves, are pictorial records of the evidence from which keen observers may build up a knowledge of animal movements, behaviour and interdependence. Dr. Ennion's lively sketches help to reconstruct the incidents which have taken place, some amusing, like the young Kestrel's game with a pine cone, some dramatic, like the Fox's seizure of a Black-headed Gull.. In some cases a sketch has been superimposed upon a photograph This is not, in my opinion, a very happy marriage, especially when a coloured drawing has been added to a black and white background, or when realism has been eclipsed by style. The Rabbits, in particular, are rather odd animals, and the tobogganing bird described as a Chinstrap Penguin looks more like the Yellow-eyed species. The explanatory text is good throughout, but no rule seems to have been followed concerning the use of capital initials for the names of animal or plant species, and two pictures of Goosander and their tracks are not explained at all.

It is evident that many of the photographs were taken in the dunes at Ravenglass, where Professor Tinbergen and his students have been working on Black-headed Gulls and other species. Other illustrative material, however, was collected elsewhere, and despite the title, the book also deals briefly with Roe Deer damage, bird pellets, the Song Thrush's anvil and the larder of the Red-backed Shrike. But the footprints in the sand had the greatest fascination for me, and I realise what a lot must escape my notice even though I now spend hundreds of hours each year walking amongst sand dunes.

The reader is unlikely to believe the oddly-worded claim made on the dust-jacket (if indeed he can understand it!) that ". . . the animals included can be found all over northern Europe and closely related species in North America". Even if allowance is made for the missing words, whatever they may be, the sentence still seems to suggest that penguins have now crossed the Equator and the zebra and wildebeeste (illustrated on pages 62 and 63) have migrated to northern lands far beyond the Serengeti!

W. G. TEAGLE

The Vivarium, by G. F. Harvey and J. Hems. Faber and Faber, 1967. 88 pages. 16s.

According to the publisher's publicity on the dust cover, this book will tell the reader all he needs to know about how to keep reptiles and amphibians in captivity; this statement seems to the reviewer as misleading as the title.

Thirteen pages of the book only, are devoted to the general principles of establishing a vivarium, while nearly 60 pages are given to accounts of the various animals concerned. While a few hints on keeping these are included, the major part of this text describes the general biology of the animals. Little help is given on the subject of obtaining or rearing food, while in the paragraphs on disease, no mention is made of red mite, sometimes a problem with lizards, neither is the value of a dilute saline environment for amphibians with fungus infection mentioned.

In summary, this book provides a chatty introduction to herpetology, but only a most elementary one to vivarium keeping. (Hellmich's *Reptiles and Amphibians of Europe* contains almost as much assistance as this book, and Leutscher's *Vivarium Life* seems in general more helpful). The author's deliberate failure to provide any bibliography, or help with further reading, and their allusion to such help as pedantry, seems arrogant in the circumstances.

D. W. YALDEN

Northaw Great Wood, edited by Bryan L. Sage. Published by the Education Department of the Hertfordshire County Council, 1966. 186 pages, four photographs, four maps, six text figures, 22 plates of line drawings. 21s.

The first impression of this book is of an attractive, well produced volume which stimulates interest in a popular woodland area. On reading further the first impression is fully justified.

The original aim was to provide a guide to the natural history of the Great Wood. That this is not exactly achieved is not the fault of the editor or contributors. However, there is a wealth of information about the wood and its inhabitants which forms a firm basis for the fieldwork of the schools which use the County School Camp in the north eastern corner of the wood.

After a short introduction, which sets the tone of the book admirably, there follow articles on the history, woodland ecology, geology and soils of the wood which are the most complete sections and provide a framework for the specialist sections to come. These include chapters on trees and shrubs, wild flowers, toadstools, lichens, bryophytes, mammals, birds, amphibians and reptiles, beetles, butterflies, molluscs and woodlice.

With two exceptions the articles are written by members of the Hertfordshire and North Middlesex Branch of the British Naturalists' Association.

It would not be difficult to find small errors or omissions in this book but this reviewer is not concerned with these. The obvious omissions are in groups in which there are no local workers. Even in the groups covered many species have been added since the book appeared. This is the major justification of the work, that it prods the less active naturalist to make useful discoveries of his own, *and report them.*

The printing is excellent with few errors, the maps and drawings clear and the photographs well chosen. This is a splendid example of co-operation between different disciplines and could be followed in other well known natural history sites in our area. The contributors and the editor are to be congratulated on their efforts and the Hertfordshire County Council applauded for its wisdom and foresight in publishing this, the first, we hope, of a long line of local monographs.

BRUCE ING

A Naturalist in Russia, Letters from Peter Simon Pallas to Thomas Pennant. Edited by Carol Urness. 189 pages. Minnesota University Press: Oxford University Press, 1968. 71s. 6d.

Two hundred years have done little to diminish the stature of the great naturalists of the latter part of the eighteenth century: in the light of our accumulated experience, we may be aware of their mistakes, but this does not cancel our debt to their explorations and early classifications. Without the sound foundations laid at this time, the massive achievements of the nineteenth and twentieth centuries could not have taken place.

Peter Simon Pallas belongs to this heroic age of natural science. The career of this German surgeon who turned to natural history and entered the service of Catherine II to spend 53 years travelling and studying in Russia is in itself fascinating reading: his letters to the Welsh naturalist, Thomas Pennant, reveal in intriguing detail not only the character of Pallas' work in virtually unknown territory, but the remarkable degree of international co-operation and friendship which was maintained despite the physical problems of communication.

This limited edition represents the first time that Pallas' correspondence with Pennant has been published, and the University of Minnesota Press is to be congratulated on its achievement. One is tempted to write of this book in superlatives. The standard of printing is high; the layout unusual, interesting and easy to follow; the illustrations are excellent; but perhaps the greatest achievement is to have transmitted something of Pallas' enthusiasm and vigour across the intervening centuries. It is a masterpiece of its kind.

PAUL A. MOXEY

Animal Twilight, by J. L. Cloudsley-Thompson. 204 pages, 31 illustrations. G. T. Foulis and Co. Ltd. London, 1967. 36s.

It is a pleasure to review an interesting book by a distinguished member of our Society. The title *Animal Twilight* does not give a complete picture of the contents of Professor Cloudsley-Thompson's latest volume: except for the last chapter, dealing with animal conservation, the book is an historical account of the interrelationship between Man and the wild life of Eastern Africa from Roman times to the present day.

Much source material is taken from the original journals of the European explorers in the late nineteenth and early twentieth centuries—Baker, Speke, Livingstone, etc. Unfortunately, when a series of quotations from these authors follow one another in close proximity in order to illustrate some point, their rather pedantic, and rather varying styles of writing do not make for an overall easy literary style.

Despite this weakness—which, admittedly, would have been difficult to overcome—Professor Cloudsley-Thompson has brought together a wealth of detailed material which, with his own comments and conclusions, forms a fascinating study of animal and human behaviour. The author's conclusions in fact show Man's nature often to have been more savage than that of his animal adversaries, particularly since the advent of modern firearms. Whereas the indigenous peoples of Eastern Africa formed a natural symbiosis with the wildlife (an early chapter on traditional hunting methods is excellent), the possessors of the rifle have seriously disturbed the ecological balance.

Thus the final chapter of game conservation is extremely important. It calls for a scientific review of the existing situation, after a century of slaughter, so that policies to ensure an ecological balance can be implemented, at least in selected areas. This would not only protect many species from probable extinction, but, as the author points out, bring definite economic advantages, especially in the more marginal agricultural and stock-rearing areas.

D. ADDISON

The Penguin Dictionary of British Natural History, by Richard and Maisie Fitter. 348 pages. Penguin Books, 1967. 8s. 6d.

The popular series of Penguin reference books is now joined by the *Penguin Dictionary of British Natural History*, taking as its province "All living things and natural phenomena of the earth and its atmosphere". Botanical, Geological, Meteorological and Zoological terms are defined and explained, sometimes in surprising detail, as are hundreds of words relating in more general terms to ecology, landscape, wild life, and nature. Entries on living species are accompanied by notes on their classification and habitat. The various Natural History Societies, Trusts and other conservation bodies are given a brief history and their aims explained.

This is a book for beginners finding their way in Natural History and also for the more experienced. It would be an ideal book on which to base a Natural History Quiz. Does every naturalist know, for example, the identity of the Gallant Soldier, Grim-the-Collier, Yellow Sally, Silver Tommy, the Shoddy Alien and Lousy Watchman, or where to find the Bishop's Mitre, Chinaman's Hat, Robin's Pincushion, or St. Patrick's Cabbage? When was the last British Earthquake? What is the Pawnbroker's Plant? When does a wind become a gale? When is the best time to hear the Dawn Chorus? All this is contained in alphabetical order in this excellent paperback dictionary, together with a Latin index of species.

D. C. HERSEY

The Shell Nature Lovers' Atlas—an apology

In the review of the *Shell Nature Lovers' Atlas*, published on page 150 of last year's issue of the *London Naturalist* it was stated that the book consisted of maps at a scale of 90 miles to the inch. This was incorrect, as only the first map was at this scale, the subsequent maps being at larger scales and showing much more detail.

We sincerely regret this error, for which we apologise to both the author, Mr. James Fisher, and to our readers.

INSTRUCTIONS FOR CONTRIBUTORS

Contributors are asked to study these notes with care, to save themselves and the Editor unnecessary work in the revision of manuscripts.

DATE OF SUBMISSION OF PAPERS

Papers should be submitted to the Editor (address in Programme) by the end of January and not later than the middle of February if they are to be considered for publication in the same year.

TEXT

Papers and short notes should be submitted in final fully corrected form. They should be typed, with double spacing and a wide margin, on one side of the paper only. Submission in duplicate is requested if possible, and authors are advised to retain a second copy for their own reference purposes. The total number of words should be pencilled at the head of the paper.

FOOTNOTES

Footnotes should be avoided wherever possible, but may be used for brief notes which cannot be fitted conveniently into the text. They should be inserted in the typescript immediately below the line to which they refer.

SCIENTIFIC NAMES

Scientific names should be underlined, and the authority upon which they are based should be cited. Where English names of species are employed, it is suggested that a capital letter be used for the beginning of the name, e.g. Badger.

REFERENCES

References should be listed at the end of the paper, 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).

As far as possible, titles of journals should be abbreviated according to the latest (4th) edition of the *World List of Scientific Periodicals.* Authors who require guidance on this point should consult the Editor.

DATES

These should be in the form June 9, 1964.

ILLUSTRATIONS

Line drawings should be submitted separately, in Indian ink on thick white paper or card, preferably 2x or 3x the size finally intended. Graphs should be drawn on paper preferably ruled in blue or faint grey. Legends should be typed separately, as they will be set up by the printer. The use of stencils or self-adhesive lettering is strongly recommended for place-names etc. on maps.

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.

PROOFS

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

OFFPRINTS

Up to 25 free offprints will be supplied on request. Additional copies may be purchased if an order is made when the proofs are returned.