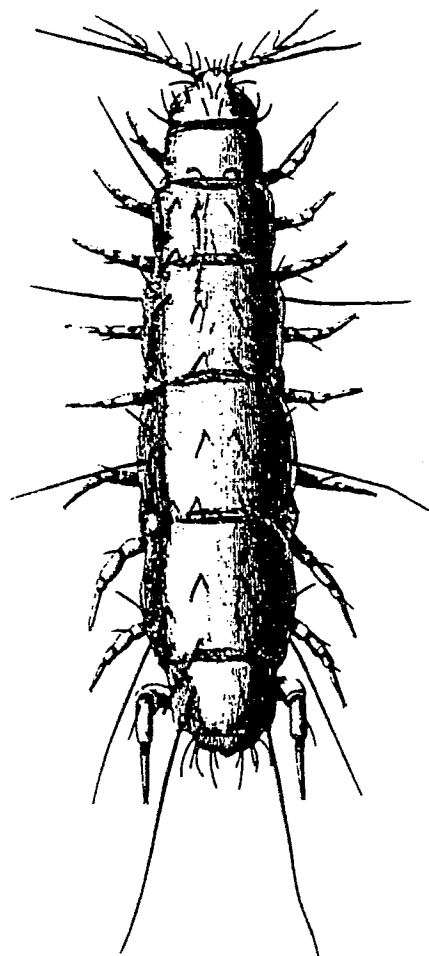

BULLETIN of the BRITISH MYRIAPOD GROUP

Edited for the Group by:
A.D. Barber
and
J.G. Blower



Volume 8

April 1992

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LIST OF CONTENTS

| | | |
|--|--------------------------------------|----|
| Editorial | | 1 |
| 9th International Congress of Myriapodology, 1993 | | 3 |
| Myriapods from North Scotland | R.E.Jones | 5 |
| A collection of Irish myriapods | R.E.Jones | 9 |
| Pauropoda, the smallest myriapods | A.D.Barber, J.G.Blower U.Scheller | 13 |
| <i>Lithobius lapidicola</i> Meinert, 1872 in Britain | A.D.Barber | 25 |
| <i>Chalandea pinguis</i> (Brolemann) in Britain and Southern Europe | A.D.Barber | 31 |
| S.G.Brade-Birks (1887-1982), an appreciation and list of papers | | 39 |
| Miscellanea: Warwickshire Myriapods, Isle of Man Records, Of the Scolopendra and Gally Worm | | 47 |

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EDITORIAL

A longer period than usual has intervened between Volumes 7 and 8, mainly due to a dearth of copy. This is perhaps because myriapodologists have been otherwise occupied; we know that two have been busy with their new book on Millipede Biology. In this Volume another name, sunk into synonymy within the life-time of BMG, has been resurrected and the identification of *Lithobius* spp. is becoming increasingly more hazardous. Another article challenges us to give more attention to the least worked of the four classes; but which of us would dare take up this challenge?

Life is becoming even more complicated for the overburdened few, responsible for carrying our fund of knowledge into the future. This is just one special case of the general decline of taxonomy and systematics. This decline was recently addressed by a House of Lords Select Committee in a report : Systematic Biology Research. Passages in the report such as: "Systematic Biology has contracted at British Universities to such an extent that it may be in danger of extinction as a sustainable discipline", even made headlines in the National Press.

Meanwhile, our esteemed millipede recorder is clearly not letting the grass grow under his feet: funded or not, he has been busy extending coverage of 10 km squares in Scotland and Ireland, and at least one of us feels the need to match this effort by increasing his own contribution.

9th INTERNATIONAL CONGRESS OF MYRIAPODOLOGY

PARIS, FRANCE

JULY 26 - 31, 1993

Following the decision taken during the plenary session of the C.I.M. held at Innsbruck (Austria) in July 1990, the 9th International Congress of Myriapodology is to return to Paris in 1993, where it began twenty five years ago (1968).

The historical surroundings (Museum galleries, Jardin des Plantes, Quartier Latin, Sorbonne) will let us have a real emotional connexion with some great souls closely related to fundamental biology such as Buffon, Cuvier, Geoffroy-Saint-Hilaire, Jussieu, ...

This international meeting will take place among the scientific activities that will be held during the bicentenary year of the "Museum National d'Histoire Naturelle de Paris", created in 1793. At this very moment came, as a Professor of Zoology, a man whose work and thought was later to be so important for biology and evolution, i.e. J.B. LAMARCK (1744-1829)

Lamarck arrived at the new National Museum in 1793, and worked partly in a building where the laboratory of Zoology-Arthropods and the permanent secretariat of the Centre International de Myriapodologie are now located. Our 9th international congress will be dedicated to his memory. Besides, 1993 will be the opening of the future Museum of Evolution that will replace the old Zoological Gallery. In these walls, millipedes and centipedes surely will have a good place.

Don't miss it !

Join us !

We're waiting for you.

Welcome, see you soon in Paris,

Yours Sincerely,



Jean-Jacques GEOFFROY

MYRIAPODS FROM NORTH SCOTLAND

R.E.Jones

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The following is a list of species which were collected from the 14th to the 22nd of July 1991 during a brief, and wet, visit to north-west Scotland. The heading shows the site, the county with vice-county number in brackets, the map reference and the date.

| | | | |
|---|-----------|---------|--|
| Near Abington, Lanarkshire (77) | 26/92 | 14.7.91 | <i>Archiboreoiulus pallidus</i> <i>Cylindroiulus punctatus</i> <i>Polydesmus angustus</i> <i>Tachypodoiulus niger</i> |
| Glen Shiel, Ross & Cromarty (105) <i>Lamyctes fulvicornis</i> | 28/01 | 14.7.91 | <i>Polydesmus denticulatus</i> |
| Rassal Ash Wood, Ross & Cromarty (105) <i>Geophilus carpophagus</i> <i>Brachygeophilus truncorum</i> <i>Lithobius melanops</i> | 18/8443 | 15.7.91 | <i>Cylindroiulus punctatus</i> <i>Proteroiulus fuscus</i> |
| Shieldaig, Ross & Cromarty (105) | 18/8073 | 15.7.91 | <i>Cylindroiulus punctatus</i> |
| Inverewe Garden, Ross & Cromarty (105) <i>Haplophilus subterraneus</i> <i>Geophilus insculptus</i> <i>Lithobius forficatus</i> | 18/8682 | 16.7.91 | <i>Cylindroiulus punctatus</i> <i>Ommatoiulus sabulosus</i> <i>Ophiulus pilosus</i> <i>Polydesmus angustus</i> |
| Inverewe foreshore, Ross & Cromarty (105) <i>Necrophloeophagus flavus</i> | 18/862818 | 16.7.91 | <i>Cylindroiulus latestriatus</i> |
| Aird of Coigach, Ross & Cromarty (105) <i>Lithobius forficatus</i> <i>Lamyctes fulvicornis</i> | 29/073115 | 17.7.91 | |
| Shore of Loch Assynt, Sutherland (108) <i>Brachygeophilus truncorum</i> <i>Lithobius forficatus</i> <i>L.melanops</i> | 29/217250 | 17.7.91 | |
| Unapool Burn, Sutherland (108) <i>Lamyctes fulvicornis</i> | 29/236304 | 17.7.92 | |

| | | |
|---|-----------------------------------|---------|
| A838 near Gualin House, Sutherland (108) | 29/299562 | 17.7.91 |
| <i>Lamyctes fulvicornis</i> | | |
| Keoldale, Sutherland (108) | 29/384658 | 17.7.91 |
| <i>Brachygeophilus truncorum</i> | <i>Cylindroiulus latestriatus</i> | |
| <i>Geophilus insculptus</i> | | |
| <i>Lamyctes fulvicornis</i> | | |
| Shore of Loch Eriboll, Sutherland (108) | 29/410551 | 17.7.91 |
| <i>Brachygeophilus truncorum</i> | | |
| <i>Schendyla nemorensis</i> | | |
| <i>Lamyctes fulvicornis</i> | | |
| Invernaver, Sutherland (108) | 29/709603 | 18.7.91 |
| <i>Lithobius forficatus</i> | <i>Cylindroiulus latestriatus</i> | |
| <i>Lamyctes fulvicornis</i> | <i>Cylindroiulus punctatus</i> | |
| Birch wood, shore of Loch Hope, Sutherland (108) | 29/473551 | 19.7.91 |
| <i>Lithobius borealis</i> | <i>Proteroiulus fuscus</i> | |
| Strath Vagastie, Sutherland | 29/25 | 19.7.91 |
| <i>Lithobius crassipes</i> | | |
| Shore of Loch Ness, Inverness (96) | 28/577316 | 19.7.91 |
| <i>Brachygeophilus truncorum</i> | <i>Cylindroiulus punctatus</i> | |
| <i>Lithobius forficatus</i> | | |
| <i>Lithobius crassipes</i> | | |
| Loch Ruthven, Inverness (96) | 28/635281 | 19.7.91 |
| | <i>Cylindroiulus punctatus</i> | |
| Strath Dearn, Inverness (96) | 28/7017 | 20.7.91 |
| <i>Brachygeophilus truncorum</i> | <i>Proteroiulus fuscus</i> | |
| <i>Lithobius melanops</i> | | |
| Strath Dearn, Inverness (96) | 28/6916 | 20.7.91 |
| <i>Brachygeophilus truncorum</i> | | |
| <i>Lithobius forficatus</i> | | |
| Rothiemurchus fish farm, Inverness (96) | 28/896116 | 21.7.91 |
| | <i>Cylindroiulus punctatus</i> | |
| | <i>Polydesmus angustus</i> | |
| Inshriach Forest, Inverness (96) | 26/8302 | 22.7.91 |
| <i>Lithobius crassipes</i> | | |
| Old Kilpatrick, Dunbartonshire (99) | 26/47 | 22.7.91 |
| <i>Brachygeophilus truncorum</i> | | |
| Glasgow, Lanarkshire (77) | 26/56 | 22.7.91 |
| <i>Geophilus insculptus</i> | <i>Brachychaeteuma</i> sp. | |
| <i>Lithobius forficatus</i> | <i>Cylindroiulus punctatus</i> | |

There are not many species recorded from north-west Scotland and this visit shows why. Much of the land is wet peat-bog which holds very little but these are some habitats such as coastal sand dunes, shore lines, woods, towns, etc. which are well worth searching. On this trip the weather did not encourage too much looking but the finds, though few, point the way for future collecting.

Haplophilus subterraneus and *Necrophloeophagus flavus* were both collected further north than they had previously been thought to occur. *Schendyla nemorensis* and *Geophilus insculptus* were both found on the north coast of Scotland but they were already known from the Shetlands.

Lithobius forficatus was a good find in the birch wood, one of the furthest north that these is. Despite searching quite hard it only produced *Proteroiulus fuscus* and two woodlice in addition. One of the biggest surprises was the finding of so many *Lamycetes fulvicornis*. I had assumed they were all *Lithobius crassipes* until I got them home. Interestingly enough those on the eastern side of the country were *L. crassipes* but I think this was mere coincidence.

The millipedes were what one would expect and gave no surprises. There seems to be no *Tachypodoiulus niger* in the very north of Scotland which is interesting. *Archiboreoiulus pallidus* is easier to find than here at home but what is one to make of a *Brachychaeteuma* sp. with no eyes from Glasgow ? Unfortunately it was not a male so I will have to visit the site again later. Is it another species or just a member of a highly variable one?

The specimens listed here show that there is still much to do in the far north but that it has to be worked for. Why not spend your next holiday there ?

REFERENCE

Barber, A.D. & Keay, A.J., (1988) Provisional Atlas of the Centipedes of the British Isles. Huntingdon, NERC.

A COLLECTION OF IRISH MYRIAPODS

R.E.Jones

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In March 1991 I made a visit to Southern Ireland during which I was able to collect various invertebrates. The results of the trip with regard to myriapods are set out below. The main collection was from Kerry but there were others which were made to and from the boat. One millipede and one centipede were new for Ireland (marked *). The name of the place (or the nearest to it on a map), the vice-county, the map reference and date form the heading for each site.

| | | |
|---|---------------------------------|---------|
| Killane, Wexford | T1309 | 22.3.91 |
| <i>Blaniulus guttulatus</i> | <i>Geophilus electricus</i> | |
| <i>Brachydesmus superus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Polydesmus gallicus</i> | | |
| Granny Castle, Waterford | S5714 | 22.3.91 |
| | <i>Lithobius forficatus</i> | |
| | <i>L.microps</i> | |
| West of Piltown, Kilkenny | S4322 | 22.3.91 |
| <i>Glomeris marginata</i> | | |
| Clonmel, S.Tipperary | S1822 | 22.3.91 |
| | <i>Lithobius microps</i> | |
| Parking place just W.of Boolakennedy, R9319 | | 22.3.91 |
| S.Tipperary | | |
| <i>Brachydesmus superus</i> | <i>Lithobius forficatus</i> | |
| <i>Brachyiulus pusillus</i> | <i>L.microps</i> | |
| <i>Polydesmus gallicus</i> | | |
| Rathbarry, W.Cork | W3334 | 22.3.91 |
| <i>Polydesmus gallicus</i> | <i>Lithobius forficatus</i> | |
| | <i>L.variegatus</i> | |
| Rosscarbery Bay, W.Cork | W3234 | 23.3.91 |
| <i>Cylindroiulus latestriatus</i> | <i>Haplophilus subterraneus</i> | |
| <i>Glomeris marginata</i> | <i>Cryptops hortensis</i> | |
| <i>Ophiulus pilosus</i> | <i>Lithobius melanops</i> | |
| <i>Polydesmus angustus</i> | <i>L.variegatus</i> | |

| | | |
|-----------------------------------|----------------------------------|---------|
| Lough Hyne, W.Cork | W0929 | 23.3.91 |
| <i>Brachydesmus superus</i> | <i>Brachygeophilus truncorum</i> | |
| <i>Glomeris marginata</i> | <i>Geophilus electricus</i> | |
| <i>Ophiulus pilosus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Polydesmus angustus</i> | <i>Lithobius forficatus</i> | |
| <i>Proteroiulus fuscus</i> | <i>L.borealis</i> | |
| Baltimore, W.Cork | W04326 | 23.3.91 |
| <i>Brachychaeteuma melanops</i> | <i>Cryptops hortensis</i> | |
| <i>Cylindroiulus punctatus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Ophiodesmus albonanus</i> | <i>Lithobius forficatus</i> | |
| Glengarriff, W.Cork | V9157 | 24.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Brachygeophilus truncorum</i> | |
| | <i>Geophilus electricus</i> | |
| | <i>Necrophloeophagus flavus</i> | |
| | <i>Lithobius variegatus</i> | |
| N71 just over the border, S.Kerry | V9060 | 24.3.91 |
| | <i>Brachgeophilus truncorum</i> | |
| Moll's Gap, S.Kerry | V8677 | 24.3.91 |
| | <i>Brachygeophilus truncorum</i> | |
| | <i>Geophilus insculptus</i> | |
| Island in the Upper Lake, S.Kerry | | 23.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Geophilus electricus</i> | |
| <i>Proteroiulus fuscus</i> | <i>Necrophloeophagus flavus</i> | |
| | <i>Schendyla nemorensis</i> | |
| | <i>Lithobius borealis</i> | |
| Blackstones Bridge, S.Kerry | V7186 | 25.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Brachygeophilus truncorum</i> | |
| <i>Polydesmus angustus</i> | <i>Cryptops hortensis</i> | |
| <i>Proteroiulus fuscus</i> | <i>Lithobius borealis</i> | |
| | <i>L.variegatus</i> | |
| Near Nedranone, S.Kerry | V6059 | 26.3.91 |
| <i>Cylindroiulus latestriatus</i> | <i>Brachygeophilus truncorum</i> | |
| | <i>Geophilus carpophagus</i> | |
| | <i>Schendyla nemorensis</i> | |
| | <i>Lithobius borealis</i> | |
| Derrynane National Park, S.Kerry | V5158 | 26.3.91 |
| <i>Cylindroiulus latestriatus</i> | <i>Brachygeophilus truncorum</i> | |
| <i>Glomeris marginata</i> | <i>Haplophilus subterraneus</i> | |
| <i>Ophiulus pilosus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Macrosternodesmus palicola</i> | <i>Lithobius forficatus</i> | |
| <i>Polydesmus angustus</i> | | |

| | | |
|-----------------------------------|----------------------------------|---------|
| Derrynane National Park, S.Kerry | V5258 | 26.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Geophilus electricus</i> | |
| <i>Glomeris marginata</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Opyiulus pilosus</i> | | |
| <i>Proteroiulus fuscus</i> | | |
| Near Cappamore, S.Kerry | V5664 | 26.3.91 |
| * <i>Chordeuma proximum</i> | <i>Brachygeophilus truncorum</i> | |
| | <i>Necrophloeophagus flavus</i> | |
| | <i>Lithobius variegatus</i> | |
| Valencia Island, S.Kerry | V3977 | 27.3.91 |
| <i>Brachydesmus superus</i> | <i>Brachygeophilus truncorum</i> | |
| | <i>Geophilus electricus</i> | |
| | <i>Lithobius forficatus</i> | |
| Valencia Island, S.Kerry | V4176 | 27.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Ophiulus pilosus</i> | | |
| <i>Proteroiulus fuscus</i> | | |
| Ballinskelligs, S.Kerry | V4366 | 27.3.91 |
| <i>Cylindroiulus latestriatus</i> | | |
| West of Templenoe, S.Kerry | V8269 | 28.3.91 |
| <i>Ophiulus pilosus</i> | <i>Brachygeophilus truncorum</i> | |
| | <i>Lithobius variegatus</i> | |
| Parknasilla, S.Kerry | V7265 | 28.3.91 |
| | <i>Brachygeophilus truncorum</i> | |
| | <i>Geophilus electricus</i> | |
| | <i>Schendyla nemorensis</i> | |
| | <i>Lithobius melanops</i> | |
| | <i>L.variegatus</i> | |
| Gougane Barra Forest Park, W.Cork | W0765 | 28.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Lithobius borealis</i> | |
| | <i>L.variegatus</i> | |
| West of Kilgarvan, N.Kerry | V9972 | 28.3.91 |
| <i>Blaniulus guttulatus</i> | <i>Brachygeophilus truncorum</i> | |
| <i>Brachydesmus superus</i> | * <i>Henia brevis</i> | |
| <i>Macrosternodesmus palicola</i> | <i>Geophilus electricus</i> | |
| <i>Ophiodesmus albonanus</i> | <i>Necrophloeophagus flavus</i> | |
| <i>Ophiulus pilosus</i> | <i>Lithobius melanops</i> | |
| <i>Polydesmus angustus</i> | | |
| Rathmore, N.Kerry | W1493 | 29.3.91 |
| <i>Cylindroiulus punctatus</i> | <i>Geophilus insculptus</i> | |
| Near Lombardstown, Mid Cork | W4597 | 29.3.91 |
| | <i>Lithobius variegatus</i> | |

| | |
|--|---------------------------------|
| Near Clondulane on the Blackwater R. W8799 | 29.3.91 |
| E.Cork | |
| <i>Brachydesmus superus</i> | <i>Schendyla nemorensis</i> |
| <i>Brachyiulus pusillus</i> | |
| <i>Cylindroiulus punctatus</i> | |
| <i>Ophiulus pilosus</i> | |
| East of Ballyduff, Waterford | W9999 29.3.91 |
| <i>Ophiulus pilosus</i> | <i>Necrophloeophagus flavus</i> |
| <i>Polydesmus gallicus</i> | <i>Lithobius forficatus</i> |
| | <i>L.variegatus</i> |
| River Barrow near New Ross, Kilkenny S6824 | 29.3.91 |
| | <i>Cryptops hortensis</i> |
| | <i>Lithobius variegatus</i> |
| Arthurstown quay, Wexford | S7110 29.3.91 |
| <i>Cylindroiulus latestriatus</i> | <i>Necrophloeophagus flavus</i> |
| <i>Polydesmus angustus</i> | <i>Strigamia maritima</i> |
| <i>Tachypodoiulus niger</i> | |

DISCUSSION

The two *Chordeuma proximum* males were collected from a ditch at the foot of a steep slope. The slope was wooded but there was nothing to suggest that it was in any way special; I think that *C.proximum* will be found to be not uncommon when it is looked for. *Henia brevis* came from the garden of a 19th century farmhouse. It was not recognised until it was back in England so the exact site is uncertain. It may be quite widespread or it may have been introduced with plants into the garden.

The *Brachychaeteuma* presents difficulties as it is a female but it has five ocelli on one side so the assumption is that it is *melanops*. The only other Irish specimen was also a female, collected by me in 1982 from Castletownshend in an adjacent grid square.

Macrosternodesmus palicola and *Ophiodesmus albonanus* were both found twice despite not being searched for in any special way. Looking under large stones produced the *O.albonanus*. Again, I think they will both prove to be common and widespread in Ireland. *Geophilus electricus* was found on a number of occasions, which shows it to be common. *Necrophloeophagus flavus* lived up to its reputation of being the commonest geophilomorph whilst *G.carpophagus* appeared to be uncommon.

Ireland is still little known from the myriapod point of view and the full list of species is undoubtedly incomplete.

PAUROPODA - THE SMALLEST MYRIAPODS

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The Study of Pauropoda, the smallest of the "myriapods" began some 125 years ago with Sir John Lubbock's paper "On *Pauropus*, a New Type of Centipede" (Lubbock, 1866). He regarded it as neither a chilopod nor a diplopod although he described it as "at first sight looks like a Chilopod; indeed the compactness of the body, the dorsal plates and the elongation of the posterior legs give it much resemblance to a small *Lithobius*".

Pauropus huxleyi, at 1/20 of an inch (1.2mm) he termed "a bustling, active, neat and cleanly little creature". "It has, too, a look of cheerful intelligence, which forms a great contrast to the dull stupidity of the Diplopods, or the melancholy ferocity of most Chilopods". He also described a second species *Pauropus* (now *Stylopauropus*) *pedunculatus*. The drawings on p.13 are from his original paper.

In the early part of the twentieth century R.S.Bagnall published a series of papers which included references to and descriptions of species of Pauropoda (see in: Scheller, 1990) but it seems that some of his descriptions were inadequate for accurate diagnosis of his species. A list of his species occurs in Blower (1987) but Scheller (loc.cit.) has provided a revised list. Various papers by Remy (1956, 1961) included British species, Turk (1967) produced lists for British caves, Scheller (1974) dealt with pauropods from arable soil, Moore (1982) species from a coal shale heap and Oliver and Amsden (1982) gave an account in "Nature in Wales" which included scanning electron micrographs.

In 1990 Ulf Scheller produced his up to date list (Scheller, 1990) in which he listed 23 species, four new to Great Britain and one new to science. It was that paper which prompted the present account in the hope that other workers might become interested in the group.

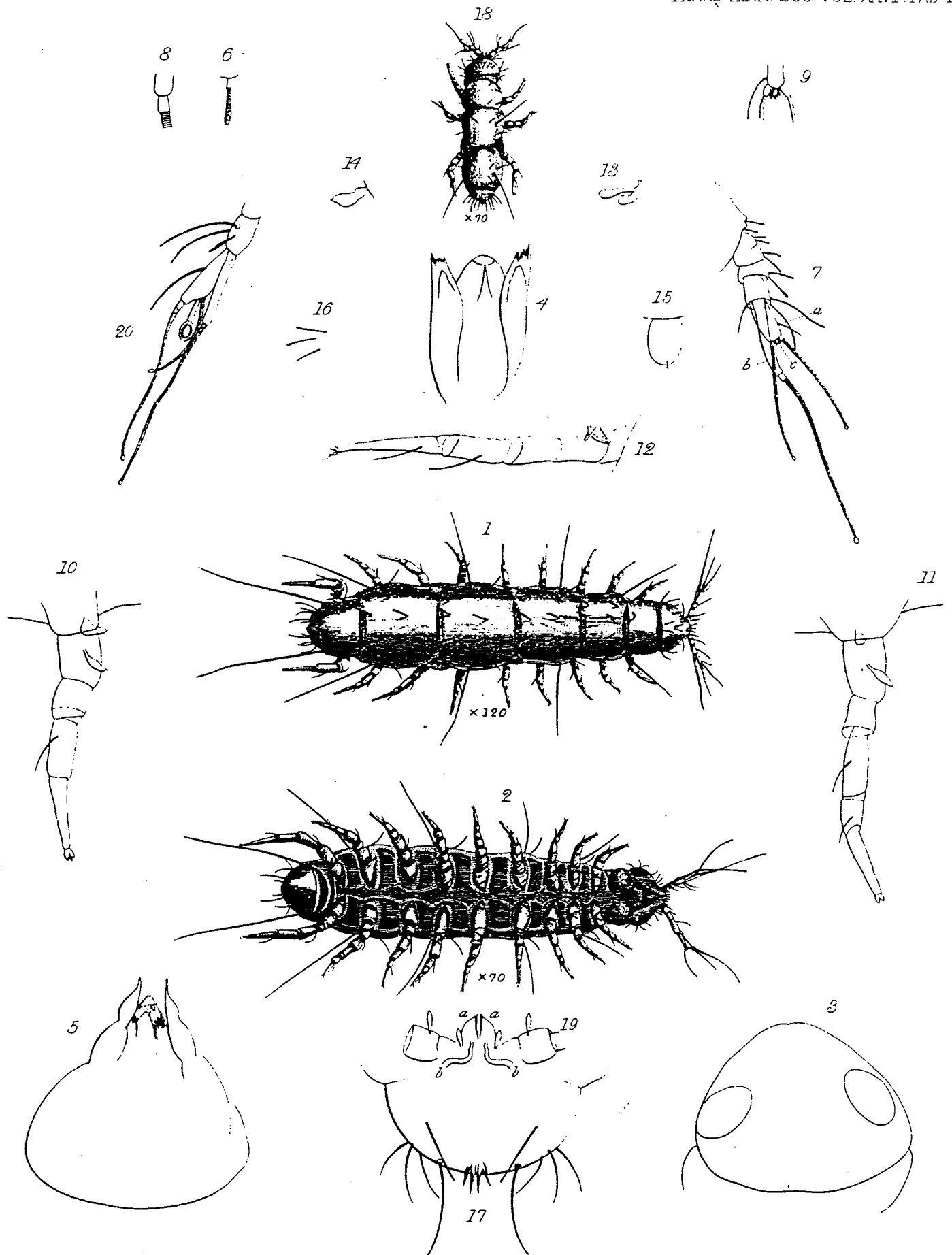
DESCRIPTION OF PAUROPODA

A valuable description of the characteristics of pauropods and of the features useful in diagnosis of genera and species is

DESCRIPTION OF THE PLATE.

PLATE X.

- | | | |
|----------|---------------------------|--|
| Fig. 1. | <i>Pauropus Huxleyi</i> . | Seen from above, × 70. |
| Fig. 2. | „ „ | Seen from below, × 70. |
| Fig. 3. | „ „ | Outline of head, × 125. |
| Fig. 4. | } „ „ | Mouth-parts, × 250. |
| Fig. 5. | | |
| Fig. 6. | „ „ | Hair on head, × 250. |
| Fig. 7. | „ „ | Antenna, × 250. |
| Fig. 8. | „ „ | Base of appendage. |
| Fig. 9. | „ „ | Portions of appendage. |
| Fig. 10. | „ „ | Anterior leg, × 250. |
| Fig. 11. | „ „ | Second leg, × 250. |
| Fig. 12. | „ „ | Posterior leg, × 125. |
| Fig. 13. | „ „ | Appendage on underside of posterior leg. |
| Fig. 14. | „ „ | Appendage on underside of antepultimate leg. |
| Fig. 15. | „ „ | Appendage at the base of second pair of legs, × 250. |
| Fig. 16. | „ „ | Spermatozoa. |
| Fig. 17. | „ „ | Posterior segment seen from above, × 250. |
| Fig. 18. | „ „ | Young. |
| Fig. 19. | „ „ | Base of second pair of legs, × 125. |
| Fig. 20. | <i>P. pedunculatus</i> . | Termination of antenna, × 250. |



J. Lubbock del.

G. Jarman sc.

Fig.2 PAUROPIDAE, based on Scheller (1988)

- a. Hypothetical male (Pauropodidae), lateral
- b. " " " ,dorsal
- c. Hypothetical head, antennae not shown,
setae rows indicated, F1-F3 flagellae
- d. Hypothetical antenna (*Allopauropus* type)
setae labelled
- e. Hypothetical leg
- f. Hypothetical pygidium, sternal view
setae labelled

given by Scheller (1988) from which much of the present account is derived. Throughout the world some 570 species in 30 genera have been recorded : of these 502 species in 15 genera are in the family Pauropodidae, nearly two thirds in the genus *Allopaupopus* (Scheller & Østerdahl, 1989).

Pauropoda are described as progoneate, dignathous, blind animals with biramous antennae, generally 0.5 to 1.5 mm long and with nine to eleven leg bearing segments in the adult. Body shape is variable; British forms are either elongate, whitish animals such as *Pauropus* which are widely distributed or are almost discoidal with heavily sclerotised tegites as in the recently discovered *Trachypauropus brittanicus* Scheller, 1990, at present our only representative of the Eurypauropodidae. The description here relates to the widespread former type.

The body is cylindrical with 9-10 pairs of legs in the adult; most species are more or less long legged and they are often speedy runners for short distances. Identification is based on external structure especially the characters of the head setae, the antennae, the tergites and their projections, legs and their characteristics, and the pygidium.

Head : tergal side triangular, with many setae, a single one between the bases of the antennal ramus and then four transverse rows. On either side of the head is a prominent ovoid temporal organ, a large, cornea like disc covering a fluid filled chamber containing sensory receptors.

Antennae : biramous, the two branches protruding from a four segmented stalk. One branch (the tergal) has one flagellum, the other (sternal) has two together with one or two globuli and one or two setae. Globuli are club shaped sensory organs seen between the two flagellae. The last segment of the stalk also bears setae. The shape, length and thickness of these structures are used in separating genera and species.

Trunk : twelve segments, the first (the collum) has vestiges of a pair of legs on its much expanded ventral side. Legs are lacking on the last two segments (last segment only in *Allopaupopus* subgenus *Decapaupopus*). Tergites are thin or very slightly sclerotised; the shape of the tergites, their division into sclerites and the number, arrangement and shape of spines, setae and other protuberances are used taxonomically. There are five pairs of long trichobothria on tergites II-VI.

Legs : five or six segmented; the number of segments, the shape of the tarsus and the setae on that and on the coxa and trochanter are used taxonomically.

Pygidium : horizontally divided, the tergum with 4-5 pairs of setae, the sternum with one to three pairs of setae and an anal plate projecting from its posteromedian part. This latter, rather peculiar structure, is a small sclerotised plate often

with branches and/or appendages of various sizes and shapes. This structure, even in the immature stages, constitutes a unique system of characters that often helps to immediately identify a species. The pygidial setae are also valuable in identification.

BIOLOGY

Paupopods occur in strata from litter to subsoil and are found in samples along with other litter organisms but, because of their small size, are often missed. They seem to occur in most soil types but rarely in heavy, peaty or very wet soils. They also occur in litter, decaying logs, under bark and in moss carpets where conditions are suitable. Not being able to burrow, pore space is of prime importance but they are very sensitive to humidity, temperature and light levels and also to insecticides.

In most environments occurrence is very patchy and populations sparse but locally up to several hundred specimens per square metre have been found in deciduous forests. Starling (1944, quoted in Wallwork, 1970) quotes densities over one million per acre (250 per sq.m.) in oak and pine stands in eastern North America.

LIFE CYCLE

Tiegs (1947) describes the life cycle of Pauropodidae and illustrates the egg to fourth larval stadia whilst Lawrence (1953) illustrates egg and early larval stadia.

The eggs, which are spherical, whitish and about 0.05-0.15 mm in diameter are laid singly or in clumps in the soil. After about two weeks the outer membrane breaks and a quiescent pupoid (prelarva) phase occurs. This lasts for a few days (3-4 is quoted by Wallwork) and may have outgrowths showing the position of antennae and more or less the first three pairs of legs. The pupoid gives rise to a hexapod first stadium with seven abdominal segments which in turn gives a second stadium with five pairs of legs after about three weeks. The third and fourth larval instars have six and eight pairs of legs respectively. The adults have eight, nine or ten pairs of legs and occur about three to four months from egg laying.

COLLECTION OF PAUPOPODS

Many workers have not seen pauropods except by accident in collections of other material and their small size makes collection difficult. Following Ulf Scheller's paper at the Manchester Congress there was some discussion regarding these animals, partly about finding them (Scheller, 1974):

"The best method to spot them on the underside of a stone is to blow gently over the surface. They can be recognised immediately by the manner in which they run. Although superficially like the slow moving collembolans, pauropods (the common Pauropodidae) run rapidly forwards, they stop, they run backwards or twist their bodies in many directions". In his 1988 report he refers to them as showing "mouse like movements".

Other than hand collection, pauropods can be found in numbers by flotation methods, including simple water flotation. Most funnels will produce results but Tullgren funnels are best for collecting agile forms. Eurypauropodidae are most conveniently obtained by Winkler funnels. Pauropods are very susceptible to slightly too high or too low moisture levels, light, etc. and it is important that the laboratory atmosphere is not too dry, forcing them inwards, not downwards in funnels.

EXAMINATION OF SPECIMENS

Because proper orientation of the animals and extension of the pygidium greatly facilitates work, animals should be fixed and preserved in fluids which keep them soft, transparent and stretched. Cold strong alcohol gives irregular contraction so strength should not exceed 70% and the drawbacks of alcohol are often eliminated if it is mixed with small amounts of acetic acid and formaldehyde.

Examination must be carried out with a high power microscope (dissecting microscopes are not adequate) and the specimen should be placed on a microscope slide. Large specimens, especially heavily sclerotised ones have to be cleared e.g. in lactic acid. Using a coverslip with a thin cork wedge (15mm x 1.5mm at its thickest end) allows movement of the animal and examination without damage by moving the wedge. Most specimens will require 1000x magnification; the use of phase contrast facilitates the examination of many structures.

Once identified the specimens may be rinsed and stored in alcohol in small upright glass vials. Specimens may be mounted (e.g. in Hoyer's fluid) but these are of limited value to the taxonomist.

IDENTIFICATION

Identification is based on various characters as indicated. There are no reliable keys at present and there are also taxonomic problems with some species because of the nature of early descriptions. If possible, all identifications should be checked by a specialist familiar with the group.

As indicated above, identification of these animals is something of a specialist activity. A key to families is given by Schubart (1964) but this is no longer of great value in the light of present understanding of the systematics of the group.

The present keys are devised by Dr. Scheller :

KEY TO HIGHER TAXA

- 1a. Antennal base four segmented with two antennal branches on segment 4.....Order TETRAMEROCERATA.....2
- 1b. Antennal base six segmented with two antennal branches, one on segment 5 of the base, the other on segment 6.....
.....Order HEXAMEROCERATA (Tropical)
- 2a. First and last tergites large, covering at least head and anterior part of pygidium respectively
.....Family EURYPAUROPIDAE (One British genus, *Trachypauropus*)
- 2b. First and last tergites small, leaving head and pygidium free.
.....3
- 3a. Body generally oval, flattened; tergites most often divided and slightly sclerotised.....
.....Family BRACHYPAUROPIDAE (May occur in the British Isles)
- 3b. Body generally fusiform; tergites most often undivided and not sclerotised; setae on tergites generally not modified.....4
- 4a. Apical organ of tarsi globular with no distinct claws.....
.....Family AFRAUROPIDAE (Tropical)
- 4b. Apical organ of tarsi with claws.....
.....Family PAUROPIDAE (5 British genera)

KEY TO BRITISH SUBFAMILIES OF PAUROPIDAE

- 1a. Sternal antennal branch with 2 setae and 2 globuli, the latter joined to a single stalk.....POLYPAUROPIDAE (*Polypauropus*)
- 1b. Sternal antennal branch with one seta and one globulus.....2
- 2a. Tergites thin.....PAUROPIDAE
(*Allopauropus*, *Pauropus*, *Stylopauropus*)
- 2b. Tergites more or less sclerotised...SCLEROPAUROPIDAE
(*Scleropauropus*)

KEY TO BRITISH GENERA IN PAUROPODINAE

- 1a. Stalk of antennal globulus distinctly longer than diameter of globulus.....*Stylopaupopus*
- 1b. Stalk of anterior globulus shorter than diameter of globulus.
.....2
- 2a. Anterior and posterior margins of sternal antennal branch of equal length.....*Paupopus*
- 2b. Anterior margin of sternal antennal branch shorter than posterior margin.....*Allopaupopus* .3
- 3a. Adults with 9 pairs of legs, seta b3 of pygidial sternum present.....*Allopaupopus* sg. *Allopaupopus*
- 3b. Adults with 9 or 10 pairs of legs, seta b3 of pygidial sternum absent.....*Allopaupopus* sg. *Decapaupopus*

.....

(BRACHYPAUROPODIDAE: Bagnall (1911) described a species, *Brachypaupopus lubbocki* from London but this is a nomen dubium (Scheller, pers comm.; also in Scheller, 1990)).

EURYPAUROPODIDAE : One species, *Trachypaupopus brittanicus* Scheller 1990 described from mixed deciduous forest, Waterbarrow, west bank of Lake Windermere (coll. J.G. Blower, Tullgren extraction)

SCLEROPAUROPODINAE : One species, *Scleropaupopus lyrifer* is recorded by Scheller (1990) from Wye College Farm, Kent (coll. R.C. Clutterbuck, 1972). Bagnall (1935) described *S. hanseni* from the London area but this is another nomen dubium.

(ASPAERIDOPIDAE : *A. ashworthi* Bagnall, 1935, Scotland: This family has been suppressed; larval stages of Pauropodidae (Scheller, 1970))

POLYPAUROPODINAE : One species, *Polypaupopus duboscqui* is recorded from Berkshire (Scheller, 1974).

PAUROPODINAE: See key to genera above.

CHECK LIST OF BRITISH SPECIES

(After Scheller, 1990)

County and, where known, Vice-county are given

Family PAUROPODIDAE

Subfamily PAUROPODINAE

Genus *Allopauropus* sg. *Allopauropus* s.str.

A.brevisetus Silvestri: Avon(6),Northumberland(67) doubtful

A.danicus (Hansen): Avon(6),Herts(20),Lancs(59),Durham(66),
Lothian

Genus *Allopauropus* sg. *Decapauropus*

A.broelemanni Remy: Somerset(5),Strathclyde(?99)

A.cuenoti (Remy): Somerset(5),Kent(15),London,Glos(33),Humberside
Durham(66),Northumberland,Strathclyde(?99)

A.distinctus Remy: Cumbria(69),Mid Glamorgan(41)

A.gracilis (Hansen): Dorset(9),Somerset(5,6),Hants(12),Surrey(17)
Berks(22),London,Glos(33),Essex,Leics(55),
Lincs(53),Lancs(69),N.Yorks,Durham(66),
Northumberland,S.Glamorgan(41),Lothian(82),
Strathclyde(99),Co.Kerry (Ireland)

A.helveticus (Hansen): Somerset(6)

A.milloti Remy: Glos(33)

A.millotianus Leclerc: Somerset(5)

A.multiplex Remy: Berks(22),Surrey(17),Kent(15),Glamorgan(41)

A.productus Silvestri: Lothian (doubtful)

A.remyi (Bagnall): Lothian

A.thalassophilus Remy: Lothian

A.vulgaris (Hansen): Somerset(5),Wilts(8),Kent(15),Lancs(69),
Durham(66),Northumberland(67),Mid Glamorgan
(41),Co.Kerry (Ireland)

Genus *Pauropus*

P.furcifer Silvestri: Oxon(23),Durham(66),Lancs(?69)

P.huxleyi Lubbock: London

P.lanceolatus Remy: Somerset(8),Wilts(7),Lancs(59)

Genus *Stylopauropus*

S.brito Remy: Devon(3),Surrey(17)

S.pedunculatus (Lubbock): Devon(3),Avon,Wilts,London,Durham(66)

S.pubescens (Hansen): Northumberland

Subfamily SCLEROPAUROPODINAE

Genus *Scleropauropus*

S.lyrifer Remy: Kent(15)

Subfamily POLYPAUROPODINAE

Genus *Polypauropus*

P.duboscqui Remy: Berks(22)

Family EURYPAUROPODIDAE

Subfamily EURYPAUROPODINAE

Genus *Trachypauropus*

T.britannicus Scheller: Lancs(69)

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LITHOBIUS LAPIDICOLA MEINERT, 1872 IN BRITAIN

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The first report of a species called at the time *Lithobius lapidicola* Meinert from the British Isles was by Brade & Birks (1916) based on material from Sugarloaf, Co. Wicklow, Ireland and identified as such by Brolemann. Interestingly, they initially thought that some of the specimens were *Lithobius borealis* Meinert and sent them to Meinert himself but he referred them to his *L. lapidicola*. The specimens did show the supplementary spine on the last leg characteristic of the former species and the authors noted well developed projections on the 11th tergite. Bagnall (1918) reported *Lithobius borealis* from Lancashire and Brade-Birks & Brade-Birks (1933) described the latter as a rare English centipede. Their description of Bagnall's specimen in the latter paper showed no accessory spine and with tergite 9 slightly excavated posteriorly tending to give the appearance of angular projections. This description could probably cover *L. melanops* Newport.

Dr Eason in his standard work (Eason, 1964) described *L. lapidicola* Meinert as well as referring to *L. borealis* and pointed out that a degree of confusion existed regarding these species. In his paper on West European species of Lithobiomorpha (Eason, 1982) he resolved the matter establishing that the species that British workers had referred to as *L. lapidicola* Meinert, 1872 should be named *L. borealis* Meinert, 1868 and that the name *L. lapidicola* Meinert, 1872 should be applied to the species known as *L. pusillus* Latzel, 1880 and which is described by Brolemann (1930) under that name. (The *L. borealis* of Verhoeff, 1937 was apparently *L. lapidicola*). *L. lapidicola* as now defined had not been recorded from the British Isles at the time but had been reported from several NW European countries.

In the mid 1980s Charles Rawcliffe made several collections from heated houses at the Royal Botanic Gardens, Edinburgh and amongst these were specimens identified by Dr Eason as the genuine *L. lapidicola* (= *L. pusillus*) and referred to in the Provisional Atlas (Barber & Keay, 1988). These were considered to be introduced animals and it was not until 1988 that I collected material from Sandwich Bay, Kent in July and October that included examples of *L. lapidicola* Meinert (det. E.H. Eason). Subsequently a few more, mostly damaged, specimens were found in the same area, above HTL and mostly within a local nature reserve or on the edge of the golf course. The area is not an

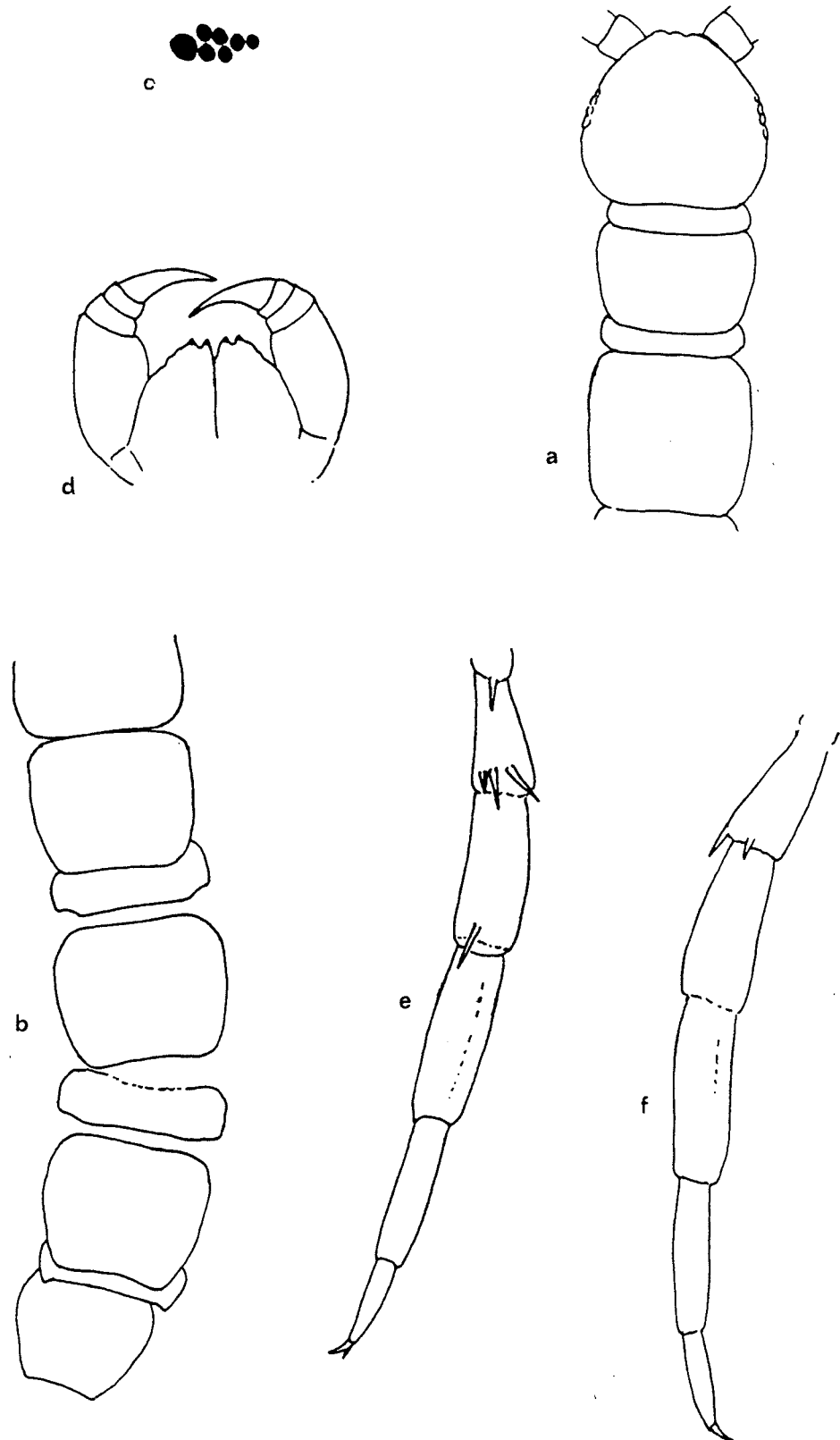


Fig.1. *Lithobius lapidicola* Meinert, female from Havergate Island, Suffolk :

| | |
|-------------------------------|------------------------|
| a. Head & first four tergites | b. Tergites 8 - 14 |
| c. Ocelli (right side) | d. Forcipules, ventral |
| e. 15th leg, dorsal | f. 15th leg, ventral |

(Drawings by R.E.Jones)

easy one for casual collecting, mostly low dune/ shingle and comparatively dry. The most abundant lithobiid there was the common coastal *L.melanops*.

In 1991 Paul Lee sent me a female of an undetermined *Lithobius* from soil in a saltmarsh at Havergate Island on the Suffolk coast which also proved to be *L.lapidicola* (confirmed E.H.Eason). He had also collected a male from the same area from dead wood.

Although there are various descriptions in the literature (e.g. Brolemann, 1930, Eason, 1980) it is thought that it would be helpful for British workers to have a readily available account of the species and the help of Dr Eason in drawing this up in relation to British specimens is much appreciated. Much of the description is based on his notes and comments as well as his description of Sardinian specimens in his 1980 paper.

DESCRIPTION

Lithobius lapidicola Meinert

Length : up to 8mm or more (Sardinian specimens up to 9.6mm), head 0.96mm wide.

Colour : chestnut brown.

Antennae : one third of body length, 26-34 articles.

Ocelli : up to 11, usually 1 + 4, 3, 2. Posterior ocellus a little larger than next largest. Immature specimens have fewer ocelli (Fig.1c).

Forcipular segment : 2 + 2 prosternal teeth, internal slightly further forward than lateral, porodont fine but thicker than a seta. Lateral to the porodont the shoulders slope backwards forming at most a feeble shoulder (Fig.1d).

Tergites : wrinkling of tergites from T5 backwards is described as characteristic of this species. Posterior angles of T9 obtuse or squared, T11 squared or with trace of projections, T13 is described as with small posterior projections but on the female from Suffolk there was barely a trace of projections and the posterior angles were more or less right angled.

Coxal Pores : number variable from 2, 2, 3, 2 to 4, 5, 4, 3 in Sardinian specimens; the Suffolk female had 3, 4, 4, 3 which is typical (fewer in males). Circular.

Legs : 14 and 15 have faint but definite tarsal articulations. 14 and 15 are slightly swollen in both sexes but without any special modification in the male. 15th legs with an accessory claw.

Female genitalia : two stout conical spurs on the gonopod; claw with small distal medial denticle and smaller more proximal lateral denticle.

Spinulation : Eason (1980) describes this as showing striking regional variation.

15th legs usually :

| | | | | | |
|---|---|---|-----|---|---|
| V | - | - | mp | - | - |
| D | | m | amp | m | - |

Table 1 is the spinulation for the Havergate female and is unusual in lacking 2 VaF (E.H.Eason, pers.comm.):

| | | | | | | |
|----|---------|-----|-----|-----|----|----|
| 1 | | | m | | a | a |
| 2 | (p) | (p) | m | mp | ap | a |
| 3 | | am | m | mp | ap | a |
| 4 | | am | m | mp | ap | a |
| 5 | | am | m | mp | ap | a |
| 6 | | am | m | mp | ap | a |
| 7 | | am | m | mp | ap | ap |
| 8 | | am | m | mp | ap | ap |
| 9 | | am | m | mp | ap | ap |
| 10 | | am | m | mp | ap | ap |
| 11 | p | am | m | amp | ap | ap |
| 12 | mp | amp | m | amp | p | p |
| 13 | m*(a)mp | amp | m | amp | p | p |
| 14 | m | amp | amp | amp | p | |
| 15 | m | amp | m | mp | | |

() one side only * very small

DISTRIBUTION

Edinburgh, Royal Botanic Garden, Tropical House No.23.
shingle on shelf supporting plants (C.P.Rawcliffe, 20.v.86)

Kent, Sandwich Bay NR and adjacent area.
shingle/sand dune/grassland, under dead wood, etc.
(A.D.Barber, 20.vii.88, 24.x.88, 28.x.90)

Suffolk, Havergate Island NR.
male in dead wood, female in soil, saltmarsh (P.Lee, 14.vii.91)

Known from : Austria, Netherlands, Sardinia, Sweden, Switzerland.
Probably quite widespread in Western Europe.

IDENTIFICATION

This species lacks any distinctive feature that allows immediate identification. Its relatively small size (8mm compared with the 12.5 mm of *L.borealis*), its lack of the characteristic swollen last two pairs of legs of *L.microps*, the double claw on the last leg, the lack of clear shoulders on the forcipular coxosternite and the small number of ocelli are valuable pointers to its identification. Whilst tergite 9 has no projection the state of T11 and T13 seems variable and this can influence the way in which it keys out in the standard works.

In "Centipedes of the British Isles" (Eason, 1964) it will key out as *L.borealis* if T11 has projections or as *L.calcaratus* if these are not present or clearly visible. Obviously it lacks the distinctive protuberances of the 15th legs of males of the latter species and the arrangement of ocelli is quite different.

In Brolemann (1930) it will either key out as *L.lapidicola* (= *L.borealis*) if projections are seen or as *L.lapidicola* (= *L.borealis*)/*L.pusillus* (= *L.lapidicola* in the present sense) if there are no projections on T11.

Dr.Eason's north-west European key (Eason, 1982) only works with males when the absence of any distinctive structure on the last legs will identify it as *L.lapidicola*. In Britain it is most likely to be confused with *L.borealis* from which, amongst other characters, it is separated by the absence of the accessory spine on the last legs.

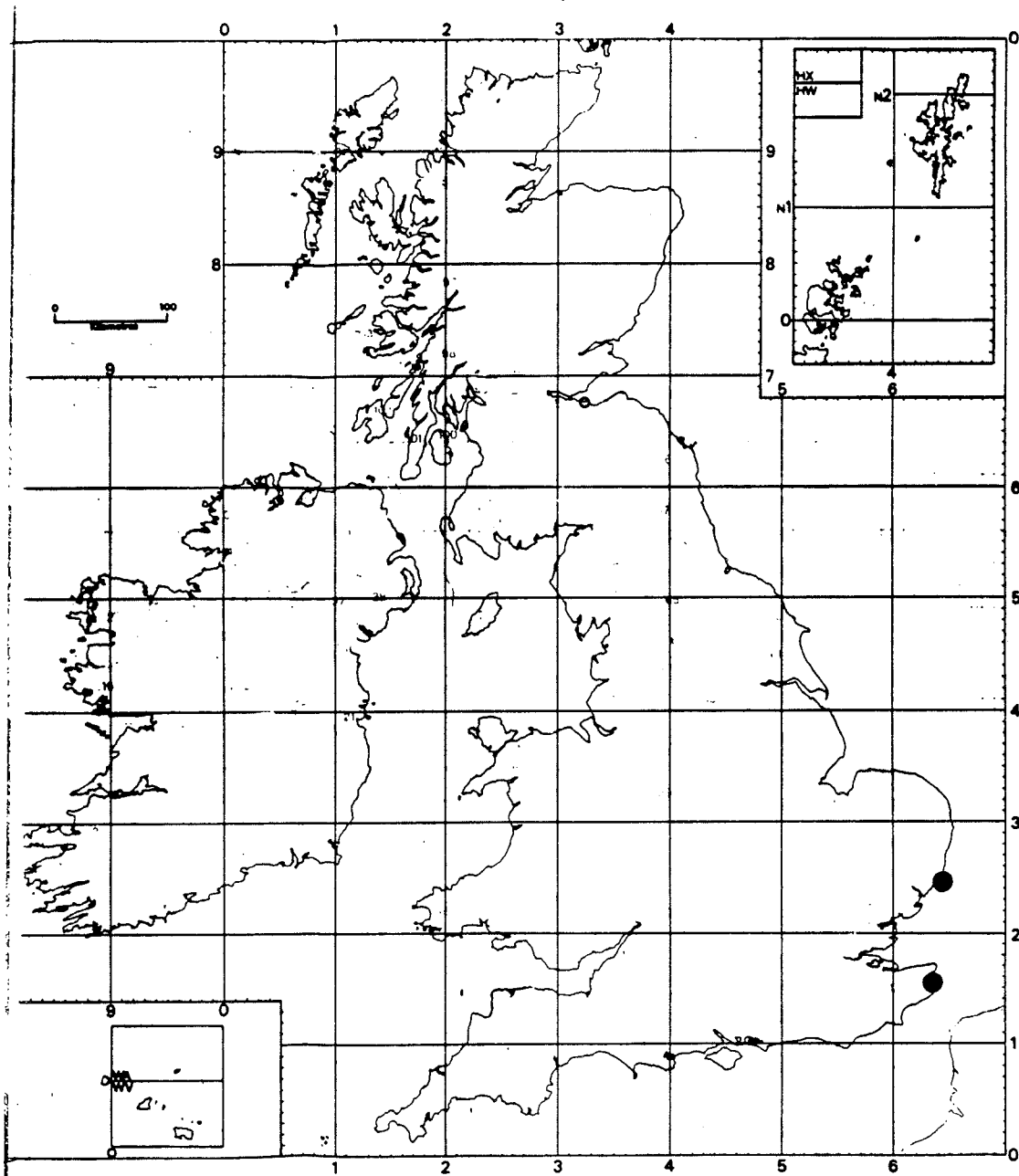
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Thanks are due to Dr.E.H.Eason for identifications, confirmations and comments on the specimens, to R.E.Jones for the drawings, to P.Lee who collected the Suffolk specimens and to the Kent Trust for Nature Conservation for permission to collect on their reserve at Sandwich Bay.



Map.1. *Lithobius lapidicola* Meinert
Known outdoor distribution in Britain

CHALANDEA PINGUIS (BROLEMANN) IN BRITAIN & SOUTHERN EUROPE

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Chalandea pinguis was described (as *Geophilus pinguis*) by Brolemann (1898a) from Ahusquy in the canton of Tardets, Basses Pyrénées (Pyrénées Atlantique) from whence he said it was "rare". In a subsequent paper in the same year (Brolemann, 1898b) he gives the locations there as a couple from the bois d'Ithé, another from Naboleguy and a young female from Ustarila, all of which sites appear to be woodland. In his later account of the French chilopod fauna (Brolemann, 1930) he reported the species from "Pyrénées; Alpes Maritimes (Peira Cava); Corse". Demange (1981) quoted "Pyrénées, Alpes Maritimes, Corse".

Minelli (1985a) recorded the species from Crissolo (Cuneo) and Bardinetto (Savona) from the region of Liguria, Italy. He noted that Crissolo was the classic locality for *Chalandea cottiana* Verhoeff and concluded that it was likely that there was a single species of *Chalandea* occurring sporadically in the Pyrenees, Alps and Corsica and also in Great Britain ("dove forse non e autoctona"). In another paper (Minelli, 1985b) he refers to *C. cottiana* from a cave in the province of Bergamo, Lombardy and states that this is known as an epigeal species from Alpi Cozi (Cottian Alps) and again refers to the fact that it is likely to be spread over the best part of the Alps, Pyrenees and Corsica. He did not include the species in his Sardinian list (Minelli, 1982). There are, apparently, also two specimens in the Zoological Museum of the University of Zurich-Irchel labelled "Val Serrata - S.Giorgio", probably a locality in Ticino, Switzerland (A.Minelli, pers.comm.). Dr.Minelli (pers. comm.) is convinced that *C. cottiana* and its variety *castensis* are *C. pinguis*.

The first British records were made in 1970 by the British Myriapod Group from three sites in North Devon (Blower, 1972). It was later collected from a fourth site by M.J.Bishop in 1973 and found again in one of its original locations by the present author in 1976. A survey carried out on behalf of the Nature Conservancy Council in 1987 (Barber, unpub.1987) found it at two more sites (extending its known area of occurrence somewhat) but failed to discover the species in the Hartland - Clovelly area to the west or in Somerset to the east. At a field meeting of the British Myriapod Group/ British Isopod Study Group in 1989 a further seven locations were found for the species but, again, it failed to turn up in the Clovelly area. At present it is therefore recorded from 14 sites in 9 10km National Grid

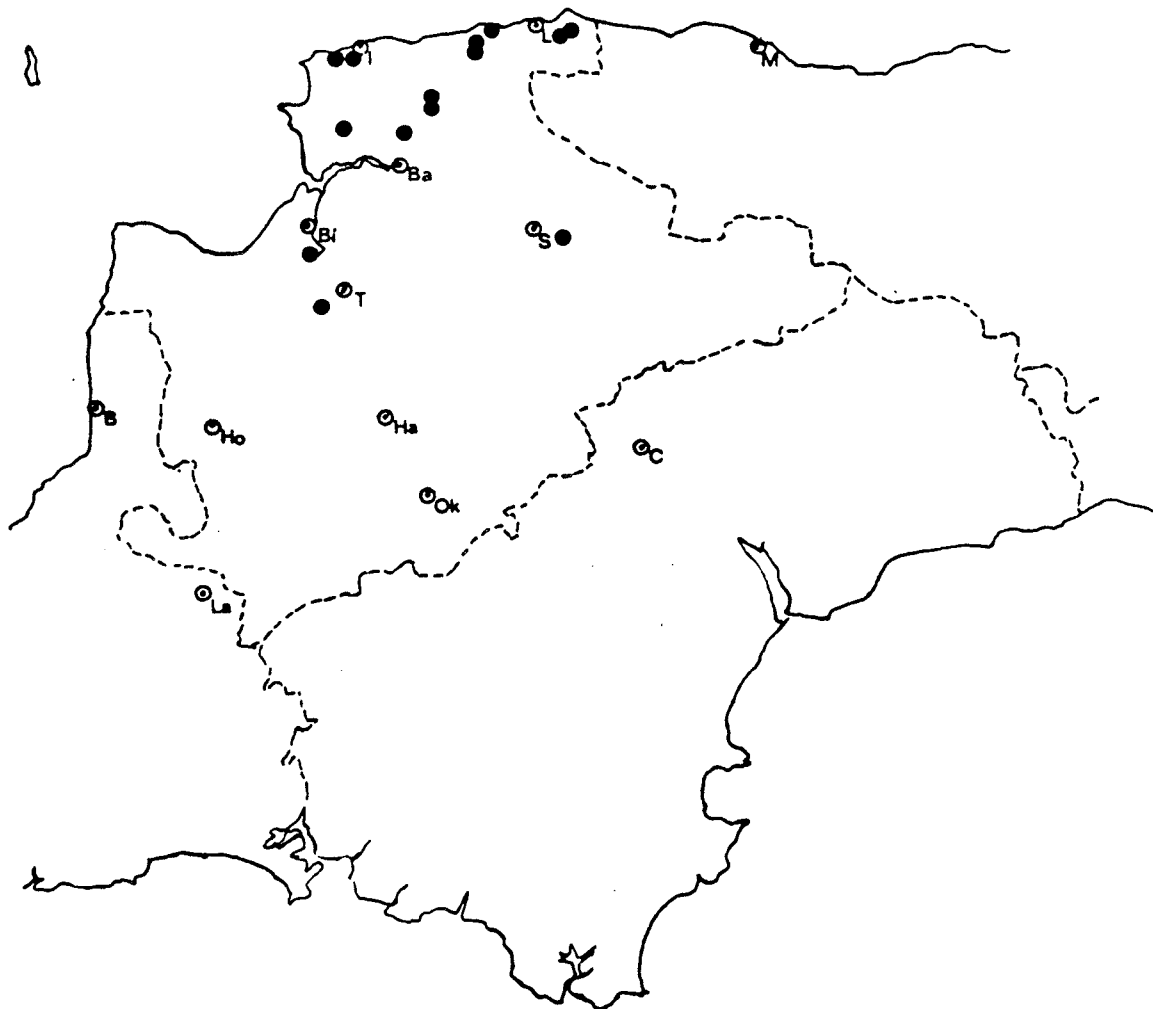


Fig.1 *Chalandea pinguis* Devon locations

Towns marked :

Bude (B), Barnstaple (Ba), Bideford (Bi), Crediton (C), Hatherleigh (Ha),
 Holsworthy (Ho), Ilfracombe (I), Lynton (L), Minehead (M), Okehampton
 (Ok), South Molton (S), Great Torrington (T)

squares. Extensive collecting has been carried out by J.G. Lewis and others in Somerset but it has not been found there. South Devon is an area that has been well collected over the years and from which it also seems to be absent but much of mid Devon remains virtually unknown as far as myriapods are concerned. It may therefore have a slightly larger area of distribution than that at present known but is clearly very local in its occurrence.

DESCRIPTION

A description based on the literature was given in an earlier issue of this Bulletin (Barber, 1985) and little more need be added. Its most distinctive field characteristic is the extreme shortness of the body "like half a *Haplophilus subterraneus*" as someone said. Indeed Brolemann himself commented on this in his description, "Très reconnaissable à son aspect ramassé, qui ne tient pas, comme on pourrait le croire au premier abord, à la contraction de l'animal" (Brolemann, 1898b).

Trunk segment numbers of British specimens seem to conform to the original descriptions i.e. 35 pairs of legs in males, 37 in females. Brolemann also reported a young female, 8mm long with 47 pairs of legs, presenting the same structure as the adults but more attenuated. He also reports (1930) that rare individuals, all females, with 45-47 pediferous segments are known from Corsica and Alpes Maritimes. No specimens of this form have yet been found in Britain.

When found in leaf litter specimens may show a remarkable similarity to the habit of *Henia vesuviana* in being rolled up into a ball with sternites facing outwards. Possibly it uses its sternal pore secretions in a similar way to that species as, for instance, described by Hopkin (1987).

ECOLOGY

Brolemann's original descriptions, as indicated above, were from bois d'Ithé (district of Pic des Vautours and the road from Ahusquy to Aussurucq), Naboleguy (forest of Arbailles, etc.) and Ustarila (wooded valley) all in the canton of Ahusquy, commune of Aussurucq, all seemingly wooded areas. Ahusquy is at 966m ASL. He collected a number of other species in the area, *Lithobius pilicornis* (very common), *L. tricuspis*, *L. piceus*, *L. aulacopus*, *L. bostryx*, *L. muticus*, *L. calcaratus*, *L. microps*, *L. crassipes*, *L. duboscqui*, *Cryptops hortensis*, *Geophilus longicornis*, *G. proximus*, *Scolioplanes crassipes*, *S. accuminatus*, *Chaetechelyne vesuviana*, *Stigmatogaster subterraneus*, *S. gracilis*.

In his 1930 account he gives no ecological information and I have not traced the original accounts describing the species from Alpes Maritimes or Corsica although Piera Cava is in an alpine area.

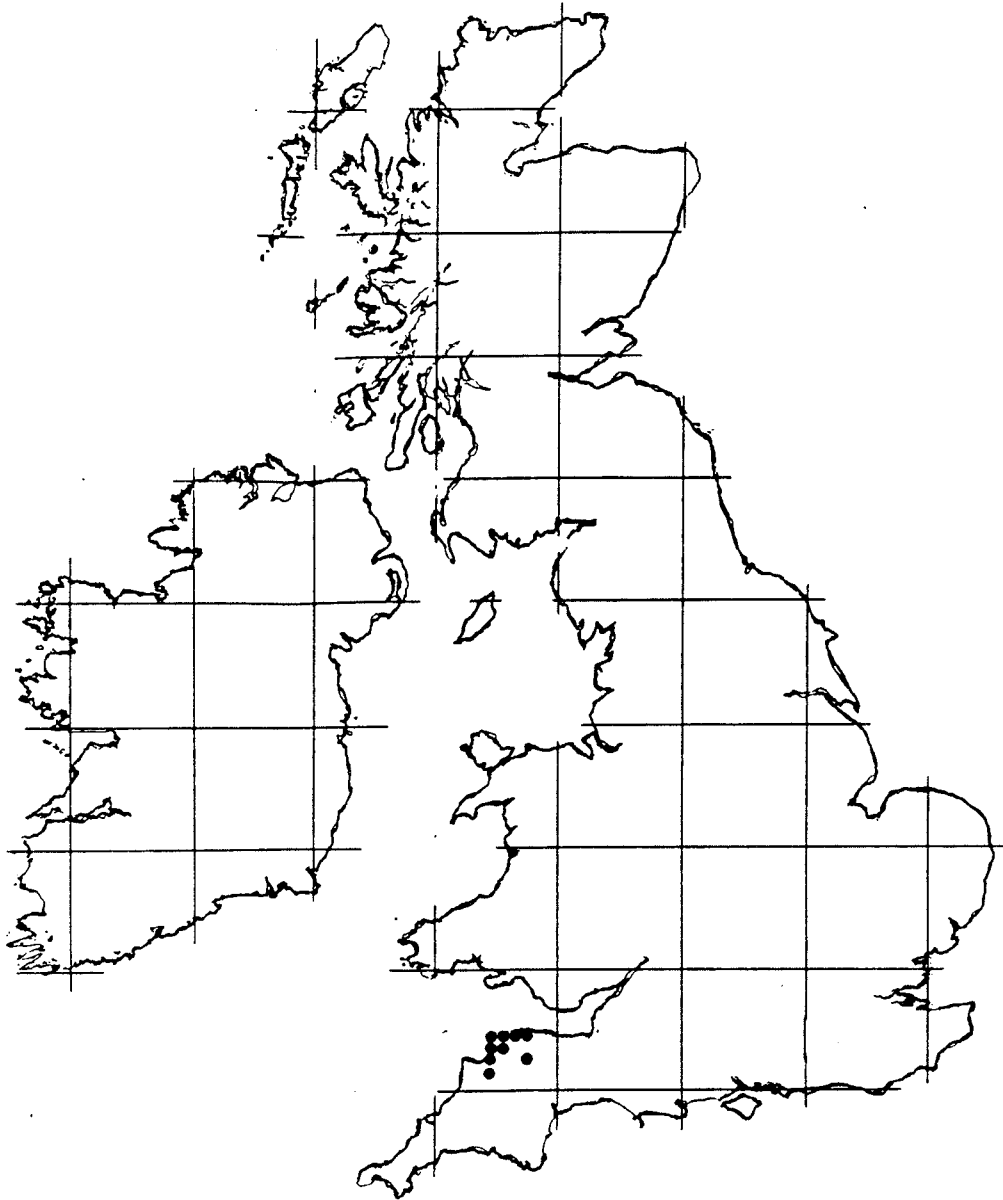


Fig.2. *Chalandea pinguis*, known British 10km NG square distribution

As indicated above, Minelli's (1985b) report of *Chalandea cottiana* is from a cave and he notes that it is known as an epigeal species from the Alpi Cozie from which area Verhoeff had first described it whilst he lists *C.pinguis* from Crissolo at 900m and from Bardinetto (no data) (Minelli, 1985a). It is in their later paper that Minelli & Iovane (1987) that report it as from 820-1500m with only one habitat record available, *Fagus*. Dr.Minelli informs me (pers.comm.) that he is convinced that *C.cottiana* and its variety *castensis* are *C.pinguis*. He also remarks that there is little woodland left in non-montane sites in the areas concerned and that this might account for the fact that there are no lowland records.

British records of *C.pinguis* seem to be all from areas with deciduous trees, either woodland, parkland or waste areas and in most cases records are from leaf litter (although it has been found under bark. At some sites (e.g. Arlington Court) it was quite abundant. All North Devon localities are "lowland" i.e. below 200m ASL, valley or coastal sites. The highest areas of Exmoor are open moorland up to little more than 500m and such woodland as has been planted on upland sites does not seem to contain the species. A total list of British sites is given in Table 1 and a map showing distribution in North Devon is Fig.1.

GEOGRAPHICAL DISTRIBUTION

The information available from Brolemann and Minelli would suggest that we are dealing with an alpine species of Southern Europe Alps and Pyrenees). Its occurrence in North Devon, in a lowland area, is therefore puzzling. Clearly it is well established here and is, from a conservation point of view, at little risk of being lost from its British sites. How it got there remains unclear. There are two main possibilities :

1. It is a relict population of a once more widespread distribution comparable with the very local distribution of a number of other species of invertebrates in Britain. Climatic change, competition or habitat destruction might account for this but none of these seems an obvious explanation.

2. It is an introduced species which has spread, either due to human influence (e.g. forestry practice) or of its own accord. The apparent rapid spread of the diplopod *Chordeuma proximum* or the amphipod *Talitroides dorrieni* show that significant changes in distribution can occur in a relatively short time. There are port areas around the Taw/ Torridge estuary (Bideford, Barnstaple, Appledore, etc.) through which chance introductions might occur.

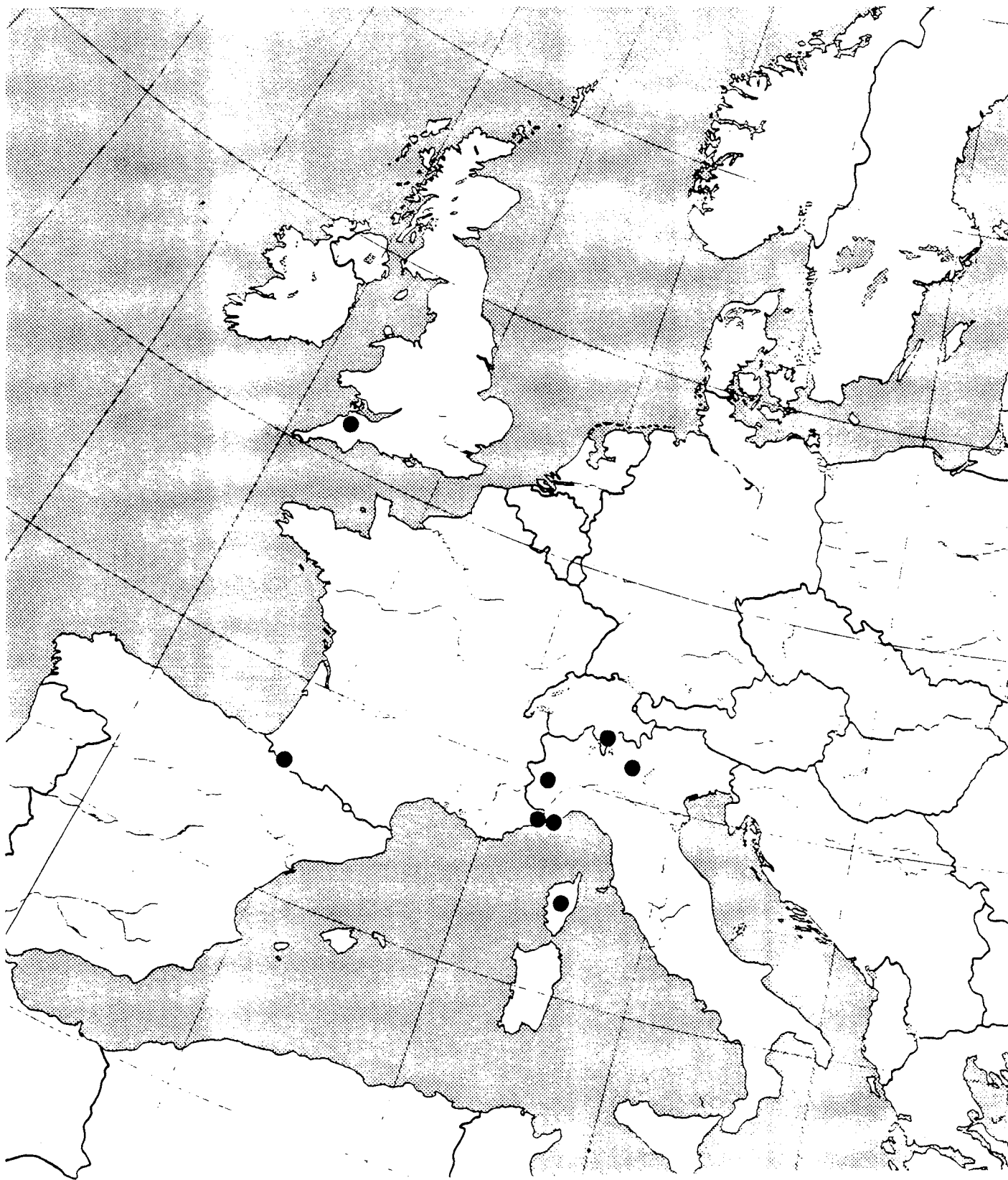


Fig.3. *Chalandea pinguis*, European records
(In some cases, approximate location only can be given because of lack of detailed information.)

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ACKNOWLEDGEMENTS

My sincere thanks to Professor A.Minelli for his information and comments and to members of the British Myriapod Group who provided me with data regarding specimens collected.

Table 1 British Records of *C.pinguis*

| Location | NGR 1km square | Date | Collector |
|---------------------|----------------|-----------|------------|
| Watergate Bridge | 21/4617 | 31.iii.89 | REJ,ADB |
| Hallsannery FC | 21/4524 | 31.iii.89 | REJ,SPH |
| N of Braunton | 21/4937 | 1.iv.89 | ANK |
| Windcutter Hill | 21/4846 | 18.x.87 | ADB |
| S of Muddiford | 21/5636 | 18.x.87 | ADB |
| Ilfracome outskirts | 21/5146 | 1.iv.89 | REJ |
| near Clifton | 21/6040 | iv.73 | M.J.Bishop |
| Arlington Court | 21/6140 | 1.iv.89 | REJ,ADB |
| Heddon Valley | 21/6547 | 31.iii.89 | IKM |
| | 21/6548 | 31.iii.89 | IKM |
| Woody Bay | 21/6749 | iv.70 | JGB |
| | 21/6548 | iv.76 | ADB |
| Barton Wd,Brendon | 21/7547 | iv.70 | JGB |
| Mill Wood,Brendon | 21/7648 | iv.70 | JGB |
| Bish Mill | 21/7425 | 30.iii.89 | REJ |

ADB = A.D.Barber, ANK = A.N.Keay, IKM = I.K.Morgan,
 JGB = J.G.Blower/British Myriapod Group,
 REJ = R.E.Jones, SPH = S.P.Hopkin

S.G.BRADE-BIRKS (1887-1982), AN APPRECIATION AND LIST OF PAPERS

We have had our attention drawn to an article published in "Wye Local History", No.3, Volume II, Spring 1982, just ten years ago. "B-B" as he was universally known was not only a major contributor to our knowledge of British myriapods but is remembered as parish priest at Godmersham and leader of the Wye Historical Society in addition to his contributions to biology. The article, by Frank Lusted, is reproduced here. Although the author refers to him as Canon Stanley Brade-Birks, he had published his myriapod works as S.Graham Brade-Birks. We have also taken the opportunity to publish a list of the "Notes on Myriapoda" which B-B contributed over more than twenty years to various journals. His photograph and paper "Myriapodology : Retrospect" appeared in the first volume of this Bulletin in 1972, an obituary by Gordon Blower in volume 2 when we reappeared in 1985.

Eds.

CANON STANLEY BRADE-BIRKS - AN APPRECIATION

F.P.Lusted

Known to everyone as B.-B., Canon Brade-Birks was born in Lancashire in November 1887. He proceeded to Manchester University where he took an honours degree in Geology in 1911 and then went on to a master's degree in 1914. Contemporary with this work he studied for Holy Orders and became deacon in 1914 and a priest in 1915. For a time he then worked as a curate in Darwen, Lancashire.

During this time he continued with his scientific work with an intensive study of millipedes and in 1919 applied for and was appointed to a position on the staff of Wye College as a lecturer in zoology and geology. This position enabled him to continue his research on millipedes, and to present his findings in a thesis to London University, for which he was awarded a doctorate of science. With his knowledge of geology and his agricultural interest he developed a special knowledge of soils and his book "Good Soil" became a standard work not only in this country but in many others. B.-B. also became an editor for English University Press for a series of books on agricultural science. For many years he was a link with London University, and served as secretary and later as chairman of the Board of

The four lives of a Canon who studies centipedes

AT the age of 83, Canon S. G. Brade-Birks is a remarkable man. He can often be seen on a moped in his parishes of Godmersham and Crundale and as one person correctly pointed out to me, the Canon has lived four lives in one.

Next month Canon Brade-Birks celebrates his 25th anniversary as Rector of Crundale. He has been Vicar of Godmersham since 1930, with Crundale also coming under his jurisdiction in 1946.

In 1943 Archbishop Temple appointed him Rural Dean of West Bridge, whose parishes include Chilham, Chartham and Lower Hardres. He still holds this post and thus takes the chair at meetings of the clergy in his area.

Before moving to Godmersham, Canon Brade-Birks took a degree in geology at Manchester and later he and his wife, Dr. Hilda Brade-Birks, took it upon themselves to study centipedes and millipedes.

They had a laboratory in their Lancashire home and Canon Brade-Birks tells me that they decided on these particular subjects because the creatures had been neglected.

While his wife concentrated more on medical work, later becoming medical officer of health for several Kent towns and districts, Canon Brade-Birks moved to Wye College in 1919. He worked for his doctorate and was head of the College's department of geology and zoology.

He was at Wye for 27 years and in 1927, with a research student, initiated soil studies, which have since greatly developed. Two books of his have been published, one taking the title "Good Soil" and the other, "Teach Yourself Archaeology."

Dr. Brade-Birks has not lost touch with Wye College and he was subsequently elected a Fellow. As far as Manchester is concerned, he has just accepted an invitation for next year

to be president of the International Congress of Myriapodologists (myriapodology is the study of millipedes and relatives).

He is also one of only 25 honorary fellows of the Linnean Society of London, a group made up of those who at some time have specialised in the classification of animals and plants.

From 1951-70 he was a Proctor of the Convocation of Canterbury. Most of his time is now taken up with parish work and pursuing one of his favourite hobbies—local history.

An avid writer of notes, he has 13 notebooks in his series on local history and other pocket companions to cover his wide range of interests.

One of Dr. Brade-Birks' greatest joys is the special children's services he holds in Godmersham and Crundale. He works out practical projects for the children and many adults attend the services to see the fun the children—and, I suspect the Canon—have.

His own two daughters now live away from the village. One of them, Mary, is a barrister and an official with one of the training boards. The other, Elizabeth, is married and has four children. She is chairman of the Gloucestershire Women's Amateur Athletics Association and a former athlete, once running a five-minute mile.

Canon Brade-Birks has no immediate plans to retire: "I would not like having nothing to do!"

His moped comes in useful for short trips in the parish and he has found a warm remedy for chilly Sundays in church. He simply slips a special small hot water bottle under his cassock and advises

cold parishioners to follow his example.

Rather foolishly, I asked him what he enjoyed doing in his spare time, only to receive the right and obvious reply, "I generally go to sleep."

East Kent Diary

by Desmond Connolly



Awheel in Kent on his motor-cycle is the very active 84-year-old Canon Stanley Brade-Birks, expert in millipedes and centipedes and Vicar of Godmersham with Crundale. [See Desmond Connolly's East Kent Diary on page 13.]

B-B

— from a local paper of the early 1970s

Studies in Agriculture. He was also on the board of the Faculty of Science. He remained on the staff of Wye College until 1948. In 1963 he was elected a Fellow of Wye College and considered this one of his two greatest honours, the other being his election as an Honorary Fellow of the Linnean Society, an honour given to very few people for specialist work in classification of animals and plants.

In addition to his work for the College he took a great interest in archaeology and history. He was a founder member of the Wye Historical Society, and later was for many years its chairman. His work for the Society and his enthusiasm has much to do with the present strength of the Society. He had a wonderful knowledge of people who could lecture well, and so ensured a high standard of talks and his knowledge of interesting places to visit was a great asset. We are thankful not only for his leadership over many years but also for his contributions from his own considerable knowledge. The pleasure we derived from "Selections from B.-B.'s Note-books" which revealed so many items of local interest will never be forgotten. His walks through Wye and other places of local interest were a source of joy. At St.Eustace's Well at Withersdane he produced some medieval drawings illustrating his legend. Although he was evasive about the date and origin of the drawings, we later discovered that they were by B.-B. himself and date the previous day. Several local history exhibitions owed much of their success to his presiding genius and enthusiasm. It is a fitting tribute to his long and successful work for the Wye Historical Society that a fund has been set up to provide a prize to be awarded annually to a pupil at the Lady Joanna Thornhill School for work on local history.

Despite a life full of other activities he became Vicar of Godmersham and later Rector of Crundale, and to these two parishes he remained priest and friend until 1977 when he retired aged 89 years. At a time when religion and science were often thought to be incompatible, he always insisted that his scientific knowledge increased his religious beliefs. He said there were mysteries in religion which we could only know in part but nothing in his scientific work could weaken his faith. His sermons were well thought out, lucid and sincere. Once a month he held a family service, consisting of matins and an address to the children. For this he always prepared something for every child to do to help illustrate his talk. His motto for them was "God first" and I am sure that everyone from the youngest child to the oldest adult was enlightened. Every day that he was in the village he would say matins in the morning and evensong in the evening. Anyone was welcome to join him but often he was alone. Recognition of his work for the church led to his appointments of Rural Dean of West Bridge and Canon of Canterbury Cathedral.

His ministry was not confined to church services. To the sick, the aged, or any in trouble he would travel on his motor-cycle

with his help and sympathy. No function in either of his parishes was complete without his presence. To all he showed an old-world courtesy so often lacking these days.

Each year on Rogation Day he would gather as many of his parishioners as possible and beat the bounds of his parishes, blessing the crops and, translating from a copy of an Anglo-Saxon Chronicle of A.D. 824, would show us how little the area had changed during more than eleven centuries.

Living in a vicarage which he was certain was the home of Rev. Collins in Jane Austen's "Pride and Prejudice", it was natural for B.-B. to become an authority on Jane's life and works. On the bicentenary of her birth he gave in the village hall a most fascinating and illuminating talk on the authoress.

He died at Hindhead, Surrey, on January 28th, aged 94 years. At his funeral the vicar of Hindhead paid tribute to a man of many talents with the only possible words, "Well done, thou good and faithful servant: enter thou into the joy of thy lord". No one who knew B.-B. could fail to have had his or her life enriched by contact with him.

S.G.BRADE-BIRKS MYRIAPOD PAPERS

Between 1916 and 1939 either alone or jointly Dr. Brade-Birks published his Notes on Myriapoda, I to XXXVI in a variety of journals, mostly The Lancashire and Cheshire Naturalist, Annals and Magazine of Natural History and, from 1929 onwards, Journal of the South Eastern Agricultural College, Wye. These papers were a major contribution towards our knowledge of the British myriapod fauna and are still of interest in terms of their descriptions, nomenclatural information and in other ways and for those preparing lists for the various counties included (notably Lancashire, Cheshire, Derbyshire, Kent, Sussex, Lincolnshire, Norfolk).

Three of the papers dealt with fossil material (XIX, XXVII, XXXII). Numbers I to V were by H.K. Brade and S.G. Birks (as they then were), VI by H.K. Brade and S.G. Brade-Birks, VII - XVII, XX - XXIII, XXV - XXVI and XXXIV were by H.K. and S.G. Brade-Birks, XIX by J.W. Jackson, H.K. Brade-Birks and S.G. Brade-Birks whilst the remainder were by S.G. Brade-Birks alone.

A list is given here with, as necessary, an indication of content. Journals are abbreviated as follows :

| | |
|------|--|
| AMNH | Annals and Magazine of Natural History |
| BSZF | Bulletin de la Société Zoologique de France |
| DNFC | Dartford Naturalists Field Club occasional paper |

GM Geological Magazine
 HESN Hastings and East Sussex Naturalist
 IN Irish Naturalist
 JSEACW Journal of The South Eastern Agricultural College, Wye
 JZR Journal of Zoological Research
 LCN Lancashire and Cheshire Naturalist
 PRPSE Proceedings of the Royal Physical Society of Edinburgh

NOTES ON MYRIAPODA

- I On a new variety of *Chordeumella scutellare* Ribaut 1916
 (*C. scutellare* var. *brolemanni*) LCN 9.49-55
- II Some brief records 1916
 (Darwen, Lancs., Silverdale) LCN 9.82
- III Two Irish chilopods : *Lithobius duboscqui* Brolemann 1916
 and *Lithobius lapidicola* Meinert IN 25.121-135
- IV A preliminary list for South Lancashire 1916
 LCN 9.141-148
- V On *Cylindroiulus (Leucoiulus) nitidus* (Verhoeff) 1917
 (Winkhill, Staffs) AMNH(8) 19.417-24
- VI Report on Chilopoda and Diplopoda 1916-17 1917
 (Lancs, Ches, Staffs, Derbys, Salop, Oxon, Westm,
 N. Wales, Ireland) LCN 10.113-122
- VII A new member of the AscospERMOMORPHA (*Jacksonneuma* 1917
bradae gen. et sp. nov.) (*Brachychaeteuma bradae*)
 JZR 2.135-149
- VIII Recent additions to the Irish Fauna 1917
 (*G. insculptus*, *Th. littoralis*, *B. superus mosellanus*)
 IN 27.27-29
- IX Report on Chilopoda and Diplopoda 1917-18 1918
 (Lancs, Cheshire) LCN 11.93-99
- X On the Family Brachychaeteumidae 1918
 (rediscription of *B. bagnalli*) JZR 3.47-53
- XI Description of a new species of Diplopoda 1918
 (*Brachychaeteuma melanops*) (R.S. Bagnall, Swanage)
 JZR 3.55-61
- XII A preliminary list for Derbyshire with a 1918
 description of *Brachychaeteuma quartum* sp.n. and
Chordeumella scutellare bagnalli var.n. AMNH(9)2.319-336
- XIII Some Kent Records 1918
 (18 D, 13 C) LCN 11.152-165, 186-199 / reprinted DNFC
- XIV The rediscovery of *Cylindroiulus parisiorum* 1918

- (Brolemann & Verhoeff) (Upper Arley) AMNH(9) 2.470-1
- XV Miscellaneous *Lithobius (Monotarsobius) duboscqui* 1919
fosteri var.nov. *Cylindroiulus frisius*,
Craspedosoma rawlini IN (1)28.4
- XVI Some observations on nomenclature 1919
AMNH(9) 3.253-6
- XVII Pour réhabiliter quelques anciens noms spécifiques 1919
BSZF 44.63-68
- XVIII Report on Chilopoda and Diplopoda for the latter 1919
part of 1918 LCN 12.101-6
- XIX A revision of some fossil material from Sparth 1919
Bottom, Lancs GM 6(663).406-411
(*Acantherpestes giganteus*, *Euphorberia armigera*,
E. robusta, *E. woodwardi*)
- XX Luminous Chilopoda with special reference to 1920
Geophilus carpophagus Leach. AMNH(9) 5.1-30/rept.DNFC
- XXI Colobgnatha, an order of Diplopoda new to Britain 1920
represented by *Polyzonium germanicum* (Brandt)
AMNH (9)5.198-200
- XXII Some Sussex Diplopoda and Chilopoda 1920
HESN (3)3.119-124
- XXIII Report on Chilopoda & Diplopoda for 1919 1920
LCN 12.297-8
- XXIV A preliminary note on a millipede New to Science 1920
(*Archeboreoiulus pallidus*) AMNH (9)6.364-5
- XXV Preliminary Lists for Lincolnshire and Norfolk 1920
AMNH (9)6.470-7
- XXVI Names of some Iulidae and Blaniulidae 1922
AMNH (9)9.160-3
- XXVII Wandering Millipedes 1922
(millipedes in Kent, day & night wanderings, also
Stosatea italica at Wye reported) AMNH (9)9.208-212
- XXVIII *Kampecaris tuberculata* n.sp. from the Old Red 1923
Sandstone of Ayrshire PRPSE 20(6).277-80
- XIX Preliminary Comments on Economic Status 1923
LCN Suppl.1-8
- XXX Report on Diplopoda and Chilopoda for 1925 1925
(includes *C. latestriatus*) LCN 18.217-221

- XXXI More about *Iulus latestriatus* Curtis 1928
 (drawings of gonopods) AMNH (10)1.397-398
- XXXII An important specimen of *Euphorberia ferox* from 1928
 middle coal measures of Crawcook GM 65.400-406
- XXXIII The Economic Status of Diplopoda and Chilopoda and 1929
 their allies. Part 1 JSEACW 26.178-216
- The Economic Status of Diplopoda and Chilopoda and 1930
 their allies. Part 2 JSEACW 27.103-146
- XXXIV A rare English centipede, *Lithobius borealis* Meinert 1933
 (description of Bagnall's 1918 specimen from Ainsdale)
 AMNH (10)11.228-31
- XXXV Nomenclatural Sources 1934
 JSEACW 34.197-209
- XXXVI Sources for description and illustration of the 1939
 British Fauna JSEACW 44.156-179

MISCELLANEA

Warwickshire Myriapods - Provisional Atlases

Pam Copson has produced, under the auspices of the Warwickshire Biological Records Centre, provisional atlases for both centipedes and millipedes up until December 1989.

The animals are mapped on a 10km National Grid basis for the whole of vice-county 38 (including Coventry). For centipedes, a total of 17 species are mapped and for millipedes 22. Indications are given of occurrence in neighbouring counties and of species that might be found in Warwickshire. There are clearly plenty of "squares" to be filled for the county but these are valuable interim reports and a similar series to WBRC's "Benchmark 1990" would be valuable for other counties. Congratulations to all involved.

Copies of the atlases may be obtained for 50p (one) or 60p (both) from Mrs Pam Copson, Warwickshire Museum, Market Place, Warwick, CV34 4SA.

Isle of Man Records

James Wright, spider recorder for the Isle of Man, has been contributing records of myriapods to the survey schemes and has recently produced his Report on Spiders and Other Invertebrates Surveyed on the Isle of Man during May and August 1991.

No new species are added to our existing list but a useful set of additional records : *T.niger* (9), *G.marginata* (4), *P.angustus* *C.punctatus*, *L.variegatus*, *L.forficatus*.

If anyone is visiting the Isle of Man, I am sure he would appreciate any spider material as would the myriapod survey schemes welcome any more centipede and millipede records.

James' address is 32 Wythburn Crescent, St, Helens, Merseyside, WA11 7HD.

Of the Scolopendra and Gally Worm

Of these hideous and angry insects we know little, except the figure and noxious qualities. Though with us there are insects somewhat resembling them in form, we are placed at a happy distance from such as are really formidable. With us they seldom grow above an inch long; in the tropical climates they are often found above a quarter of a yard.

The Scolopendra is otherwise called the Centipes, from the number of its feet; and it is very common in many parts of the world, especially between the tropics. Those of the East Indies, where they grow to the largest size, are about six inches long, of a ruddy colour, and as thick as a man's finger; they consist of many joints; and from each joint is a leg on each side; they are covered with hair and seem to have no eyes; but there are two feelers on the head, which they make use of to find out the way they are to pass: the head is very round, with two small sharp teeth, with which they inflict wounds that are very painful and dangerous. A sailor that was bit by one on board a ship, felt an excessive pain, and his life was supposed to be in danger; however, he recovered by the application of three roasted onions to the part, and was soon quite well. Of this animal there are different kinds; some living, like worms, in holes in the earth; others under stones, and among rotten wood; so that nothing is more dangerous than removing those substances, in the places where they breed. 1

The Gally-worm differs from the scolopendra, in having double the number of feet; there being two on each side, to every joint of the body. Some of them are smooth, and others hairy; some are yellow, some black, and some brown. They are found among decayed trees, between the wood and the bark; as also among stones that are covered with moss. They all, when touched, contract themselves, rolling themselves up like a ball. Whatever may be their qualities in the tropical parts of the world, in Europe they are perfectly harmless; having been often handled and irritated, without any vindictive consequences.

All these, as well as the scorpion, are supposed to be produced perfect from the parent, or the egg; and to undergo no changes after their first exclusion. They are seen of all sizes; and this is a sufficient inducement to suppose, that they preserve their first appearance through the whole of their existence. It is probable, however, that, like most of this class, they often change their skins; but of this we have no certain information.

1 *The Great Centipede.*—None of the insect tribe, the scorpions excepted, are so formidable in appearance, as the centipede or giant scolopendra. It is found in the East and West Indies, and in various parts of Africa, inhabiting chiefly the woods, where it is preyed upon by the different species of snakes. It is,

however, sometimes found in houses, and is said to be so common in particular districts, that the inhabitants are obliged to have the feet of their beds placed in vessels of water, in order to prevent their being annoyed during night by these horrible reptiles.

The scolopendrae vary greatly both in size and colour. Some of them are of a deep reddish brown; others of a yellow ochre colour, livid yellow, or tinged with red: and are sometimes seen about a foot in length: they are, however, generally much less. Their legs terminate in very sharp hooks, or nails, of a shining black colour; and all the other legs are furnished with smaller ones of the same kind.

Gronovius says, that all the legs of this detestable animal are venomous; but its most formidable weapons are the two sharp and hooked instruments that are placed under its mouth, with which it destroys its prey. At the extremity of each of these is a small opening from thence extends a tube, through which it is supposed the centipede emits the poisonous fluid into the wound inflicted by these fangs.

Leeuwenhock, desirous of ascertaining the influence of the poison, placed a large fly within reach of a centipede. He seized it between a pair of the middle feet, then passed it from one pair to the next, till it was brought under the fangs, which were plunged into its body, and it died instantly. St. Pierre says, that in the Isle of France his dog was bitten by one of them which was upwards of six inches in length, and that the wound turned to a kind of ulcer, which was three weeks in healing. He was highly diverted in observing one of them overcome by a vast number of ants, that attacked it in conjunction, and, after seizing it by all its legs, bore it along as workmen would do a large piece of timber. Its poison is not more injurious than that of the scorpion, and seldom proves fatal to the larger animals.

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