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EDITORIAL

On behalf of the Irish Biogeographical Society, I wish to thank all our contributors for making Bulletin No. 8 such an interesting and varied one. In addition, special words of thanks are due to the following:-

Dr. Tony McNally, Assistant Editor, for his enthusiastic assistance with the editing of this number, Mr. Declan Doogue for looking after its production with his usual efficiency, Mrs. Marian McNally for her excellent typing, the referees of the various articles and finally the Committee of the Society for their support and encouragement.

It is evident that the publication of Bulletin No. 7 stimulated our members to make Bulletin No. 8 a bumper issue. I hope therefore that the appearance of the latter will have, in turn, a similar influence on the next number. Manuscripts which authors wish to have considered for publication in Bulletin No. 9 should be submitted before 1st September, 1985.

J. P. O'Connor,

Editor.

27 March 1985.

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A PROVISIONAL LIST OF IRISH PSILIDAE (DIPTERA)

M. C. D. Speight, P. J. Chandler, A. G. Irwin and M. de Courcy Williams

The Psilidae form a small but distinct group of flies within the mass of families traditionally consigned to the "Acalypterates". Griffiths (1972) has rather convincingly demonstrated that the groups "Acalypterae" and "Calypterae" are phylogenetically meaningless, so it is more appropriate to regard the psilids simply as members of the superfamily Nothyboidea (along with another European family, the Periscelidae) within the Cyclorrhapha (to which all erstwhile "Calypterate" and "Acalypterate" families belong).

The known larvae of psilids are internal feeders on the tissues of the lower stems and roots of various low-growing plants. Chandler (1975) reviews this subject. Essentially, Loxocera species are associated with Juncaceae and Luzula, Psila species attack various Cruciferae, Compositae and Umbelliferae, while Chyliza species have been bred from Orobanche and certain Orchidaceae.

There does not appear to have been any published account of the Irish Psilidae in the present century (the family was not recognised as a discrete taxon in the 19th century). Chandler (1975) provides Irish records of a number of species and individual species are occasionally mentioned elsewhere. There may well be additional published records of "Psila rosae" from Ireland, in literature concerned with the pest status of this insect, otherwise known as the carrot fly. But any records relating to "P. rosae" and published prior to 1959 must be regarded as suspect due to possible confusion of P. rosae with P. persimilis Wakerley, since the latter species was until then undescribed (see Wakerley, 1959). P. persimilis and P. rosae can only be distinguished on characters of the male genitalia.

By amalgamating available records it is possible to derive the following provisional list of Irish Psilidae:

Chyliza

C. extenuata (Rossi, 1790)

C. scutellata (Fabricius, 1798)

C. nova Collin, 1944

C. vittata Meigen, 1826

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Loxocera

- | | |
|---------------------------------|------------------------------|
| L. albiseta (Schrank, 1803) | L. nigrifrons Macquart, 1835 |
| L. fulviventris Meigen, 1826 | L. sylvatica Meigen, 1826 |
| L. ichneumonea (Linnaeus, 1758) | |

Psila

- | | |
|-----------------------------------|-------------------------------|
| P. atra Meigen, 1826 | P. nigricornis Meigen, 1826 |
| P. limbatella (Zetterstedt, 1847) | P. nigromaculata Strobl, 1909 |
| P. merdaria Collin, 1944 | P. obscuritarsis Loew |
| P. nigra (Fallen, 1820) | P. pallida (Fallen, 1820) |
| | P. persimilis Wakerley, 1959 |
| | P. rosae (Fabricius, 1794) |

We have seen Irish specimens of all the species listed above. The species P. humeralis (Zetterstedt, 1847) is probably Irish, since there is, in the collections of the National Museum in Dublin, a Haliday specimen bearing the label "Ireland". However, there is some doubt as to the provenance of specimens so-labelled so it would seem preferable to exclude this species from the Irish list unless its presence here can be confirmed.

Further, there are published 19th century Irish records of three additional species, as follows:

SPECIES

REFERENCE

- | | |
|--|---|
| Chyliza fuscipennis
(Robineau-Desvoidy, 1830) | Haliday (1837) |
| Psila bicolor Meigen, 1826 | Haliday (1837);
Hogan and Haliday (1855) |
| Psila fimetaria (Linnaeus, 1758) | Walker (1853) |

But we have been unable to locate any Irish material of any of them and so consider their presence in Ireland requires confirmation before they can realistically be included on the Irish list.

The Irish Psilid list now totals 19 species. Twenty seven Psilids are known in Great Britain, so further additions to the Irish list would not be surprising.

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A digest of the information available on the distribution of Irish Psilids is presented below. No nineteenth century records are included. All of the records given are based upon Irish specimens which have been examined by one or more of the present authors.

In the records, Irish grid references are followed, in brackets, by 50 km UTM grid references. In a few cases it has not been possible to trace localities, so that grid references cannot be given. Where the collector is not the determinator of a specimen referred to, the determinator's initials are given, in brackets, following the collector's initials. Records based on specimens now in institutional collections end with the initials of the relevant institution. A key to all initials used is given at the end of the records.

Publications which include Irish Psilid records are listed in the reference section of this text.

Chyliza extenuata (Rossi)

Louth: 17 June 1921, T11 (PV.3), Carlingford, J (PC), NMI; 15 August 1824. 01481 (PV.3) Termonfeckin, J (PC), RSM.
Wicklow: 12 June 1927, T18 (PU.3), Rathdrum, AS (PC), NMI; 19 July 1980. 02610 (PU.3), Glen of the Downs, by stream, oak woods, MW.

C. nova Collin

Wicklow: ♂, 14 July 1976, 02117 (PU.3), pathside vegetation, deciduous woods along stream, MS.

C. nova is very similar in appearance to C. scutellata. The two species are most easily distinguished using the figures provided by Lyneborg (1964) backed up by Collin's (1944) key. Lyneborg's illustrations make Collin's description of the differences between the fore tibiae of the males more intelligible. At present C. nova is known only from Ireland, Great Britain, Denmark and adjacent European parts of the USSR.

C. scutellata Fab.

Cork: Glengarriff, Y, (PC), NMI.

Wicklow: 25 June 1975, 02610 (PU.3), Glen of the Downs, on tree trunk, PC.

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C. vittata Mg.

Galway: ♀ 18 June 1983, M1057 (MV.4), Ballykine Wood, Swept, grasses beneath Salix, limestone pavement, MW.

Loxocera albiseta (Sch.)

Cavan: 20 August 1972, N5786 (PV.1), Phragmites etc., Salix carr, MS.

Fermanagh: 28 June 1971, G9754 (NA.4), swept, stream-side, pasture, MS;

30 August 1972, M1062 (MV.4), Lusty Beg Is., L. Erne, CR(AI), UM.

Galway: 11 August 1980, M7702 (NU.1), swept, hedgerow, poorly drained field, MS.

Kerry: 20 July 1901, Parknasilla, V76 (MT.2), Y (PC), NMI; 28 August 1901, Loo Bridge W08 (MT.4); Y(1902).

Laois: 5 September 1979, S3380 (NU.3), Schoenus fen, fen carr/mixed woods at lakeside, MS.

Meath: 8 August 1977, N9965, (PV.4), by wet ditch, edge of deciduous woods, MS.

Waterford; 7 September 1906, Stradbally, X39 (PT.1), HA (PC), BM; 1918, Tramore, S50 (PT.1), (PC), NMI.

Wicklow: 13 August 1943, Ballymoyle, Arklow, T27 (PU.3) BB (PC), BM;

12 August 1926, Rathdrum, T18 (PU.3), (PC), NMI 1; 15 September 1971, 03107 (PU.3), marshy meadow, MS.

L. fulviventris Mg.

Laois: 21 August 1949, Woodbrook, AS (PC), SW.

L. ichneumonea (L.)

There are more Irish records of this species than of any other psilid. A map of its known Irish distribution is shown in Figure 1. Although the map suggests L. ichneumonea is predominantly an insect of the midland counties it very probably occurs throughout the island. It occurs in a wide range of wetland situations, including dune slacks, fen and poorly drained pasture. Due to the number of records involved, only county and grid reference is given for each below. No nineteenth century records have been included. L. ichneumonea is represented by Irish specimens in the collections of the following institutions: Forest and Wildlife Service (Dublin); National Museum of Ireland (Dublin); Royal Scottish Museum (Edinburgh); Smithsonian Institute (Washington); Ulster Museum (Belfast).

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Clare: R39; Donegal: C34; Dublin: 013, 023, 035; Fermanagh G95;
Galway: M73; Kerry: V79; V87; Kildare: N71; N82; Laois: N50; Longford: N08;
Louth: J11; Mayo: F60, I88, L98; Roscommon: M94; Westmeath: M91; Wexford:
S92; Wicklow: 020, 021, 030, S99.

Additional records for which grid references have not been located:

Sligo: Streedagh; Tipperary: Hayes Is.; Wexford: Ardcavan; Wicklow:
Coan.

L. nigrifrons Macqt.

Wicklow: ♂ 19 July, 1950, Manor Killbride, AS (PC), SW.

L. sylvatica Mg.

Clare: May 1970, R18 (MU.3) Swept from Luzula sylvatica, PC; 24 April 1974
♀ , R2689, (MU.3), Corofin, roadside pasture, RN (AI), UM.

Down: ♂ 19 July 1975, J1817 (PV.3); Rostrevor, oak woods, RN (AI) UM; 19 May
1957, J33 (UF.2), Tollymore PK., AS (PC) SW.

Limerick: 10 June 1949, ♀ R82 (NU.2), Lyracappul, AS (PC), SW.

Tipperary: 10 June 1944 ♂♂ , R82 (NU.2), L. Curra, Galtee Mts., 200 ft.,
AS (PC), SW.

Wicklow: 11 July 1969, 02512, (PU.3), Glen of the Downs, deciduous woods,
PC; 17 September 1978, 02117 (PU.3), Knocksink Wood, deciduous woods on
calcareous drift, MW; 17 May 1977; 02611 (PU.13), Luzula sylvatica, in
oak woods, MS; May 1970, T19 (PU.3), Glendalough, swept Luzula sylvatica,
PC; 4 May, 1975, T1191 (PU.3), swept, Luzula sylvatica by stream, mixed
woods, MS, NMI.

Psila atra Mg.

Antrim: ♂♂♀♀ 16 May 1975, J3268 (UF.2), Barnetts Pk., Belfast AI (UM);
23 May 1973, J1485 (PA.3), Masserene, AI (UM).

Clare: 25 May 1975, M2069 (MV.4), Caherloughlin pavement, Burren, AI (UM);
22 May 1970 ♀ , M1606 (MU.3), Slieve Elva, Corylus scrub, PC; 21 May 1970
♀♀ , R1896 (MU.3), Corylus scrub, PC.

Galway: ♂♀ 20 May 1970, M4219 (NU.1), Clarinbridge, mixed woods, PC.

Wicklow: 16 June 1979, T2980 (PU.3), Buckronef fen, fen carr, MW.

P. limbatella (Zett.)

Mayo: July 1910, L68 (MV.1), Clare Is., PG(PC), NMI.

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P. merdaria Coll.

Antrim: 27 May 1974, J3269 (UF.2) Belfast, by stream, RN (AI), UM;
30 May 1973, J1485 (PA.3), Masserene, mixed woods, RN (AI), UM.
Laois: 17 June 1979, N5203 (PU.1), Salix scrub on bog, MW.
Wicklow: 14 June 1975, 02215, (PU.3) by stream, deciduous woods, MS.

P. nigra (Fal.)

Antrim: 5 July 1973, D1549 (PB.2), Rathlin Is., marsh by in-filled lake, RN(AI)(UM).
Clare: 20 May 1970 ♂♀, M2908 (MU.3), Corcomroe Abbey, Burren, PC;
22 May 1970 ♀♀, M3008 (MU.3), Burren, PC: 26 May 1975, M1408 (MU.3), Caher River, Burren, AI (UM); 26 May 1975, M2609 (MU.3), Caherloughlin pavement, Burren, AI (UM).
Dublin: 25 May 1971, 02538 (PV.4), dune system, MS.
Mayo: 1 June 1972, L9697 (MV.3) swept, lake side meadow, MS.
Monaghan: 21 May 1976, H71 (PV.1) L. Egish, Salix scrub by lake, JC (PC).
Wicklow: 7 June 1980, 02207 (PU.3), Carriggowen, beaten from Betula, cut-over, regenerating bog at 600 ft. MS.

P. nigricornis Mg.

Kerry: 19 July 1981, ♂♂, V1895 Inishtearaght, Blasket Is., MW.

The three species P. nigricornis, P. persimilis and P. rosae can be reliably distinguished only in the male sex (see Wakereley, 1959). For this reason, the only records of these species mentioned in the present text are those based on males.

P. nigromaculata Strobl.

Dublin: 1906, 035 (PV.4), Lambay Is., (PC), NMI.
Kildare: 21 June 1978, N7715 (PU.1), Pollardstown fen, MS, NMI.
Laois: 28 June 1979, N5208 (PU.1), mixed woods on part-drained bog, MW (MS).
Mayo: L98 (MV.3), Belclare, PG (PC) NMI.
Tipperary: 1 June 1944, R82 (NU.2), Ballynacourty, AS (PC), SW.
Wicklow: 22 July 1978, 03103, (PU.3), Murrough, coastal marsh, MW.

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P. obscuritarsis Lw.

- Clare: 22 June 1977, M1505 (MU.3), Limestone grassland, 750 ft. MS.
Dublin: June 1906, 035 (PV.4), Lambay Is., (PC), NMI.
Galway: June 1916, Ardfry, JH(PC), NMI.
Kildare: 23 May 1982 ♂ , N9326 (PV.4), Grand Canal, JO (PC), NMI.
Laois: 27 June 1979, N5203 (PU.1), Betula/salix scrub on cut-away, part drained bog, DD (MS).
Wicklow: 24 June 1948, T28 (PU.3), Buckroney, AS (PC), SW.

P. pallida (Fal.)

- Tipperary: 22 June 1975, Woodroof Woods, S1124 (NU.4), on flowers Heracleum, PC.
Wexford: 12 July 1978. X9596, (PT.3), Saltee Is., swept, DD, MS.

P. persimilis Wakeraley

- Cork: ♂ 14 October 1978, Dunamarc Falls, PC,
Kerry: ♂ 2 July 1969, V98 (MT.3), Muckcross, PC.
Tipperary: ♂ 17 July 1979, R8821 (NU.4), Cooper's Wood, deciduous woods along stream, MW (MS).

P. rosae (Fab.)

- Clare: 20 May 1970 ♂ , R19 (MU.3), at Kilfenora, copse, PC.
Down: 16 May 1974 ♂ , J3974 (UF.1), Stormont, AI (UM).
Kerry: 17 October 1977 ♂ , V99 (MT.4), Killarney, deciduous woods, PC.
Kildare: 11 July 1969 ♂ , S79 (PU.1), Moone Abbey, PC, 13 July 1970, ♂ , N7715 (PU.1), Pollardstown fen, MW (MS).
Leitrim: 2 October 1977, ♂ , G74, (NA. 2), Glencar waterfall, PC.
Mayo: 29 September 1977, ♂ , L98 (MV.3), Westport demesne, PC.
Roscommon: 28 September 1977, ♂ , G80 (NV.1), L. Key Forest Park, PC.
Sligo: 1 October 1977, ♂ , G62 (NA.2) Coolaney, Fraxinus woods, PC.

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Abbreviations used in records

- AI = A. G. Irwin
AS = A. W. Stelfox
BB = B. P. Beirne
BM = British Museum (Natural History), London
CR = C. Reid
DD = D. Dowling
HA = H. W. Andrews
J = W. F. Johnson
JC = J. Cole
JH = J. N. Halbert
JO = J. O'Connor
MS = M. C. D. Speight
MW = M. de Courcy Williams
NMI = National Museum of Ireland, Dublin
PC = P. J. Chandler
PG = P. Grimshaw
RN = R. Nash
RSM = Royal Scottish Museum, Edinburgh
SW = Smithsonian Institution, Washington
UM = Ulster Museum, Belfast
Y = T. W. Yerbury

Acknowledgements

We are grateful to the staff of the institutions listed in the records section of this text for the opportunity to examine Irish Psilid specimens in the collections in their care. Also, we thank those individuals who have permitted us to publish Irish Psilid records based on material in their own collections.

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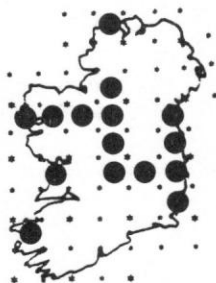
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Fig. 1: *Loxocera ichneumonea* (L.) (Dipt. Psilidae), known distribution in Ireland

Mapped using 50 km., UTM grid squares: only 20th cty. records used; for 10 km Irish grid records see text. This species probably occurs throughout Ireland, but records are available from only 30% of the 50 km squares, demonstrating the limitations of available distribution information for psilids. More systematic psilid recording activity would almost certainly result in addition of species to the Irish list, as well as providing a much clearer picture of distribution patterns among known Irish species.



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COMMENTS ON THE STATUS AND ECOLOGY OF SIMETHIS PLANIFOLIA (L.) GREN. IN CO. KERRY.

P. S. Wyse Jackson

Status and distribution:

Simethis planifolia (L.) Gren., the Kerry Lily, is restricted to one small area of Ireland, occurring only in the Derrynane region of south-west Kerry, vc. Hl. Praeger (1934) notes that its range is restricted to 10 to 12 square miles of wild rocky and furzy heath with a peaty subsoil. Scully (1916) also notes that it occurs on rocky ground, rough furzy heaths and in peat-filled fissures in rocks near the sea. It is also found in Spain and Portugal, extending northwards through France to Ireland and eastwards along the Mediterranean coast to western Italy. It is also found in Corsica, Sardinia and North Africa (Tutin et al., 1980). In Britain it was formerly recorded near Bournemouth in Dorset, growing under conifer trees where it was almost certainly an introduction, but became extinct in about 1925 (Good, 1948). It was also planted in Hants from Dorset stock and there became naturalised (Clapham et al., 1962). There are no stations in Britain where it is considered to be native.

It was first found in Ireland in 1848 by the Rev. T. O'Mahony (Scully, 1916) and is regarded by most authors as being native in Ireland, e.g. Webb, 1977; Praeger, 1901 and Scully, 1916. It has been suggested that it could have been accidentally introduced by smugglers to Derrynane from Spain or Portugal; Derrynane was a particularly active port for smugglers in former times. This explanation for its occurrence in south-west Kerry is not generally accepted however. Although its Co. Kerry station is very distant, at over 600 km, from its nearest occurrence in France, other plants such as Arbutus unedo L. and Pinguicula grandiflora Lam. have similarly disjunct distributions, are absent from Britain and also occur in Co. Kerry. S. planifolia is one of the 52 plant species protected by Ministerial Order under the Wildlife Act of 1976.

Perring and Walters (1962) record it as occurring in only three 10 km squares in the Derrynane region. Its detailed distribution has never been mapped. Most records for the plant were made over fifty years ago and little work has been published on its present day occurrence. Scully (1916) notes that it is locally frequent around Derrynane, on the Derrynane side of Lamb's Head,

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on Abbey Island and in many places near the shore of Kenmare Bay for a distance of eight or nine miles east of Derrynane. During field work for this paper it was found in a number of localities on the south side of Abbey island, south-west of Derrynane (Grid Ref. V5158) and on the north side of the same island (V520585). It was also found in small numbers on the mainland shore opposite the island (V517587). Further populations were seen on the north side of Lamb's Head (V528572). Another population was noted growing in a heath-type vegetation on a rocky knoll on the north side of the Caherdaniel - Sneem road, 1½ km east of Caherdaniel (V588567). It is also common on the slopes of Knocknasullig Mountain, south of the same road, 1½ km east of Caherdaniel (V5857) (B. Baldock, 1985, pers. comm.).

Similar localities were searched along the coast east of Derrynane but no further localities for the plant were found. The plant is easily overlooked, especially when not in flower, as the leaves resemble those of Molinia caerulea (L.) Moench, with which it usually grows.

Results

Two relevés were recorded of the vegetation in which S. planifolia was present on Abbey Island, on the 24th June, 1982. The results are shown in Table 1. Cover values are given in the Domin scale. Each relevé was one metre square in size. Data on soils for these relevés is given in Table 2.

Notes on Relevé 1.

The plot was situated approx. 100 m from the shore at about 40 m above sea level, in a shallow depression between rock outcrops of Old Red Sandstone, on the south side of the island. Molinia caerulea and S. planifolia averaged about 30 cm tall. The rest of the vegetation was about 15 cm tall. The soil was very peaty and greater than 50 cm in depth. About seven S. planifolia plants grew in the plot.

Notes on Relevé 2.

The plot was situated approx. 50 m from the shore at about 35 m above sea level. It was on a north-east facing slope of about 30 degrees. Molinia caerulea and S. planifolia averaged about 25 cm tall and the rest of the vegetation, much of which was dry and dead, was 15 cm tall. The soil was

very peaty and about 40 cm deep over much of the quadrat. About nine S. planifolia plants grew in the plot.

Discussion

S. planifolia occurs in vegetation dominated by Molinia caerulea, Ulex gallii Planch. and Erica cinerea L. at Derrynane. It is a heath-type vegetation with a very peaty soil of low pH that is often very dry in summer. This vegetation probably belongs to the alliance Ulici-Ericion cinereaé Géhu 1973. Most of the Irish lowland gorse heathlands belong to this alliance (White and Doyle, 1982). S. planifolia is not found in the Derrynane region in vegetation types which are very different from that described above.

In Dorset, where it is regarded as being almost certainly introduced, it occurs in Pinus pinaster Aiton woodlands (Clapham et al., 1962). Habitat information given on herbarium sheets in various British and Irish herbaria indicated that in the Mediterranean region it is commonest in open pine woods and in dry heathy communities dominated by Cistus L. spp. and broom species. The occurrence of S. planifolia in Ireland in the Ulici-Ericion cinerea alliance appears to be unusual and unlike its occurrence elsewhere in Europe.

TABLE 1: Results of the two relevés on Abbey Island, 24 June 1982.

Species	Relevé 1.	Relevé 2.
<i>Simethis planifolia</i>	2	3
<i>Carex flacca</i> Schreb.	x	2
<i>C. panicea</i> L.		3
<i>Dactylorhiza maculata</i> (L.) Soó	x	1
<i>Erica cinerea</i> L.	3	5
<i>E. tetralix</i> L.	3	3
<i>Festuca vivipara</i> (L.) Sm.	4	
<i>Molinia caerulea</i> (L.) Moench	9	8
<i>Narthecium ossifragum</i> (L.) Huds.	1	
<i>Polygala vulgaris</i> L.	2	
<i>Potentilla erecta</i> (L.) Räusch.	3	4
<i>Salix repens</i> L.	3	
<i>Succisa pratensis</i> Moench	x	2
<i>Ulex gallii</i> Planch.	6	6
<i>Calopogea muellerana</i> (Schiffn.) K. Müll.	3	
<i>Hypnum jutlandicum</i> Holmen & Warncke	2	3
<i>Plagiothecium undulatum</i> (Hedw.) Br. Eur.	3	
<i>Pseudoscleropodium purum</i> (Hedw.) Fleisch.	2	2
<i>Thuidium tamariscinum</i> (Hedw.) Br. Eur.	2	2

The symbol x has been used to indicate the presence of a plant in the stand of vegetation immediately adjacent to the plot analysed, but absent from the plot itself. Other species occurring in the same stands of vegetation but outside the quadrat boundaries were:

1. *Jasione montana* L. and *Sedum anglicum* Huds. and
2. *Thymus praecox* Opiz.

TABLE 2: Soils data.

	Relevé 1.	Relevé 2.
Loss on ignition (organic content)	91%	80%
Total nitrogen (parts per million)	20,000	21,000
Total phosphorus (parts per million)	500	450
pH	3.9	4.4

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CRUSTACEAN RECORDS FROM LOUGH INE, CO. CORK; PART III.

J. M. C. Holmes.

Lough Ine (or L. Hyne) (W 0928) is a sea lough in West Cork. Two lists concerning the Crustacea have already appeared in this series (Holmes, 1980, 1983), but recent investigations have revealed a number of species not previously encountered. These are listed below.

Material was collected by means of an underwater light trap (Holmes and O'Connor, in prep.), unless otherwise stated. Full descriptions of the stations cited in this paper will be found in Kitching and Thain (1983). A representative selection of the animals collected has been deposited in the National Museum of Ireland.

Species List

Order CLADOCERA

Daphnia longispina (O. F. Müller): Although this freshwater species is clearly not part of the marine fauna of Lough Ine, dead specimens were found floating at the surface on two occasions in July 1982, and it is probable that they floated into the lough from a freshwater pond upstream.

Order MYODOCOPIIDA

Parasterope muelleri (Skögsberg): In the South Basin.

Polycopsis compressa (Brady & Robertson): Off the Whirlpool Cliff.

Order PODOCOPIIDA

Semicytherura cornuta (Brady); In littoral gravels collected by hand,
July 1982.

Machaerina tenuissima (Norman): Abundant below 20 m depth.

Order CALANOIDA

Anomalocera patersoni Templeton: Collected by dip net at the surface,
August 1983.

Eurytemora affinis (Pope): Off the Whirlpool Cliff, July 1983.

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Diaixis hibernica (A. Scott): Abundant below 20 m depth.

Stephos rustadi Strömberg: In the North Basin at 20 m depth.

Order HARPACTICOIDA

Ectinosoma melaniceps Boeck: Frequently taken in the lough.

Microstella norvegica (Boeck): Whirlpool Cliff, July 1981.

Pseudobradya fusca (T. & A. Scott): One specimen, North Basin, July 1981.

Pseudobradya similis (T. & A. Scott): One specimen, South Basin, July 1981.

Harpacticus chelifera (O. F. Müller): Locally abundant near the shore.

Harpacticus flexus Brady & Robertson: One specimen, Whirlpool Cliff,
July 1981.

Harpacticus gracilis Claus: Locally abundant near the shore.

Harpacticus uniremis Kröyer: Whirlpool Cliff, July 1981.

Zaus spinatus Goodsir: Whirlpool Cliff, July 1981.

Alteutha oblonga (Goodsir): Occasionally encountered in the lough.

Porcellidium tenuicauda Claus: On 'lithothamnia' collected by diver. Also
found in light trap.

Porcellidium viride (Philippi): On 'lithothamnia' collected by diver.

Parategastes sphaericus (Claus): One specimen, Whirlpool Cliff, July 1981.

Tegastes clausi G. O. Sars: One specimen, Whirlpool Cliff, July 1981.

Tegastes falcatus Norman: Whirlpool Cliff.

Tegastes nanus G. O. Sars: Off Whirlpool Cliff.

Scutellidium longicauda (Philippi): South Basin.

Tisbe furcata (Baird): Abundant near the shore.

Tisbe longicornis (T. & A. Scott): Whirlpool Cliff, July 1981.

Tisbe minor (T. & A. Scott): Near the shore, July 1981.

Ameira parvula (Claus): Found on several occasions, July 1981.

Ameiropsis mixta G. O. Sars: One specimen, North Basin, July 1981.

Sarsameira longiremis (T. Scott): One specimen, North Basin, July 1981.

Itunella muelleri (Gagern): One specimen, 40 m depth, July 1983.

Mesochra lilljeborgii Boeck: Found on several occasions, July 1981.

Mesochra pygmaea (Claus): Found on several occasions, July 1981.

Enhydrosoma propinquum (Brady): One specimen, North Basin, July 1981.

Asellopsis hispida Brady & Robertson: Specimens found at 20 m depth, July 1983.

Heterolaophonte stroemi (Baird): Found on several occasions, July 1981.

Laophonte longicaudata Boeck: One specimen, 40 m depth, July 1983.

Laophonte setosa Boeck: Found on several occasions, July 1981.

Normanella minuta (Boeck): One specimen, North Basin, July 1981.

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Normanella mucronata G. O. Sars: One specimen, North Basin, July 1981.

Paralaophonte brevirostris (Claus): One specimen, North Basin, July 1981.

Paralaophonte congenera (G. O. Sars): Whirlpool Cliff, July 1981.

Paronychocamptus curticaudatus (Boeck): One specimen, Whirlpool Cliff,
July 1981.

Metis ignea Philippi: Collected by hand amongst weed in shallow water,
July 1982.

Amonardia phyllopus (G. O. Sars): Found on several occasions, July 1981.

Amphiascoides brevifurca (Czerniavski): North Basin, July 1981.

Amphiascoides subdebilis (Willey): Found on several occasions, July 1981.

Amphiascopsis thalestroides (G. O. Sars): Found on several occasions, July
1981.

Amphiascus graciloides Klie: One specimen, North Basin, July 1981.

Amphiascus parvus G. O. Sars: Found on several occasions, July 1981.

Amphiascus tenuiremis (Brady & Robertson): One specimen, Whirlpool Cliff,
July 1981

Amphiascus varians (Norman & T. Scott): Found on several occasions,
July 1981.

Bulbamphiascus imus (Brady): Two specimens, South Basin, July 1981.

Diosaccus tenuicornis (Claus): Abundant in the lough.

Diosaccus varicolor (Farran): Two specimens, North Basin, July 1981.

Paramphiascopsis longirostris (Claus): Found on several occasions, July
1981.

Pseudamphiascopsis attenuatus (G. O. Sars): Found on several occasions,
July 1981.

Robertgurneya similis (A. Scott): Found on two occasions, July 1981.

Robertsonia celtica (Monod): One specimen, North Basin, July 1981.

Stenhelia reflexa (Brady & Robertson): One specimen, 40 m depth, July 1983.

Dactylopodia tisboides (Claus): Abundant in the lough.

Dactylopodia vulgaris (G. O. Sars): Abundant in the lough.

Diarthrodes minutus (Claus): Found on several occasions, July 1981.

Diarthrodes nobilis (Baird): Found on several occasions, July 1981.

Diarthrodes ponticus (Kričagin): Amongst sublittoral weed collected by
diver, September 1981.

Paradactylopodia brevicornis (Claus): Found on several occasions, July 1981.

Paradactylopodia latipes (Boeck): Three specimens, North Basin, July 1981.

Parathalestris clausi (Norman): Found on several occasions, July 1981.

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Parathalestris harpacticoides (Claus): Found on several occasions, July 1981.

Parathalestris hibernica (Brady & Robertson): Locally abundant near the shore, July 1981.

Thalestris rufoviolacens Claus: Whirlpool Cliff, July 1981.

Order MONSTRILLOIDA

Monstrilla helgolandica Claus: Found on two occasions, July 1982 and 1983.

Monstrillopsis gracilis (Gurney): One specimen, Whirlpool Cliff, August 1983.

Thaumaleus rigidus (Thompson): One specimen, near the rapids, July 1982.

Thaumaleus thompsoni Giesbrecht: Found on two occasions, July 1981 and 1982.

Order SIPHONOSTOMATOIDA

Cancerilla tubulata Dalyell: Found on several occasions.

Collocheres gracilicauda (Brady): One specimen, off Whirlpool Cliff, July 1983.

Scottocheres elongatus (T. & A. Scott): Abundant in sponges, July 1982. Also taken in light trap.

Bradypontius papillatus (T. Scott): Found on two occasions, 20 m depth, July 1982 and 1983.

Cryptopontius brevifurcatus Giesbrecht: One specimen, Whirlpool Cliff, August 1983.

Lepeophtheirus salmonis (Kröyer): One specimen taken from the dorsal surface of a Ballan Wrasse, Labrus bergylta Ascanius, August 1981. (An unusual host, but the fish was captured by gill net and there was no possibility of contamination.)

Pseudocaligus brevipedis (Bassett-Smith): Two specimens from the roof of the mouth of a Shore Rockling, Gaidropsarus mediterraneus (L.), July 1981.

Sphaeronella leuckartii Salensky: One specimen from the amphipod Aora gracilis (Bate), North Basin, July 1982.

Sphaeronella paradoxa Hansen: Specimens from the amphipod Perioculodes longimanus (Bate & Westwood), rapids area.

Order CYCLOPOIDA

Cyclopina norvegica Boeck: Found on several occasions.

Cyclopinoides littoralis (Brady): Abundant below 20 m depth, South Basin.

Cyclopinoides longicornis (Boeck): Abundant below 20 m depth.

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Mychophilus roseus Hesse: One male specimen, off Whirlpool Cliff, July 1983.
(Gotto et al., 1984)

Order POECILOSTOMATOIDA

Herrmannella parva Norman & T. Scott: One male specimen, North Basin, 20 m depth, July 1983.

Herrmannella pecteni (Sowinski): Found on one occasion, North Basin, July 1981.

Scambicornus finmarchicus (T. Scott): One specimen, North Basin, July 1981.

Macrocheiron fuciculum Brady: Whirlpool Cliff, July 1982.

Oncaea subtilis Giesbrecht: Frequently found in plankton tows, and in the light trap.

Hemicyclops aberdonensis (T. & A. Scott): Abundant below 20 m depth.

Anthessius arenicolus (Brady): whirlpool Cliff.

Anchistrotos onosi (T. Scott): Nine specimens taken from a Shore Rockling, Gaidropsarus mediterraneus (L.), July 1981.

Order LEPTOSTRACA

Nebalia bipes (Fabricius): Occasionally found in the lough, July 1982 and 1983.

Order CUMACEA

Eudorella truncatula (Bate): In mud cores, South Basin, summer 1982.

Diastylis rugosa G. O. Sars: Rapids area, July 1982.

Order TANAIIDACEA

Tanaopsis graciloides (Lilljeborg): In mud cores, South Basin, winter 1982-1983.

Order AMPHIPODA

Acidostoma obesum (Bate & Westwood): One specimen, off Whirlpool Cliff, July 1983.

Synchelidium maculatum Stebbing: Off Whirlpool Cliff, July 1982 and 1983.

Leucothoe lilljeborgi Boeck: One specimen, below 20 m depth, July 1983.

Hyale pontica Rathke: One specimen, Whirlpool Cliff, June 1984.

Argissa hamatipes (Norman): Found on several occasions, July 1982.

Guerneia coalita (Norman): Off Whirlpool Cliff, 20 m depth, July 1982 and 1983.

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Ampelisca brevicornis (A. Costa): Whirlpool Cliff, 20 m depth, August 1983.

Ampelisca tenuicornis Liljeborg: Found on several occasions, July 1982 and 1983.

Megaluropus agilis Hoeck: Found on several occasions, July 1982 and 1983.

Melita hergensis Reid: Collected by hand, in shallow water, North Basin, July 1982.

Photis longicaudata (Bate & Westwood): Rapids area, July 1982.

Aora spinicornis Afonso: Off Whirlpool Cliff, July 1978. (Already recorded from the lough by Myers & Costello, 1984)

Leptocheirus hirsutimanus (Bate): Off Whirlpool Cliff, July 1983.

Leptocheirus pectinatus (Norman): Found on several occasions, Whirlpool Cliff.

Microdeutopus stationis Della Valle: One specimen, Whirlpool Cliff, June 1984.

Corophium sextonae Crawford: Barloge Creek, in gravel, August 1981.

Erichthonius punctatus (Bate): Abundant amongst weed in the rapids area.

(Following the revision of the genus by Myers & McGrath (1984), it is clear that the specimens recorded as Erichthonius brasiliensis (Dana) by Holmes (1980) should be E. punctatus.)

Order MYSIDACEA

Hemimysis lamornae (Couch): Whirlpool Cliff, June 1984.

Praunus neglectus (G. O. Sars): Occasionally found in the lough.

Order DECAPODA

Processa nouveli subsp. holthuisi Al-Adhub & Williamson: Abundant below 20 m depth.

Pandalus montagui Leach: Found on several occasions, 20 m depth.

Pontophilus bispinosus Hailstone: Locally abundant.

Axius stirhynchus Leach: Larvae in the plankton.

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ECOLOGICAL CONSEQUENCES OF AMBLYSTEGIUM RIPARIUM GROWING ON A SEWAGE WORKS PERCOLATING FILTER

N. F. Gray

Percolating filters are rectangular or circular in plan and contain filter medium to a depth of between 1.8 - 2.4 m. The medium, which can be either mineral or plastic, allows the development of an attached slime composed of microscopic heterotrophic organisms which adsorbs and metabolizes the suspended material or nutrients from sewage. The sewage is applied evenly over the surface of the medium by a system of moving or static distribution pipes (Gray, 1982). While the thin slime which covers the medium is comprised mainly of bacteria and fungi the surface layer of medium can become dominated by algae, although the medium normally remains free from higher forms of plant life.

During a student field trip to the sewage treatment works at Saggart, Co. Dublin in April 1980, the percolating filter was observed to be ponded (i.e. the gaps between the surface filter medium had become blocked thus preventing the sewage from rapidly percolating into the filter). On examination it was discovered that ponding was not due to excess microbial slime accumulation, the normal cause of ponding, but due to excessive moss growth. It was estimated that over 60% of the surface of the medium, which comprises of granite particles 35-50 mm in diameter, was covered with a dense mat of moss. Samples were taken from various affected areas of the filter, but were all subsequently identified as the single species Amblystegium riparium (Hedw.) Br. Eur. (Syn. Leptodictyum riparium (Hedw.) Warnst.).

This particular species of moss is found in a wide variety of habitats, growing on rock, wood or soil, although it is normally associated with river banks or pond margins. Watson (1968) observed the same moss growing on the coke filter medium of a percolating filter at Reading in England, and in a personal communication concluded that apart from his 'chance observation' thirty-five years previously he had not come across another similar occurrence. In America, Cooke (1953) also noted that the same species of moss occurred on the surface of percolating filters, and in

a more recent comparative study in the Tame Division of the Severn and Trent Water Authority a total of twelve moss species were found associated with percolating filters. Only four of the species recorded in that study were capable of forming dense mats over the surface of the filter medium, these were Bryum argenteum Hedw., Brachythecium rivulare (Bruch) B. & S., Eurhynchium confertum (Dicks.) Milde, and A. riparium, the latter being the most frequently observed and clearly the most successful in this man-made habitat (Hussey, 1982).

The moss was well established at Saggart when first observed in 1980. However the severe winter of 1981-82 reduced the area of the filter affected from 60 to 30%. No attempt has been made to remove or control the moss and since 1982 the area of the filter surface covered by the moss has remained constant at between 30 - 35%. This level of infestation by the moss has had a number of effects on the ecology and treatment efficiency of the filter at Saggart. The moss has caused an increase in slime accumulation in the medium directly beneath it and this, coupled with the habit of this species to grow in the interstices of the medium, results in the filter ponding in the winter or early spring. This can subsequently lead to a reduction in the treatment efficiency of the filter and a worsening of final effluent quality.

On the 15 March, 1984, one litre samples of filter medium were collected from five different areas of the percolating filter which were covered with moss and compared with five samples collected from moss-free areas. Slime and associated macroinvertebrates were removed from the pieces of medium using the 'wash and scrub' method (Gray, 1980). Macroinvertebrates were collected by filtration using a Hartley pattern Buchner funnel and passing 50 ml subsamples of washings from the separation process through a 150 mm Whatman 113 filter paper at low pressure. The filter papers were cut into sections and the macroinvertebrates counted at X16 magnification using a stereo microscope.

The moss creates a different habitat within the filter which encourages a different flora and fauna. The slime associated with medium beneath the moss at Saggart contained a significantly greater biomass of macroinvertebrates compared with the slime on the moss-free filter medium, especially Lumbricidae ($p < 0.001$), Enchytraeidae ($p < 0.05$), psychodid fly larvae ($p < 0.05$) and Tipulidae ($p < 0.001$) (Table 1). The lumbricids observed

associated with the moss were larger and more mature than those normally recorded in percolating filters (Gray, 1980).

In conclusion, although rarely reported, A. riparium is able to successfully colonize and thrive on the surface of percolating filters. Once established it is not easily removed. Although the moss does not normally affect the biological action of the percolating filter, combined with increased film accumulation it can block the interstices of the filter medium causing ponding and a loss in treatment efficiency. The moss alters the ecology of the filter by providing an ideal habitat for Lumbricidae, Enchytraeidae and the larvae of many dipterans.

TABLE 1. Comparison of macroinvertebrate densities (No. l⁻¹ medium) in filter medium with and without moss growth. The 95% confidence limits and the level of significance (p) of the Mann-Whitney test statistic U are also given.

Macroinvertebrate group	Medium				P
	Moss present		Moss absent		
	\bar{x}	CL	\bar{x}	CL	
Lumbricidae	50	+ 8	4	+ 6	< 0.001
Enchytraeidae	1040	+ 420	356	+ 205	< 0.05
Psychodidae (larvae)	1514	+ 370	809	+ 317	< 0.05
Tipulidae (larvae)	11	+ 3	0	+ 0	< 0.001

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SOME NOTES ON THE DISTRIBUTION OF BUFO CALAMITA LAUR., THE NATTERJACK TOAD IN IRELAND DERIVING FROM A SURVEY CONDUCTED IN 1975.

P. G. O'Connor and F. Jeal.

"In different places in the West of Ireland at the margins of the wild areas you are shown places to which, and no further St. Patrick is said to have gone, and when he saw the desolate country beyond he said 'I'll bless yees to the West, but the deil a foot I'll put among you". This is told of Iveragh, West Kerry, which accounts for the Natter-jack toad being found there.

(Kinahan, 1881.)

In 1975, following the discovery of Natterjack toads at Castlegregory and Fermoy, Co. Kerry (Gresson and O'Dubhda, 1971) and a further paper on their distribution in Kerry from visits made to likely sites between 1971 and 1973 (Gresson and O'Dubhda, 1974) a survey was conducted, partly under the auspices of the Forestry and Wildlife Service (Department of Lands), to confirm and augment the available knowledge on the location and habitat of this species in Ireland. A full report on this survey was submitted to the Department of Lands (O'Connor, 1975) since which time Bufo calamita has become a fully protected species under the Wildlife Act 1976.

Hitherto the results of this survey have not been accessible to workers in the field. Though much of the distributional information served to confirm previous knowledge, and other data may have been obtained since (though at the time of writing - March, 1984, - we know of no published data since 1974), it has been thought worthwhile to publish this information for comparative purposes, and also to document some ancillary observations which may prove of interest to other investigators.

At the outset we were greatly assisted by the results of the surveys by Professor Gresson, and his advice, and the unpublished results of a survey carried out in 1973/4 on behalf of the British Herpetological Society, provided by Dr. T. J. C. Beebee, (Beebee, 1974). These sources of information will be referred to as 'R.A.R.G.' and 'B.H.S.' respectively.

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Aims and methods of the survey.

The primary aim of the survey was to map the distribution of B. calamita with particular reference to the location of possible breeding sites. Unfortunately the summer of 1975 was exceptionally dry, and many small lakes and ponds that might normally be suitable for breeding had dried out. Also the survey for unavoidable reasons began rather late in the breeding season, commencing in June and running until the end of August.

Suitable sites were investigated for the presence of spawn, and tadpoles. Both are readily identifiable, and could be checked by means of information contained in Smith (1969). Adults were located under stones, or in burrows by extensive and labour-intensive trial-and-error searching. The presence of the unmistakable tracks of adult toads was of great assistance, particularly on sandy areas, and the croaking of males in the evenings helpful in locating them at the lake margins.

The efficiency of such searching is difficult to assess (some of the terrain is very difficult to work) and one cannot be absolutely confident in 'negative' findings, but the fact that specimens of B. calamita were found at every one of the sites from which they had been recently recorded (R.A.R.G., B.H.S.) gave a measure of thoroughness of the survey, and gave more confidence to "negative" results.

After mid-July the survey concentrated on adults, as by that time larval metamorphosis had taken place.

Overall length measurements were taken of as many specimens as possible, and are given in Table 1. Too few measurements were obtained for adequate size-class analysis, but they did serve as a guide to 'young', 'old' and 'mixed' populations.

Results: Summary of distribution and sites visited.

'Positive' locations.

1. Definite breeding sites as indicated by spawn and/or tadpoles:
 - (a) Lough Gill Q 6114;
 - (b) Inch Peninsula, East V 663989;
 - (c) Lough Yganavan V 7196.

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2. Areas where adults were found, and where suitable breeding sites exist:
 - (a) Lough Nambrackdarrig V 699937;
 - (b) Dooaghs Golf Links and environs V688958
 - (c) Fermoyle Q5512.
3. Areas where adults were found, but where no suitable breeding site was present at the time of the survey:
 - (a) Loch Naparka (North of) Q 6217;
 - (b) Kilnabrack V 654914.

'Negative' locations.

1. Areas which proved negative, but appeared suitable for both adults and breeding:
 - (a) Smerwick Harbour (Beal Ban Strand) Q 352058;
 - (b) White gate cross roads Q 776035;
 - (c) Knockaunnaglashy, (North of L. Yganavan);
 - (d) Waterville Golf Links;
 - (e) Parknasilla and environs.
2. Areas which proved negative, are suitable for adults, and which could be suitable for breeding in wetter summers, or with certain conservation measures:
 - (a) Akeragh Lough, Ballyheigue;
 - (b) Derrynane National Park;
 - (c) Ballycarberry V 434795;
 - (d) Rosbehy Island V 649938.
3. The following areas were extensively searched, proved negative and appeared to be unsuitable habitats:
 - (a) Blennerville and Anonagh areas;
 - (b) Ventry Q 374100;
 - (c) Feohanagh Q 3910;
 - (d) Minard V 527986;
 - (e) Ardcanacht Q 8001;
 - (f) Castlemaine Q 831029;
 - (g) Kilderry Q 800100;
 - (h) Callanafersy V 7899;
 - (i) Cromane V 7099;
 - (j) Kells Bay V 555881;
 - (k) Coonanna Bay V 4885;
 - (l) Valentia River Estuary V456798;
 - (m) Ballinskelligs lakes.

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4. Areas in South Clare which looked promising, were surveyed and proved negative:

- (a) Farrihy Bay, and Farrihy Lough Q 9164;
- (b) White Strand Q 9969;
- (c) Lough Donnell R 0071;
- (d) Lurga Point Q 9974.

Notes on individual localities

1. Lough Gill ('Castlegregory Lake').

This area appeared to be the largest breeding site visited on the survey. Judging from the croaking which could be heard nearly a mile away in the evenings (from between the 17th and 20th March to early July) the adult population was large. Some spawn was still present on the first observation (June 23rd 1975) tangled in reeds in 10cms of water. Most of the spawn had hatched, as tadpoles of all stages from new hatchlings to incipient metamorphosis were abundant in very shallow, and to the touch, warm, water at the Eastern end of the lake (from Q 6112 to Q 612150). Tadpoles were not found along the Northern and Southern shores where the water is deeper (ca. 24 ins) and more thickly reeded.

Four regurgitated adult toad carcasses were recovered at a point on the eastern shore of the lake. This appeared to be at a regular mallard feeding site, though the heron, also common here is a more likely predator of adult toads. However the large mallard population could cause considerable depredation on the tadpoles.

No further study was carried out at this site as the Lough Gill population was at that time under active investigation by Prof. R.A.R. Gresson.

2. The Inch Peninsula.

The Western side of the peninsula, a long sandy beach backed by an extensive dune system revealed no live toads. However toad tracks were observed here on 29/vi/75, and 1/vii/75 and on the latter occasion a desiccated toad carcass was found in the area.

The Eastern side of the peninsula is divided into three pasture lands by

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marramgrass-covered hills. All three pastures are subject to tidal flooding, and the central pasture has many man-made drains, which were the only breeding site found on Inch in this survey. The southernmost pasture however had many dried up slacks which might, in a wetter year, serve as breeding sites.

Observations: Tadpoles, in various stages of development, were located in the drain systems on 29/vi/75 and 1/vii/75. At that time the drainwater tasted fresh. However the small pools of water in the partially dried drains contained an extraordinary faunal assemblage, some pools containing toad tadpoles, others containing elvers (Anguilla anguilla (L.)) and/or shore crabs (Carcinus maenas Bell). On a subsequent visit, 24/vii/75 no tadpoles were found and the drains were filled with seawater.

On 29/vi/75 37 toads were located in this region, of which thirty were recently metamorphosed at 21mm or less in length. On 25/vii/75 13 toads were found nearby, three adults, and ten 'toadlets' which latter were all together within a single grass tussock at the drain side. Strangely three of the ten newly-metamorphosed toads had only one rear leg! These toads seemed able to move about with little difficulty, and the skin appeared to be completely healed at the site of the missing limb. It is possible that these animals had suffered attack, perhaps from the elvers or crabs, during the late tadpole stage when the rear legs are exposed.

The main danger to the Inch population appeared to be the incursion of seawater into the breeding sites. Potential predators observed feeding at the fen drains included herons, mallard and seagulls.

The Inch population has a long history of documentation and recent visits had confirmed their survival (R.A.R.G., B.H.S.) but as pointed out by Beebee (B.H.S.) 'it is clear from old records that Natterjacks are now restricted to a small fraction of their original habitat at Inch'.

3. Lough Yganavan (V 7196)

This site for B. calamita was first discovered by Gresson and O'Dubhda (loc. cit.) in the Summer of 1973. The mistaken date given as 1971 in Ni Lamhna (1979) is to be corrected in future editions of that atlas (Ni Lamhna, pers. comm). The presence of toads at L. Yganavan was confirmed

in 1974 (B.H.S.)

It is a very open lake with little vegetation except for bullrushes at the western end, and water lobelia Lobelia dortmanna which affords little cover. This somewhat oligotrophic lake has a very shallow stony-bottomed border at the eastern end where a large number of tadpoles were observed in a shallow (15 cm. deep) inlet, (V707961), on 23/vii/75.

The tadpoles were very conspicuous, and appeared vulnerable to bird predation at this exposed site and large flocks of seagulls were observed apparently feeding in the vicinity. On a subsequent visit 9/viii/75 the tadpoles had disappeared.

A second batch of tadpoles was found in a small pool (5m diameter, 30cm. deep) some 10m from the Southern side of the lake. A large number were present at various stages of development estimated at about 30 individuals per square metre.

Earlier surveys (R.A.R.G., B.H.S.) had only located adults at this site. We found no adults, though nearby residents had heard croaking at nightfall during June.

4. Lough Nambrackdarrig (V 699937)

This is a bleak, oligotrophic lake with little plant cover, and surrounded by rough pasture to the west, and bog on the other three sides. Here five toads were found under stones at the north-eastern bank of the lake where it connects via a bog drain with another small lake to the north east. No toads were found by this other lake, though they appear quite similar. The toads were four young adults (ca. 40mm) and one juvenile (25mm).

This was the first record of B. calamita from L. Nambrackdarrig, though farmers living nearby were familiar with them "croaking under the stones at the edge of the lake" and "coming near the houses in the Autumn". The latter observation might endorse the suggestion of Gresson and O'Dubhda (1971) that some movement from the vicinity of the breeding grounds may take place during September and October.

This site at 1.5 miles from the sea was the farthest inland that Natterjacks had been recorded in Ireland.

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5. Dooaghs Golf Links and environs (V 688958)

This area is well drained pasture land to the northern border of the Dooaghs Golf course. There were no evident breeding sites where the toads were found though some dried up slacks were present which might be suitable in wet years. A small pond exists 200 m to the north of the site at which most toads were located.

Locations:

- 1) A solitary toad was found on the shore just 1.5m above highwater in a tunnel under a flat stone. Found on 9/viii/75 it was still there three days later.
- 2) A total of 28 toads were found in a gravel pit of ca. 8m in diameter. All the toads were on the northern (southfacing, and presumably sunniest) bank, under stones on the gravel. Eleven of them were aggregated under a single stone measuring 12cm x 25cm. Only the smallest and largest of this batch of toads were measured, giving a size range of 14 - 59mm.
- 3) 150 m N.W. of the 12th tee of the Golf course, a region of sandy gravel two toads were found under a rock surrounded by scrub.

Oddly, the toads from the Dooaghs area appeared markedly darker than those observed at other sites, almost black rather than olive. Another curious observation at this site was that under the vast majority of stones turned, ants nests were present. However ants were never present under stones which harboured toads. One can only speculate on the basis of this negative association. The presence here of 11 toads under one stone also highlights the general tendency to gregariousness in that a single toad under a stone was very much the exception and five under a stone were found on four occasions.

6. Fermoyle (Q 5512)

This area was a swamp lying behind sandhills, which had been eroded in two places by the sea, which effectively cut off a triangular area in which toads had been discovered previously (R.A.R.G.) The toads had been confined to this triangle, which due to the incursion of the sea was progressively reduced in size from 1970 to 1973 (Gresson and O'Dubhda, 1974).

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In 1975 we found 18 toads, under stones on banks, within this triangular region, and for the first time, found six toads outside the triangle on banks to the East. It seemed that the toads had broken the confines of the two inroads of the sea.

7. Loch Naparka (Q 6217)

This location is a sand dune system to the North of Loch Naparka, where natterjacks had been reported by Dr. T. Beebee (pers. comm.). No breeding site was available in the summer of 1975 as the numerous slacks in the dune system, and the Loch itself were dry. Toads were located in the vicinity of these slacks (Q 618175) around which many toad tracks were visible. Four large (seetable 1) toads were found burrowed in tunnels on top of the sand beneath a 5cm cover of roots, grass and moss. The major threat to this habitat appeared to be a large caravan site nearby.

8. Kilnabrack (V654914)

Toads had previously been found in this area of rough and rocky pasture between the Behy river and the mouth of the Caragh river (R.A.R.G.). After extensive and tedious searching (three days) a single large (61mm) toad was located under a rock on the verge of a turf drain about 200m from the seashore, west of the Behy river. The bog drains were dry so no breeding was apparent.

Assessment

This survey confirmed the previous observations (R.A.R.G., B.H.S.) that the distribution of B. calamita as compared with earlier records, had declined markedly, and that such sites as Castlemaine, Callinafersy, Cromane, and Rosbehy where toads formerly abounded no longer harboured the species, probably as a result of extensive land drainage. The Natterjack population was centred on four main sites: Loch Gill, the largest colony, Inch, Dooaghs and Fermoye. The remaining sites, L. Naparka, L. Yganavan, L. Nambrackdarrig, and Kilnabrack held only very small marginally viable colonies. The discovery of toads 1.5 miles inland at L. Nambrackdarrig,

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a hitherto unrecorded site, and the slight Eastern spread of the Fermoyale population were the only optimistic findings to emerge.

The submitted report (O'Connor, 1975) suggested certain conservation measures:

- Reintroduction of the species to Ballycarbery, where they existed prior to the drainage of two small ponds in 1945. These ponds still exist as marsh, and with permission could be restored.
- Introduction (or possibly reintroduction if an earlier report is correct (MacDougald, T. J. 1942)) of the species to the Waterville peninsula. It appeared that with little effort both the Derrynane National Historic Park, and the Waterville Golf links could be suitable sites for the species. Elsewhere, Smerwick Harbour seemed a promising site for the species should introduction be deemed desirable.

With regard to existing locations it was pointed out that:

1. Although the Lough Gill population appeared in no imminent danger, the Lough being on average only 1m deep, it was very vulnerable to interference and agricultural pollution.
2. The Fermoyale population was in urgent need of conservation measures, particularly from encroachment of the sea.
3. The Inch population likewise was endangered by marine incursion into the breeding sites, which should be rectified.
4. Attention should be paid to improving the breeding sites in the other locations.

Had these recommendations been acted upon the Fermoyale site might not have been destroyed by agricultural activity in 1981; the accidental drainage of L. Gill (fortunately rectified) might have been avoided; and the Inch population might have regained its former strength. Follow-up visits to these locations, and to Dooaghs, and L. Naparka, by one of us (P.O'C) in 1976, 1977 and 1978 showed the continued existence of toads at each place, but no sign of any conservation measures.

Thoughts on the Kerry Natterjack population

Despite the legend cited by Kinahan (see above) there is no documentary evidence of the existence of toads in Ireland prior to 1805 when they were first seen at Callinafersy by Mackay (Mackay, 1836). Early reports show

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that the species was extremely common around Castlemaine Harbour in the early 19th century (see Gresson and O'Dubhda, 1971, 1974 for refs.) from which region they seem to have undergone a very modest spread. We shall probably never know the facts of the origin of toads in this area, but it is of interest that Smith (1756) makes no mention of them. Smith gave a detailed description of the area enumerating, among many other aspects of the region, its plants, fisheries and natural curiosities. He travelled the Inch peninsula (where toads abounded a half-century later) to map the sand bars, and commented on its botany. It seems incredible that had the toads been present, or known of in the area, one with such an eye for natural curiosities would have failed to mention them.

Smith's description of Castlemaine Harbour in the mid-18th century may suggest how the toads could have arrived:

"Castlemaine: 'Deep enough for vessels of 50 tons or upwards to sail up to the bridge at high water where they may lie on soft oozy ground to discharge'
'Some vessels are unloaded here on the bankside which serves as a wharf. These are generally freighted with rock-salt from England, and others are laden with iron ore which is carried on horses to the iron foundries'."

It is conceivable that the toads may have arrived with such cargo, or perhaps with sand often used as ballast and, as so often with immigrant species (Elton, 1958) undergone a rapid colonisation, and population explosion. This would also explain the observation by Andrews (1841) that 'the peasantry have the greatest horror and even dread of them', - which is understandable if they faced a sudden infestation by an unknown animal, but is very odd if they had had a long-standing acquaintance with such an amiable species. Present day attitudes in this area show none of this 'horror'. It would also explain another legend that is found in the region, that the natterjack arrived 'when a boatload of toads was sunk in Dingle Bay!'

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TABLE 1: OVERALL LENGTH MEASUREMENTS

Date	Location	Spawn	Tadpoles	Adults	Size, mm	Notes.
23/6	L. Gill	+	+	-	-	Adults heard croaking.
21/7		-	+	-		
13/8	L. Naparka	-	-	4	1 @ 48 1 @ 60 1 @ 62 1 @ 63	
13/8	Fermoyle	-	-	24	2 @ 20 5 @ 22 10 @ 25 1 @ 28 1 @ 30 1 @ 37 1 @ 49 1 @ 54 2 @ 61	
29/6	Inch	-	-	37	20 @ 15 10 @ 21 2 @ 43 1 @ 46 1 @ 50 3 @ 56	
25/7		-	-	13	1 @ 12 1 @ 14 1 @ 16 2 @ 18 1 @ 19 1 @ 20 2 @ 22 1 @ 23 1 @ 42 1 @ 45 1 @ 46	
23/7	L. Yganavan	-	+, +	-		Tadpoles present at two locations.
15/8	L. Nambrack -darrig	-	-	5	1 @ 25 2 @ 40 2 @ 44	
16/8	Kilnabrack	-	-	1	61	
9/8	Dooaghs	-	-	28 1	Size range 14 to 59 mm 1 @ 45	
12/8		-	-	2	1 @ 40 1 @ 57	

PLANT LISTS FROM THE SCIENTIFIC TOURIST THROUGH IRELAND(1818)

M. J. P. Scannell

In 1818 a small volume (5cm x 15cm), entitled The scientific tourist through Ireland, was published in London by 'An Irish Gentleman'. In its full title the publication directs the traveller to the 'principal objects of antiquity, art, science and the picturesque'. The work is in the nature of a road-book of which many were issued from the beginning of the eighteenth to the middle of the nineteenth century. The table of contents lists 36 pages and refers only to the Introduction, which includes paragraphs on Cairns, Caves, Round Towers, Castles and such antiquities. The remainder of the work, some 200 unnumbered pages, is devoted to an account of each of the 32 counties ending in most cases with a list of plants. The work is illustrated with eight vignettes of landscapes and two maps - one depicting the lakes of Killarney and one showing the principal towns of Ireland.

The scientific tourist through Ireland is not indexed in Irish floristic bibliographies. When Praeger's attention was drawn to the work in 1906 he informed readers of the Irish Naturalist (Praeger 1906) that 'An Irish Gentleman' had 'no claim to this 'nom de plume''. He was Thomas Walford (1752-1833), militia officer and antiquarian who was author of The scientific tourist through England, Wales and Scotland published in 1818 in two volumes. Walford was also a member of the Linnaean and Geological Societies and contributed to some learned journals. Colgan (1906) pointed out that Walford extracted his plant lists from the works of the early botanists, Keogh, Threlkeld and Smith, and 'laid the 'Statistical Surveys of the Dublin Society' under contribution for the plant lists of some counties'. Thus few (if any) of the records are original and it may explain why Walford's work has been neglected.

The Walford publication is rare. However, as it is often cited at the head of county lists in Simpson (1960) it may be of interest to publish the topographical lists for the benefit for county recorders. The information below is arranged in numerical order of the counties (vice-counties); the species are in alphabetic order. Walford's name for the county is given in brackets when it differs from the current name. The vice-county number has been inserted following the name of the county.

Notes on the plant lists

Walford's lists are reproduced below (Appendix 1). The nomenclature, where necessary, has been brought up-to-date according to Tutin et al. (1964-1980) and Scannell & Synnott (1972). Lists of name changes follow separately and are arranged under the county and in the order of Walford (Appendix 2). The updated names are prefixed by an asterisk*. Many of the species on Walford's list do not occur in Ireland, as, Senecio palustris. In some cases the statement of Scully in Flora of County Kerry (1916) is included. He commented on the polynomial species noted for Kerry by Charles Smith in the Antient and present state of the County of Kerry (1756). Walford provided no species list for several counties. In the case of Westmeath he wrote, 'promising of a great variety of aquatics'.

The ortography of some place names is incorrect, Bengevenogh may be Benevenagh, but the locations have not been corrected. It is left to the reader to place the site when the record is important.

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APPENDIX 1: WALFORD'S LISTS

KERRY H1 and H2

Andromeda polifolia, Marsh Cistus or Wild Rosemary: in bogs in Iveragh and Dunkerron baronies, and near Isaac-town.

Arbutus Unedo, Strawberry-tree: -on rocks and mountains about Lough Lane.

Artemisia campestris, Field Southern-wood: -in a field near Castle Island.

Asplenium adiantum nigrum, Common Black Maidenhair; -on the mountains.

*Asplenium Ceterach, Spleenwort or Milkwort : -on rocks

Asplenium Ruta muraria, White Maiden-hair, Wall Rue or Tentwort: -in a rocky cavern near Blackstones.

Asplenium Trichomanes, English Black Maiden-hair: -on the rocks in various parts

*Astragalus arenarius, Purple Mountain Milkwort; on the mountains about the Lakes of Killarney.

*Atriplex portulacoides, Sea Purslane: -near the river Mang near Callinafersy.

*Atriplex serrata, Indented Sea Orache:-on the banks of the river Galey, plentifully.

*Cardamine bellidifolia, Daisy-leaved Ladies' Smock: -in the islands of Lough Lane.

*Cheiranthus sinuatus, Sea Stock: - near Beal Castle towards the Shannon mouth.

*Chenopodium maritimum, Sea Blite or White Glasswort: -on the shore near Callinafersy, the bottom of Castlemain harbour.

*Cineraria alpina, Mountain Ragwort: -on the side of Knockanore mountain, near Fell's Spa, in the barony of Iragticonnor.

*Cineraria palustris, Marsh Flea-bane: -in ditches in the barony of Clanmaurice.

Convallaria majalis, Lily Convally, or May Lily: -in the island of Innisfallen.

*Crategus Aria, White Beam Tree: -in woods and hedges in a mountainous or chalky soil, plentifully.

*Cucubalis acaulis, Moss Champion: -on the rocky mountains in Dukerron near blackstones.

Draba muralis, Speedwell-leaved Whitlow Grass: -on mountains near the southern part of Lough Lane.

Drosera rotundifolia, Round-leaved Sundew: -in moist grounds near Lixnaw.

Dryas octopetala, Mountain Elder: -on hills near passage into the upper lake at Killarney.

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KERRY H1 and H2 (Contd/....)

Echium italicum, Wall Viper's Bugloss: -in sandy ground in Ballyheigh Bay near Ferrit.

Equisetum hyemale, Rough Horsetail or Shave-grass: -in a bog through which the river Buck runs near Lixnaw.

Eryngium maritimum, Sea Holly or Eryngo: -on sandy shores.

Euphorbia hiberna, Knotty-rooted Spurge: -on the mountains.

*Galeopsis villosa, Hairy Dead Nettle: -in fields near Castle Island.

*Geranium Maritimum, Sea Crane's-bill: -on the strand of Tralee.

*Geranium moschatum, Musk Crane's-bill or Muscovy:-on the abbey walls of Lislactin.

Geum rivale, Water Avens: -on the hills near the passage into the upper lake of Killarney.

Herniaria glabra, Smooth Rupture-worth: -on Lamb-head near the mouth of the river Kenmare.

*Hieracium paludosum, Succory-leaved Hawkweed: -in Ballybog.

Ilex aquifolium(baccis luteis), Yellow-berried Holly: -on mountains near Lough Lane.

Inula crithmoides, Golden Samphire: -on rocks near Bolus-head in Iveragh, and elsewhere.

*Jungermannia epiphylla, Broad-leaved Jungermannia; -in a wood near Beal Castle.

Juniperus communis, Juniper: -on the mountains.

Juniperus Sabina, Savine: -in islands at Killarney.

Lepidium latifolium, Dittander or Pepperwort: -near the head of Kenmare river.

*Lichen islandicus, Eryngo-leaved Liverwort: -on the mountains of Iveragh near Blackstones.

*Lichen tartareus, Welch Liverwort, Cork or Archill: -on rocks on the sea coast.

*Lycopodium alpinum, Mountain Club Moss: -on the mountains of Toomesh and others near the Lake of Killarney.

*Lycopodium clavatum, Common Club Moss: -on the southern districts on the mountains.

*Lycopodium Selago, Upright Fir Moss: -on Mangerton and most other mountains near the Lake of Killarney.

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KERRY H1 and H2 (Contd/...)

Ophioglossum vulgatum, Adder's Tongue: -in moist meadows.

*Osmunda crispa, Stone Fern: -on rocks among mountains in the southern baronies.

Osmunda regalis, Osmund royal or Flowering Fern: -in bogs of Irachticonnor; in a wood near Lixnaw and elsewhere.

Paris quadrifolia, Herb Paris, True-love or One-berry: -in the wood near Ross Castle, near the Lake.

Peucedanum officinale, Hog's Fennel, Sulphurwort: -on the shores of Ballyheigh bay.

*Pinus Abies: Common Fir or Pitch Tree: -in the mountains.

*Pinus picea, Yew-leaved Fir: -in the mountains.

*Pisum maritimum, Sea Pease: -on Inch Island in Castlemain bay.

Polemonium caeruleum, Greek Valerian, or Jacob's Ladder: -near Castle Island, in meadows.

Polygonum Bistorta, Great Bistort or Snakeweed: -in a park near Tralee.

*Polypodium fragile, Brittle Polypody: -on Mangerton mountains.

*Polypodium fragile β , a variety of the last; on the south side of the rocks called the Reeks.

*Polypodium rhaeticum, Stone Polypody: -on several mountains round the Lake of Killarney, near the new road to Glanerough.

*Pulmonaria maritima, Sea Bugloss: -on the beach near Beal Castle.

Rubia peregrina, Wild Madder: -in the Island of Innisfallen.

Rubus idaeus, Raspberry Bush or Framboise: -near Lough Lane, plentifully.

Salsola Kali, Prickly Glasswort: -on the sea shore at the bottom of Ballyheigh Bay.

*Santolina maritima, Sea Cudweed: -on the shores of Ballyheigh Bay.

Saxifraga oppositifolia, Mountain Heath-like Sengreen; among the rocks near Blackstones.

Saxifraga umbrosa, London Pride, or None-so-pretty: -on Mangerton mountain.

*Scrophularia Scorodonia, Balm-leaved Figwort: -on the sea coast near the Magherie Islands in Tralee bay.

Smyrniolus Olusatrum, Alexanders: -on a small bushy hillock near Crumlin Ch., about the shore near Dunkerton, the head of the river Kenmare, and elsewhere.

*Sorbus domestica, True Service or Sorb; on several rocks about Killarney.

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KERRY H1 and H2 (Contd/...)

Solidago cambrica, Welch Golden Rod: -near the Devil's Punch-bowl, on the west side of Mangerton mountain.

Tragopogon porrifolius, Purple Goat's-beard: -on the banks of the river Brick near Lixnaw.

CORK H3, H4 and H5

Althaea officinalis, Marshmallow: -at Cable Island.

Aquilegia vulgaris, Columbine: -plains near Kilbullane.

*Arbutus Teredo, Strawberry Tree: -on the mountains.

Asplenium Adiantum nigrum, Common Black Maiden-hair: -on the mountains.

Asplenium Trichomanes, English Black Maiden-hair: -on rocky soils.

*Cardamine bellidifolia, Daisy-leaved Ladies-smock: -on old walls near Cork.

*Cistus Helianthemum, Dwarf Cistus or Little Sun-flower: -on limestone hills near Castlemore, and in the barony of Muskerry.

Cochlearia danica, Danish Scurvy-grass: -on Cape Clear and elsewhere.

Cochlearia officinalis, Common or Garden Scurvy-grass: -on rocks near the sea.

Convallaria majalis, May Sally: -on the river Bandon.

Dianthus Caryophyllus β Common Pink: -on the walls of an old castle in the market-place at Kinsale.

Euphorbia hyberna, Knotty-rooted Spurge: -in the mountains.

Helleborus viridis, Wild Black Hellebore: -in a meadow near Doneraile.

*Hypericum Ascyron (Lin.), Bruges-rose: -near Ballymaloe in the barony of Imokilly.

Lavatera arborea, Sea Tree Mallow: -on Cable Island near Youghall harbour in Cork.

Lepidium latifolium, Dittander or Pepperwort: -near Corkbeg.

Mentha rubra, Red Mint: -near the head of the river Lee near Lough Alloa.

Nymphaea Alba, White Water-lily: -on the rivers Lee and Blackwater.

Pimpinella major, Great Burnet Saxifrage: -in woods and hedges on a chalkey soil about Cork plentifully.

*Pinus Abies, Common Fir: -in the mountains.

Sambucus Ebulus, Dwarf Elder or Danewort: - on the lands of Rathpecan near Cork.

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CORK H3 H4 and H5 (Contd./..)

*Saxifraga umbrosa, London pride, or None-so-pretty: -on all the rocks
in the western districts.

Sedum dasyphyllum, Round-leaved Stonecrop: -on an old wall near Blarney
Castle.

Sedum Telephium, Orpine or Live-long: -on walls and in pastures and hedges
near Mallow and Doneraile.

Taxus baccata, the Yew-tree: -in several parts of Carbery.

Vaccinium Oxycoccus, Cran-berries, Moss-berries, or Moor-berries: -in
moorish boggy grounds.

WATERFORD H6

Allium carinatum, Purple-flowered Mountain Garlic: -on pasture lands.

Althaea officinalis, Marsh Mallow: -in the isles of Icaene.

Asplenium Adiantum nigrum, Common Black Maiden Hair: -on mountains.

Carex dioica : Small Carex: - in bogs.

Carum Carui, Caraway: -in meadows and pastures: -near Woodhouse in the
parish of Stradbally.

Convallaria majalis, Lily Convally or May Lily: -in a wood near the river
Collygan.

Crithmum maritimum, Samphire: -on sea cliffs.

*Cucubalus otites, Spanish Catchfly: -in a grove near Lismore, near the
Blackwater river.

Daphne Laureola, Spurge Laurel: -in a wood near Mogehey in the parish of
Whitechurch.

*Drosera longifolia, Long-leaved Sundew: -on a bog near Ballycaroge.

Eryngium campestre, Common Eryngo: -in the sand near Youghal harbour.

*Gladiolus communis, (Linn.) Sword Grass or Corn Flag: -at the upper end of
the Conegary, at Dungarvon.

*Imperatoria Ostruthium, Masterwort: -on Slatwood Hill near Lismore, and
Tallow.

Menyanthes trifoliata, Buckbean: -on bogs.

Osmunda regalis, Osmund Royal, or Flowering Fern: -near Bally-car-oge..

Peucedanum officinale, Hog's Fennel, or Sea Sulphurwort: -in the barony
of Gualtier.

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WATERFORD H6 (Contd./...)

Polemonium caeruleum, Greek Valerian, or Jacob's Ladder: -on a bank of the Blackwater between Cappoquin and Lismore.

Polygonum Bistorta, Greater Bistort or Snakeweed: -on Slatwood-hill near Lismore, and Tallow.

Solidago Virga Aurea, A variety of common Golden Rod: -on Cushean-hill near Dungarvon

*Spiræa filipendula, Dropwort: -on Cumeragh mountains.

TIPPERARY H7 and H10

*Ammi vulgaris (Linn.) Bishop's Weed: - on Killough Hill, near Cashell, plentifully.

Hypericum Androsamum, Tutsan, or Park-leaves: -in woods.

Leonurus Cardiaca, Motherwort: -in hedges and among rubbish.

Ophioglossum vulgatum, Adder's Tongue: -in moist meadows.

*Ophrys bifolia, Common Twayblade: -in woods.

LIMERICK H8

Euphorbia hiberna, Knotty-rooted Spurge: -near Anakirk.

Helleborus foetidus, Great Bastard Black Hellebore, Bear's foot or Tetter-wort: -on Slieve Baghtine and near Drumcallagher.

Teucrium Scordium, Water Germander: -in marshy places: on the banks of the Shannon near Limerick.

CLARE H9

Adiantum Capillus Veneris, True Maiden Hair: -on the rocky mountains of the Burrin.

*Arundo arenaria, Sea Matweed: -on the sandy beaches.

*Asclepias Vincetoxicum (Lin.) Swallow Wort: -on the rocky mountains of Burrin.

Butomus umbellatus, Flowering Rush: -in the vicinity of Clare and Correfin.

Bull. Ir. biogeog. Soc. No. 8.

CLARE H9 (Contd./...)

Crithmum maritimum, Samphire: -on sea cliffs.

Dryas octopetala, Mountain Avens: -found in Burrin on the limestone mountains in abundance, where scarce any other vegetable will exist.

Gentiana verna, Spring Gentian: -on limestone gravelly soils near Galway Bay.

Juniperus communis, Juniper: -in mountainous districts.

Ricinus communis, (Lin.) Palma Christi, or Greater Spurge: -in Burrin.

Rubus saxatilis, Stone Bramble: -in the woods of Cratulagh.

Satureja montana, Lin. Winter Savory: -on the mountains of Burrin.

Saxifraga granulata, White Sengreen or Saxifrage: -in dry meadows and pastures in Burrin.

*Senecio saracenicus, Broad-leaved Ragwort: -near Corfin.

*Spiræa Filpendula, Dropwort: -in Burrin barony.

*Teucrium Chamæpitys, Ground Pine: -in the rocky mountains of Burrin.

KILKENNY H11

*Borago officinalis, Burrage: -on the ruins of Grandison Castle.

Erica cinerea, Female Heath; with white flowers: -on moist sides of hills.

Humulus Lupulus, or Hops: -indigenous evidently in many parts of the county.

Iris Pseud-acorus, Common Flags or Saggons: -in wet grounds.

Lichen, Common Mosses; with all the varieties of caninus, physodes, farinaceus &c.: -in many places.

Lonicera var. fol. quercinis, Oak-leaved Honey-Suckle: -in the s.e. district, in meadows.

*Lycopodium alpinum, Alpine Moss: -on the hills on western side of the Nore.

*Lycopodium clavatum, Club Moss: -near Inistioque.

*Lycopodium Selago, Ladies' Shamrock: -in moist grounds on the banks of the Nore.

Rumex acetosa, Sorrel: -in moist meadows.

*Rumex acutus, Sharp Dock: -on clayey soils in the north.

Verbena officinalis, Vervain: -in pastures, and on road sides.

Bull. Ir. biogeog. Soc. No. 8.

WEXFORD H12

Yet uninvestigated.

CARLOW H13

Hitherto uninvestigated.

LAOIS (QUEEN'S COUNTY) H14

Yet unexplored.

GALWAY H15, H16, H17

Aquilegia vulgaris, Columbine: in woods near Clunetuescart.

Crithmum maritimum, Samphire: -in the Isles of Arran.

Cyclamen europæum, Sowbread: -at Milleek.

*Erica Daboicia, Irish Heath: -on the mountains.

Gentiana campestris, Vernal Dwarf Gentian: -on the mountains between Gort and Galway.

Juniperus communis, Juniper: -on mountains.

*Lycopodium Selago, Upright Fir-moss: -on the mountains near Galway.

*Senecio saracenicus, Broad-leaved Ragwort: -in meadows and pastures and under hedges in Pallace near Tynagh.

OFFALY (KING'S COUNTY) H18

Hypnum crispum, Curled Hypnum: -in woods, heaths, and rocks.

*Melittis Melissophyllum, Bastard Balm: -in woods and hedges.

Pinus sylvestris, Scotch Fir: -in woods in various parts.

Pyrola rotundifolia, Wintergreen: -in a bog near Dunkerrin.

Bull. Ir. biogeog. Soc. No. 8.

KILDARE H19

Narthecium ossifragum, Lancashire or Bastard Asphodel: -in turfy bogs.

Pinguicula vulgaris, Butterwort, or Yorkshire Sanicle: -in pastures near Barberstown.

Samolus Valerandi, Round-leaved Water Pimpernel: -in marshes and moist meadows, at Monasterevan.

WICKLOW H20

Asplenium Trichomanes, English black Maiden-hair: -on rocks.

*Hieracium paludosum, Succory-leaved Hawkweed: -on the Mountain of the Three Rocks.

Juniperus communis, Juniper: -on mountains.

*Pulmonaria maritima, Sea Bugloss: -on the Meneagh of Wicklow.

*Saxifraga umbrosa, London Pride, or None-so-pretty: -on mountains.

*Silene amaena, Sea Champion: -among stones near the sea.

DUBLIN H21

Agaricus alneus, Alder Agaric: -in woods.

Alchemilla vulgaris, Common Ladies Mantle: -in Closes between Glassmanogue and Finglass.

*Alisma Damasonium, Star-headed Water Plantain: -in a pasture near Temple-ogue in Dublin.

Allium vineale, Crow Garlic: -above Island Bridge, and in some meadows near Bally Griffin, in Fingall.

Anthyllis vulneraria, Kidney Vetch or Ladies Finger: -on dry hillocks near the the Bay.

*Asperula odorata, Woodroof: -among bushes between Ropers Rest and Mount Jerom.

Asplenium Ruta muraria, White Maiden-hair, or Wall Rue: - at Tallagh Castle and Ball's Bridge.

Aster Tripolium, Sea Starwort: -under the Black Rock.

Brassica oleracea sylvestris, Sea Cabbage: -on sea cliffs.

Chrysanthemum segetum, Corn Marygold: -near Iniscree Hill and in Patrick's Well Lane, Dublin.

DUBLIN H21 (Contd./...)

Chrysosplenium oppositifolium, Common Golden Saxifrage: -near Harold's Cross.

Cochlearia anglica, Sea Scurvy-grass: -among the short grass below the
Black Rock.

Cochlearia danica, Danish Scurvy-grass: -near Ringsend.

Cochlearia officinalis, Garden Scurvy-grass: -on the coast.

*Cotyledon Umbilicus Veneris, Navel-wort, Kidney-wort, or Wall Penny-wort:

-on old buildings at Mitchel's-town and on the wall of a ruined Church
at Lucan.

Crambs maritima, Sea Colewort: -on the sea beach near Dunleary.

*Drosera longifolia, Long-leaved Sundew: -near Edenderry.

Empetrum nigrum, Black-berried Heath, Crow or Crake berries; -on mountainous
heaths.

Erigeron acre, Blue-flowered Flea-bane: -in a dry hilly pasture facing the
huts at the Black Rock.

Eryngium maritimum, Sea Holly or Eryngo: -Dublin.

Erysimum cheiranthoides, Treacle Wormseed: -about Temple-oge.

Euphorbia hyberna, Knotty-rooted Spurge: -on mountainous districts.

*Euphorbia paralia, Sea Spurge: -on the sandy shore between the Warren House
and Raheny.

*Fucus palmatus, Handed Fucus: -on rocks about Dalkey Island.

Geranium sanguineum, Bloody Crane's-bill: -in a close near Simon's Court.

Glaux maritima, Sea Milkwort or Black Salt-wort: -above Bally-bough Bridge
near the rivulet.

Hieracium murorum, French or Golden Lungwort: -under a hedge on Iniscore Hill.

Lathræa Squamaria, Toothwort: -on the sea shore between Dunleary and Newton.

*Linum perenne, Perennial Blue-flax: -on the lands of Simon's-court.

*Lysimachia tenella, Purple Money-wort: -in a rotten spongy pasture beyond
Simon's-court and at Rathfarnham.

Lithospermum officinale, Gromwell: -at Iniscore Hills and above Palmerstown
Mills.

Lycopodium clavatum, Common Club-moss: -on mountains.

Narcissus Pseudo-narcissus, Daffodil: -in closes near Clontarf, the Hill of
Howth, and near Doulack's Well.

Ophioglossum vulgatum, Adders-tongue: -in moist places.

*Orchis pyramidalis, Purple Lake-flowering Orchis: -on dry sea banks between
Newtown and Dunleary.

Bull. Ir. biogeog. Soc. No. 8.

DUBLIN H21 (Contd./...)

Ornithogalum luteum, Yellow Star of Bethlehem: -in a low meadow between
Finglass Bridge and Drumcondra.

*Osmunda Lunaria, Moonwort: -on the hills, and in the pastures of Palmerstown.

Polemonium caeruleum, Great Valerian: -at Rathfarnam.

Rosa spinosissima, Pimpernel or Burnet Rose: -on the edge of the brow at
Black Rock, and near Raheny Mills.

*Salsola fruticosa, Shrub Stone-crop or Glass-wort: -in Clontarf Island.

Salsola Kali, Prickly Glasswort: -near the Black Rock.

Samolus Valerandi, Round-leaved Water Pimpernel: - near Dalkey.

Scilla verna, Vernal Star Hyacinth: -in meadows and pastures, and near
Temple-oge.

*Statice Armeria, Thrift or Sea July Flower: -between the Black Rock and
Dunleary.

*Viola grandiflora, Yellow Violet or Pansies: -on the Hill of Howth.

MEATH (EASTMEATH) H22

Drosera anglica, Great Sundew: -on a bog near Isaac-tower.

Nymphaea alba, White Water Lily: -in the Boyne and other rivers.

WESTMEATH H23

A virgin field; but promising great variety of aquatics.

LONGFORD H24

Inula Helenium, Elecampane: -in meadows.

*Lichen herbaceus, Green Lichen: -on ash-trees.

Oenanthe crocata, Hemlock Dropwort: -in marshy grounds.

ROSCOMMON H25

Aristolochia Clematis, Climbing Birthwort: -in the woods of Briole near
Athlone.

Bull. Ir. biogoeg. Soc. No. 8.

ROSCOMMON H25 (Contd./...)

Cyclamen europaeum, Sowbread: -near Mount Talbot.

MAYO H26, H27

Requires a scientific explorer.

SLIGO H28

Dryas octopetala, Mountain Avens: -on the mountains.

Saxifraga umbrosa, London Pride: -in the hilly districts.

LEITRIM H29

Cyclamen europaeum, Sowbread: -in various places.

CAVAN H30

Cicuta virosa, Long-leaved Water Hemlock: -in watery places.

Myrica Gale, Gale, Sweet Willow, or Dutch Myrtle: -near rivers.

Spergula arvensis, Small Spurrey: -in sandy places.

LOUTH H31

Artemisia maritima β , a variety of Sea Wormwood: -on sea-shore.

*Bunias Cakile, Sea Rocket: -on the sands near Maiden Tower near Drogheda.

Cuscuta europaea, Dodder: -on dry sandy banks near Maiden Tower near Drogheda.

Lepidium ruderales, Narrow-leaved Wild Cress, or Dittander; near the sea.

Salicornia europaea herbacea, Jointed Glasswort: -on the sea shore.

Sambucus nigra, Elder: -in hedges.

Saponaria officinalis, Soapwort: -in ditches.

Bull. Ir. biogeog. Soc. No. 8.

MONAGHAN H32

Rich in aquatic plants generally, and in alpine plants on the Slievebaught or Slabay range of mountains, bordering Tyrone.

FERMANAGH H33

*Bryum flexuosum, Soft Bryum: -on rocks.

Cicuta virosa, Long-leaved Water Hemlock: -in watery places and rivers,
in Fermanagh.

*Serapias latifolia: -a variety of broad-leaved Bastard Hellebore: in
woods and hedges.

Vaccinium Myrtilus, Black Whorts, Whortle-berries, or Billberries: -
on heaths and in woods.

DONEGAL (DONNEGAL) H34 and H35

Galium boreale, Crosswort Madder: -in mountainous meadows.

Gnaphalium sylvaticum, Upright Cudweed: -in sandy pastures and woods.

TYRONE H36

Agrostis canina, Brown Bent Grass: -in very wet meadows in northern parts.

*Aira caespitosa, Turfy Bent Grass: -in the mountainous district near
Strabane.

*Astragalus glycyphyllos, Liquorice Vetch: -in upland pastures.

Achillea Millefolium, Yarrow: -on river sides.

Crepis biennis, Rough Hawk's-beard: -in meadows.

Erica cinerea, Fine Heath: -on moorlands.

*Eriophoron polystachion, Cotton Grass: -in wet meadows.

ARMAGH H37

Colchicum autumnale, Meadow Saffron: -on the borders of the Blackwater and
Callen rivers.

Euphrasia, Eyebright: -in low grounds near the Lough.

Bull. Ir. biogeog. Soc. No. 8.

ARMAGH H37 (Contd./...)

Hippuris, Marestail: -at the mouth of the Bann.

Iris, or Flag: -on the banks of the river Callen.

Lobelia Dortmanna, Water Gladiole: -in Lough Neagh.

Mentha aquatica, Water Mint: -common in low grounds.

Menyanthes, Purple Buckbean: -beautiful specimens in various places.

Nymphaea, Water Lily (White and Yellow): -on the borders of Lough Neagh,
and in muddy ditches.

Parnassia, Grass of Parnassus: -on Tynan river.

*Phellandrium aquaticum: -on the banks of Cushier and Blackwater rivers.

Potamogeton natans, Pondweed: -in stagnant waters near Lough Neagh.

Ranunculus, Crowfoot: -in the marshy grounds.

Scrophularia aquatica, Water Figwort: -on the banks of Newry Water.

*Senecio paludosus, Bird's Tongue: -in low marshes.

Subularia aquatica, Awlwort: -under the water in Lough Neagh.

Thalictrum flavum, Meadow Rue: -on the lake side near summit of Slieve Gullien.

Typha angustifolia, Narrow-leaved Catstail: -very common.

DOWN H38

Asplenium Adiantum nigrum, Black Maidenhair: -on the mountains of Mourne.

*Fucus Esculentus, Broad esculent Sea Wrack: -on sub-marine rocks and stones.

Galega officinalis, (Linn.) Goat's Rue: -in the western parts.

Juniperus communis, Common Juniper: -on Mourne and Scraba.

Juniperus Sabina, Savine: -on the Mourne mountains.

*Lycopodium alpinum, Mountain Club Moss: -in the Mourne district.

*Lycopodium clavatum, Common Club-moss: -on the Mourne mountains.

Nymphaea alba, White Water Lily: -among the lakes in the western parts.

*Orobus sylvaticus, Bitter Vetch: -in woods and hedges near Rosstrevor.

Pyrola rotundifolia, Winter-green: -on Scraba.

*Scrapias longifolia y, a variety of White-flowered Bastard Hellebore: -on a
rotten bog by a lough side near Ballinahinch.

Teucrium Scordium, Water Germander: -in marshy places about Granshaw.

*Valantia cruciata, Crosswort: -among the rubbish of the Cathedral of
Downpatrick.

Bull. Ir. biogeog. Soc. No. 8.

ANTRIM H39

Alopecurus pratensis: -in the levels near Lough Neagh.

Dactylis glomerata, Cock's foot Grass: -meadows near Lisburn.

*Festuca fluitans, Float Fescue: -bogs and wet grounds in the s. and w. parts of the county.

Holcus lanatus, White Grass: -springs up in turf bogs.

Phleum pratense, Timothy Grass: -Castle Dobbs and Island Magee.

Plantago, Narrow-leaved Plantain: -to be met with in every field or meadow.

Poa aquatica: -in the wettest bogs, where only it will grow.

Rhinanthus, Yellow Rattle: -on dry soils.

LONDONDERRY H40

Agrostis stolonifera, Florin-grass, called in England Joint-grass.

Anthoxanthum odoratum, Sweet Vernal-grass: -in woods and coarse grounds.

Alopecurus geniculatus, Flute Foxtail: -in wet grounds.

*Arundo arenaria, Sea Reed: -on the shores.

*Alchemilla vulgaris, Ladies Mantle: -a plant of great elegance in high pastures.

Achillea Millefolium, Yarrow: -in pastures on the banks of the Fahan.

Angelica sylvestris, Wild Angelica: -an aromatic plant in woods and moist hedges.

*Arenaria peploides, Sea Sand-wort: -an elegant plant, abounding on the coast.

Borago officinalis, Borage: -on the banks of the Bann.

Caltha palustris, Marsh-Marigold: -in most parts.

Campanula rotundifolia, Round-leaved Bell-flower: -on the barren pastures near Downhill.

*Convolvulus Sepium, Great Bind-weed: -among plantations near the sea.

Digitalis purpurea, Foxglove: -very common near ditches.

Elymus arenarius, Sea Lime-grass: -on sandy grounds near the sea.

Epilobium angustifolium, Rosebay Willow-herb: -in hedges.

Erica cinerea, Fine Heath: -on moors and wastes.

*Erica multiflora, Fir-leaved Heath: -on Magilligan Mountains.

*Festuca elatior, Tall Fescue-grass: -in the woods of Aghanloo.

Galium palustre, White Ladies Bed-straw: -in moist meadows, and on the banks of the Bann.

Bull. Ir. biogeog. Soc. No. 8.

LONDONDERRY H40 (Contd./...)

Hypericum pulchrum, Upright St. John's Wort: -an elegant plant in woods and
glens.

Iris Pseud-acorus, Common Flag: -a beautiful species in boggy meadows.

*Leontodon Taraxacum, Dandelion: -in pastures.

Lychnis Flos Cuculi, Meadow Pink: -in low meadows at Aghanloo.

Melica uniflora, Single wood-grass: -in wet wooded grounds.

Melampyrum sylvaticum, Wood Cow-weed: -in oakwoods.

Nymphaea alba, White Water-lily: -in lakes and rivers.

*Orchis Satyrion, Orchis: -all the varieties to be found in high grounds and
wet meadows.

Parnassia palustris, Grass of Parnassus: -in wet grounds.

Potentilla anserina, Silver Weed: -in dry pastures and meadows.

Ranunculus Flammula, Crowfoot: -in wet meadows.

Saponaria officinalis, Soap-wort: -in dry ditches, but rare.

Tanacetum vulgare, Yellow Tansey: -in the river Roe, and sandy ditches in
Drumbane.

*Trifolium alpestre, Long-leaved Trefoil: -amongst the romantic fallen rocks
of Bengevenogh.

*Veronica maritima, Sea Speedwell: -several varieties on the coast.

Viola odorata, Sweet Violet: -under hedges, bushes &c.

Zostera marina, Grass-wrack: -on shallow beaches.

APPENDIX 2: UPDATED NAMES

KERRY H1 and H2

Ceterach officinarum DC; Astragalus danicus Retz. (No doubt some error' -
Scully); Halimione portulacoides (L.) Aellen; Atriplex littoralis L.; Arabis
stricta Huds. (Scully suggested Arabidopsis thaliana (L.) Heynh.); Matthiola
sinuata R. Br.; Suaeda maritima (L.) Dumort; Senecio integrifolius (L.)
Clairv. (Scully said, 'no doubt some mistake'); Senecio palustris (L.)
Hook. ('perhaps S. aquaticus was meant'); Sorbus aria agg.; Silene acaulis
(L.) Jacq. Galeopsis? versicolor ('probably refers to G. tetrahit' - Scully);
Erodium maritimum (L.) L'Hérit; Erodium moschatum (L.) L'Hérit; Crepis
paludosa (L.) Moench; Pellia epiphylla (L.) Corda; Cetraria islandica (L.)
Ach; Ochrolechia tartarea Ach.; Diphasium alpinum (L.) Rothm.;

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APPENDIX 2 - KERRY H1 and H2 (Contd./...)

Lycopodium clavatum L.; Huperzia selago (L.) Bernh.; Cryptogramma crispa (L.) R.Br. ex Hooker; Picea abies (L.) Karsten; (probably P. sylvestris); Taxus baccata L. (probably the tree concerned); Lathyrus maritimus = L. japonicus Willd.; Cystopteris fragilis (L.) Bernh.; ? intended, Athyrium filix-femina (L.) Roth.; Mertensia maritima (L.) S. F. Grey; Otanthus maritimus (L.) Hoffmans & Link; Scrophularia species, ('it is impossible to determine what plant was really meant by Dr. Smith' -Scully); Sorbus rupicola (Syme) Hedl. (according to Scully this was the tree Smith intended).

CORK H3, H4 and H5

Arbutus unedo L.; Arabidopsis thaliana, (see remarks in Kerry list); Helianthemum nummularium (L.) Miller; Hypericum calycinum L.; Pinus sylvestris L. (most probably); Saxifraga spathularis Brot.

WATERFORD H6

Silene otites (L.) Wibel; Drosera intermedia Hayne; Gladiolus illyricus Koch; Peucedanum ostruthium (L.) Koch.; Filipendula ulmaria (L.) Maxim.

TIPPERARY H7 and H10

Aegopodium podagraria L.; Listera ovata (L.) R. Br.

CLARE H9

Ammophila arenaria (L.) Link; Vincetoxicum hirundinaria Med.; Senecio fluviatilis Wallr.; Filipendula ulmaria (L.) Maxim; Ajuga chamaepitys (L.) Screb.

KILKENNY H11

Diphasium alpinum (L.) Rothm.; Lycopodium clavatum L.; Huperzia selago (L.) Bern. ex Schrank & Mart; Rumex conglomeratus Murr.

Bull. Ir. biogeog. Soc. No. 8.

GALWAY H15, H16 and H17

Daboecia cantabrica (Huds.) C. Koch; Huperzia selago (L.) Bern. ex Schrank & Mart; Senecio fluviatilis Wallr.

OFFALY H18

Neckera crispa Hedw.

WICKLOW H20

Crepis paludosa (L.) Moench; Mertensia maritima (L.) S. F. Grey; Saxifraga spathularis Brot.; Silene vulgaris subsp. maritima (With.) A & D. Love.

DUBLIN H21

? Flammula alnicola Fr.; Alchemilla vulgaris sensu lato; Galium odoratum (L.) Scop.; Leucanthemum vulgare Lam.; Euphorbia paralias. L.; Rhodymenia palmata Grev.; Linum perenne L.; Anagallis tenella (L.) L.; Anacamptis pyramidalis (L.) Rich.; Gagea lutea (L.) Ker.-Gawl.; Botrychium lunaria (L.) Swartz; Sueda vera J. F. Gmelin. Armeria maritima (Mill.) Willd.; Viola tricolor subsp. curtisii (E. Forster) Syme.

LONGFORD H24

? Lichen herbaceus

SLIGO H28

Saxifraga spathularis Brot.

LOUTH H31

Cakile maritima Scop.

Bull. Ir. biogeog. Soc. No. 8.

FERMANAGH H33

Campylopus paradoxus Wils.; Epipactis ? helleborine (L.) Crantz.

TYRONE H36

Deschampsia cespitosa (L.) Beauv.; Eriophorum angustifolium Honck.

ARMAGH H37

Oenanthe aquatica (L.) Poiret

DOWN H38

Alaria esculenta Grev.; Diphasium alpinum (L.) Rothm.; Lycopodium clavatum L.; Vicia orobus DC: Cepalanthra longifolia (L.) Fritsch; Cruciata chersonensis = C. laevipes Opiz.

ANTRIM H39

Glyceria fluitans (L.) R. Br.

LONDONDERRY H40

Ammophila arenaria (L.) Link: Alchemilla vulgaris agg.: Honkenya peploides (L.) Ehrh.; Calystegia sepium (L.) R. Br.; Erica vagans L.; Festuca pratensis Huds.; Taraxacum officinale agg.; ? Platanthera chlorantha (Custer) Reichb.; Trifolium medium L.; Veronica longifolia L.

DISTRIBUTION OF IRISH INTERTIDAL TALITRIDAE

Anne V. Hudson and Julian D. Reynolds

Sandhoppers, gammarid amphipods in the family Talitridae, occur commonly around the Irish coastline. Between October 1981 and April 1983, distribution records of talitrids around Ireland were collected and mapped. Four species were found - Talitrus saltator (Montagu), Orchestia gammarellus (Pallas), O. mediterranea Costa and Talorchestia deshayesii (Audouin). Of these, O. gammarellus and T. saltator occurred most frequently and had the widest distributions. A fifth species, Talitroides dorrieni (Hunt) is associated with damp humus and decaying vegetation in Co. Galway, but is not further discussed here.

This paper presents details of intertidal sites where talitrids were collected, and also includes records from the literature. For each species the county, place, approximate grid reference, habitat, date of collection, collectors initials (where known) and reference (where applicable) are presented. References to Sea Areas in Lincoln (1979) are assigned to the county most central; e.g. 'Belfast Sea area' to Co. Down, 'Fastnet' to Kerry and 'Clyde and Argyll' to Antrim. In the last case, it is not certain that Irish records are involved. Collectors were Don Cotton (D.C.), Jeremy Dorman (J.A.D.), Jan Feenstra (J.F.), V. Gotto (V.G.), James Holahan (J.H.), Mark Holmes (J.M.C.H.), Anne Hudson (A.V.H.), Nick McCarthy (N.McC.), S., D., C. and D. Murphy (S.M.), James O'Connor (J.P.O'C), Julian Reynolds (J.D.R.), Peter Stafford (P.S.) and James Wilson (J.G.W.).

Talitrus saltator

T. saltator has been recorded from 50 sites in fourteen counties. (See Figure 1.). Large numbers were often found, in varying densities. Preferred habitats appeared to be clean beaches.

Co. Dublin (3 sites)

Portrane (02551) - shingle and seaweed. October 1981. A.V.H.

Dalkey (02726) - (Duhig, 1960).

Dublin Sea Area - (Lincoln, 1979).

Bull. Ir. biogeog. Soc. No. 8.

Co. Wicklow (3 sites)

Greystones (02913) - 1) south beach; shingle and stones and limited seaweed. October 1981 - January 1983. A.V.H. 2) north beach; shingle and stones and limited seaweed. 18.vi.1978 J.M.C.H.; 22.vii.1982, winter months 1982, A.V.H.; Mackintosh, (1884).

Brittas Bay (T3183) - 3.viii.1970. J.M.C.H.

Co. Wexford (8 sites)

Ballymoney, near Gorey (T2261) - coarse sand and some shingle, limited seaweed. 27.xi.1981. A.V.H.

Carne Beach (T1306) - 25.viii.1980. J.P.O'C.

Lady's Island Lake (T0805) - coarse sand, limited seaweed. 18.iv.1982. A.V.H.

Bastardstown, near Kilmore Quay (S9904) - sandy, much seaweed along HWM. June - August 1982. J.H.

Kilmore Quay (S9603) - 1) beach north of pier; much seaweed, sand. June - August 1982. J.H. 2) south of pier; coarse sand, stones, limited weed. June - August 1982. J.H.

The Burrows, Ballyteigue Bay, near Kilmore Quay (S9505) - sand, little seaweed. June - August 1982. J.H.

Cullenstown (S8707) - fine sand, very little seaweed. 18.iv.1982. A.V.H.

Co. Waterford (1 site)

Annestown (X4999) - fine sand and, higher up shore, shingle and drifted seaweed. 9.viii.1982. A.V.H.

Co. Cork (2 sites)

Inchydoney, near Clonakilty (W3939) - sandy, limited seaweed. 28.ix.1982. S.M.

Sherkin Island (W0326) - (Rees, 1980).

Co. Kerry (4 sites)

Ballynagall, near Dingle (Q4402) - 22.vii.1978. J.M.C.H.

Inch Strand (Q6500) - 19.vii.1978. J.M.C.H.

Ventry (Q3800) - 22.vii.1978. J.M.C.H.

Near Clohane, Brandon Bay (Q5111) - 23.vii.1978. J.M.C.H.

Bull. Ir. biogeog. Soc. No. 8.

Co. Clare (2 sites)

Fanore (M1308) - 1) sandy shore beside dunes. 14.v.1983. J.D.R. 2) stony and seaweedy stretch beside river. 14.v.1983. J.D.R.

Co. Galway (1 site)

Inishmore, Aran Island (L8808) - east beach; sand and occasional stones, very limited seaweed. 17.vi.1982. J.D.R.

Co. Mayo (3 sites)

Clare Island area (L6886) - (Southern, 1915).

Achill (F0070) - April 1898.

Mayo Sea Area - (Lincoln, 1979).

Co. Sligo (2 sites)

Cullenamore (G6134) - sandy estuary mouth with some rocks and attached seaweed. February 1983. D.C.

Lissadell (G6144) - (Patterson, 1904).

Co. Donegal (7 sites)

Tory Island (B8546) - (Tattersall, 1910).

Port-na-Blagh (C0637) - 07.vi.1980. J.M.C.H.

Horn Head (C0142) - (Tattersall, 1910).

Mulroy Bay (C1644) - small, extremely clean beach, coarse sand. July 1982.

J.F.

Culadaff Bay (C5350) - (MacDonald, 1952).

Malin Head (C3859) - (MacDonald, 1952).

North Donegal Sea Area - (Rees, 1939), (Lincoln, 1979).

Co. Londonderry (2 sites)

Coolkeeragh (C4822) - Bate and Westwood (in MacDonald, 1953).

Lough Foyle - (MacDonald, 1951b).

Bull. Ir. biogeog. Soc. No. 8.

Co. Antrim (3 sites)

Ballycastle (D1341) - R. Welch.

Carrickfergus (J4188) - Kinahan (in MacDonald, 1951a, 1953).

Berfast Sea Area - (Lincoln, 1979).

Co. Down (9 sites)

Belfast Lough - (Williams, 1954).

Belfast Bay - Kinahan (in MacDonald, 1945).

Cultra (J4181) - Bate & Westwood (in MacDonald, 1945).

Crawfordsburn (J4782) - Kinahan (in MacDonald, 1945, 1951a; Williams, 1954).

Groomsport (J5384) - Kinahan (in MacDonald, 1945; Williams, 1954).

Millisle (J6076) - (MacDonald, 1945).

Newcastle (J6554) - Kinahan (in MacDonald, 1945; Williams, 1954).

Benderg Bay, near Millquarter Bay (J6044) - abundant under dead seaweed near
HWM. (Williams, 1954).

Dundrum Bay (J4236) - (Anderson, 1978).

Orchestia gammarellus

O. gammarellus has been recorded from 86 sites in fourteen maritime counties, with no obvious concentration or trend. (See Figure 1.) Typically, large numbers were found to occur at most collection sites and densities of these talitrids were often high.

Co. Meath (1 site)

Mornington (O1476) - June 1894, (Walker, 1898).

Co. Dublin (15 sites)

Skerries (O2561) - under seaweed in sand. Some stones present. October 1982.
A.V.H.

Rush (O2754) - stony with seaweed. October 1981, 1982. A.V.H.

Lambay (O3150) - April 1906. A.R. Nichols; W.L. Praeger.

Portrane (O2551) - fine sand with seaweed. October 1981. A.V.H.

Malahide Estuary (O1947) - (Walker, 1898).

Malahide (O2246) - (Halbert, 1920).

Bull. Ir. biogeog. Soc. No. 8.

- Portmarnock (02442) - November 1893. R.F. Scharff. (Walker, 1898)
Howth (02838) - sandy with seaweed. November 1981. A.V.H.
Bull Island (02237) - muddy sand, some stones, limited seaweed. November
1981. A.V.H.
Dublin - no site named. Thompson (in Bate and Westwood, 1863).
Dublin Sea Area - (Lincoln, 1979).
Sandymount (01933) - muddy, limited seaweed on stones. 16.iv.1978, J.M.C.H.
and 13.ix.1982, A.V.H.
Dun Laoghaire (02429) - stones and seaweed. July 1982. A.V.H.
Sandy Cove (02528) - fine sand and much drifted seaweed. 5.ix.1978, J.M.C.H.
and July 1982 A.V.H.
Dalkey (02726) - (Duhig, 1960).

Co. Wicklow (5 sites)

- Bray (02729) - sand with seaweed and some stones. September 1981. A.V.H.
Greystones (02913) - 1) stone and shingle beach just north of harbour; sand
and stones beneath seaweed (sand 7-15 cm beneath stones). 22.vii.1982.
A.V.H. 2) harbour; piles of seaweed and rotting vegetation and
debris overlying fine sand. October & December 1982, January 1983.
A.V.H.
Newcastle (03104) - 8.xi.1981. J.M.C.H.
Broadlough (T3197) - estuarine reed bed, muddy substrate, September 1982.
A.V.H.

Co. Wexford (4 sites)

- Rosslare Beach (T0918) - 13.v.1981. J.P.O.C.
Great Saltee Island (X9597) - 1) landing site; fine sand, much drifted seaweed.
29.vi.1982. A.V.H. 2) 8 m up cliff, south of island; under stones
overlying clay/sand, with sea grass and thrift nearby, 29.vi.1982.
A.V.H.
Lady's Island Lake (T0805) - (Healy, Bates and McGrath, 1982).

Co. Waterford (4 sites)

- Annestown (X4999) - fine sand and, higher up the shore, shingle and
drifted seaweed. 6.xii.1981, 21.vii.1982, 8.viii.1982. A.V.H.
Benvoy (X4898) - fine sand and shingle with much seaweed. 6.xii.1981,
26.iii.1982, 22.vii.1982, 9.viii.1982, 1.xi.1982, A.V.H.

Bull. Ir. biogeog. Soc. No. 8.

Bonmahon (X4398) - muddy river estuary; in tidal region of R. Mahon, along river edge among grass. 20.vii.1982. A.V.H.

Dungarvan (X2694) - 2.xii.1978. J.G.W.

Co. Cork (12 sites)

Courtmacsherry (W5243) - sand and seaweed drifted along HWM. 4.x.1982. J.A.D.
Ring, near Clonakilty (W4140) - 6.ix.1970. J.M.C.H.

Donore Strand, near Clonakilty (W3841) - 3.ix.1970. J.M.C.H.

Dineen and Coolmane Strands, near Clonakilty (W3936) - 6.ix.1970. J.M.C.H.

L. Ine (W0928) - 8 - 9.vii.1977 and 8.vii.1980. J.M.C.H. (Holmes, 1980).

Baltimore (W0427) - muddy sand with some stones, limited seaweed. 16.vi.1982. A.V.H.

Sherkin Island (W0326) - 1) Harbour; on stones with sand 10 - 15 cm beneath stones, limited seaweed. 9.vi.1982. A.V.H. 2) south of island; muddy sand with little seaweed. 9.vi.1982. A.V.H. and Rees (1980).

Bantry Bay - A.R.C. Newburgh 1892 (Walker, 1898).

Templenoë, near Kenmare (V8469) 10.ix.1970. J.M.C.H.

Cork Sea Area - (Lincoln, 1979).

Co. Kerry (2 sites)

Fenit Island (W4139) - sandy beach with seaweed. January 1983. N.McC.

Fastnet Sea Area - (Lincoln, 1979).

Co. Limerick (3 sites)

Foynes Island (R2553) - 1) sandy/muddy beach covered with drifted Enteromorpha and Ulva. August 1981, August, November & December, 1982. J.D.R. 2) sandy/stony beach with much drifted vegetation. August 1981, August, November & December 1982. J.D.R.

Aughinish Island, Shannon (R2853) - (O'Sullivan, 1983).

Co. Mayo (9 sites)

Rossroe Pier, near Killary Harbour (L7765) - deep piles of seaweed and decaying vegetation overlying sand. 2.viii.1982. A.V.H.

Clare Island (L6886) - (Tattersall, 1913), (Southern, 1915).

The Bill, Clare Island (L6886) - (Praeger, 1915).

Newport (L9795) - sand and much seaweed. September 1982. A.V.H.

Lough Furnace (L9797) - 15.x.1970. J.M.C.H.

The Bill Rocks (L5594) - (Halbert, 1920).

Bull. Ir. biogeog. Soc. No. 8.

Achill Island (F0070) - E. Williams, 1898.

Blacksod Bay (F1865) - (Farran, 1915).

Mayo Sea Area - (Lincoln, 1979).

Co. Sligo (4 sites)

Cullenamore, near Strandhill (G6134) - sandy estuary mouth with some rocks and attached seaweed. 11.ii.1983. D.C.

Sligo Bay, near Lissadell (G6144) - beneath stones and seaweed on shingle beach. 11.ii.1983. D.C.

Lissadell (G6144) - (Patterson, 1904).

Inishmurray (G5754) - R. Welch, 1900.

Co. Donegal (4 sites)

Rossnowlagh Lower (G8668) - 11.ii.1983. D.C.

Donegal Town (G9378) - August 1978. Health Inspector.

Tory Island (B8546) - 12.vii.1910. R. Welch (Tattersall, 1910).

Horn Head (C0142) - September 1908. R. Welch (Tattersall, 1910).

Co. Londonderry (2 sites)

Lough Foyle - (MacDonald, 1951b).

Coolkeeragh (C4822) - (MacDonald, 1953).

Co. Antrim (5 sites)

Maidens (D1345) - (MacDonald, 1953).

Larne (D0242) - (MacDonald, 1953).

Islandmagee (J9845) - (Macdonald, 1953).

Carrickfergus (J4188) - Kinahan (MacDonald, 1951a, 1953).

Strandtown, Belfast - W.H. Patterson.

Co. Down (20 sites)

Belfast Lough - (Williams, 1954).

Belfast Sea Area - (Lincoln, 1979).

Crawfordsburn (J4782) Kinahan (MacDonald, 1951a; Williams, 1954).

Carnlea (J4682) - (MacDonald, 1951a; MacCarten and Slinn, 1953; Williams, 1954).

Groomsport (J5384) - Kinahan (MacDonald, 1951a; Williams, 1954).

Orlock (J5684) - (MacDonald, 1951a; Williams, 1954).

Bull. Ir. biogeog. Soc. No. 8.

- Lighthouse Island, Copeland Island (J5986) - 21.v.1939. R. Macdonald,
Williams (1954).
- Mew Island (J6086) - (Williams, 1954).
- Cloughy (J6457) - (Williams, 1954).
- Kearney Point (J6552) - exposed beach, under seaweed on shingle. 11.x.1982.
J.A.D.
- Ballyquintin Point (J6346) - exposed beach, under seaweed on shingle.
10.x.1982. P.S.
- Strangford Lough - (Williams, 1954).
- Portaferry (J5991) - sheltered beach, high up on shingle beach under stones,
some weed. 11.x.1982. J.A.D.
- Newtownards (J5073) - summer months 1982. V.G.
- Island Taggart (J5355) - (MacDonald, 1951b; Williams, 1954).
- Kilchief (J6046) - (MacDonald, 1951a; Williams 1954).
- Barr Hall Bay (J6246) - (MacDonald, 1951a).
- Ardglass Harbour (J5737) - (MacDonald, 1939).
- Rossglass (J5235) - (Williams, 1954).
- Ballycoulter - (MacDonald, 1939).

Orchestia mediterranea

O. mediterranea has been reported from 21 sites in eight counties, as follows:
(See Figure 1.) It occurred in moderate numbers but densities were not as
high as for O. gammarellus.

Co. Dublin (4 sites)

- Skerries (O2561) - sand, some stones and seaweed. Found lower down the
intertidal zone than O. gammarellus. October 1981. A.V.H. Winter
months 1981 - 1982. J.H.
- Portmarnock (O2442) - November 1893. R. F. Scharff. (Walker, 1898).
- Dublin Bay - Kinahan (in Bate, 1862).
- Dublin Sea Area - (Lincoln, 1979).

Co. Cork (4 sites)

- Lough Ine (W0928) - 12.x.1979 and 8.vii.1980. J.M.C.H.
- Baltimore (W0427) - muddy sand, some stones, limited seaweed. 16.vi.1982.
A.V.H.

Bull. Ir. biogeog. Soc. No. 8.

Sherkin Island (W0326) - 1) harbour; shingle and some seaweed overlying
sand. 9.vi.1982. A.V.H. 2) Narrows, Kinnish Harbour.
3.vii.1980. J.M.C.H.

Co. Kerry (1 site)

Fastnet Sea Area - (Lincoln, 1979).

Co. Galway (1 site)

Salthill (M2824) - 10.iv.1983. J.M.C.H.

Co. Mayo (1 site)

Mayo Sea Area - (Lincoln, 1979).

Co. Donegal (1 site)

Horn Head (C0142) - September 1908. R. Welch (in Tattersall, 1910).

Co. Londonderry (1 site)

Lough Foyle - (MacDonald, 1951b).

Co. Antrim (4 sites)

Larne (D0240) - Kinahan (in MacDonald, 1953).

Carrickfergus (J4188) - Kinahan (in MacDonald, 1951a, 1953).

Greenisland (J3885) - (MacDonald, 1947, 1951a).

Clyde & Argyll Sea Area - (Lincoln, 1979).

Co. Down (5 sites)

Belfast Lough - Kinahan (in MacDonald, 1945; Williams, 1954).

Belfast Sea Area - (Lincoln, 1979).

Groomsport (J5384) - (MacDonald, 1945; Williams, 1954).

Killough (J5437) - (MacDonald, 1945; Williams, 1954).

Strangford Lough - Bate and Westwood (in MacDonald, 1951a).

Bull. Ir. biogeog. Soc. No. 8.

Talorchestia deshayesii

T. deshayesii has been recorded from 20 sites in ten maritime counties, but was not found to occur in large numbers throughout the duration of this project. (See Figure 1).

Co. Dublin (4 sites)

Rush (O2754) - fine sand with seaweed. October 1981, November 1982. A.V.H.
Howth (O2838) - sandy with seaweed. November 1981. A.V.H.
Dalkey (O2726) - (Duhig, 1960).
Dublin Sea Area - (Lincoln, 1979).

Co. Wicklow (1 site)

Greystones (O2913) - south beach; shingle, limited seaweed. 16.vi.1978.
J.M.C.H. April - September 1982. A.V.H.

Co. Wexford (2 sites)

Kilmore Quay (S9603) - south of pier; coarse sand, limited seaweed, some stones. June - August 1982. J.H.
Bastardstown (S9904) - sandy, much seaweed along HWM. June - August 1982.
J.H.

Co. Waterford (1 site)

Benvoy (X4898) - fine sand, but shingle along west end of beach, much seaweed.
26.iii.1982, 9.viii.1982, 1.xi.1982. A.V.H.

Co. Cork (2 sites)

Courtmacsherry (W5243) - sand, beneath seaweed along HWM. 4.x.1982. J.A.D.
Sherkin Island (W0326) - (Rees, 1980).

Co. Kerry (2 sites)

Fenit Island (W4139) - sandy beach, seaweed. January 1983. N.Mc.C.
Inch Strand, Dingle Bay (Q4402) - 19.vii.1978. J.M.C.H.

Bull. Ir. biogeog. Soc. No. 8.

Co. Clare (1 site)

Fanore Strand (M1308) - stoney and seaweedy stretch beside river.

14.v.1983. J.D.R.

Co. Sligo (2 sites)

Cullenamore, near Strandhill (G6143) - sandy estuary mouth with some rocks
and attached seaweed. February 1983. D.C.

Lissadell (G6144) - (Patterson, 1904).

Co. Antrim (2 sites)

Carrickfergus (J4188) - Kinahan (in Bate 1862; MacDonald, 1951a, 1953).

Clyde & Argyll Sea Area - (Lincoln, 1979).

Co. Down (4 sites)

Belfast Sea Area - (Lincoln, 1979)

Crawfordsburn (J4782) - Kinahan (in MacDonald, 1951a, 1945; Williams, 1954).

Cranfield (J2710) - (MacDonald, 1951c)

Near Portaferry (J5951) - exposed beach. 12.iii.1971. J.M.C.H.

DISCUSSION

Talitrid sandhoppers have been identified from 156 intertidal sites in 16 maritime Irish counties. Only Louth and Leitrim have not been surveyed. New published county records are as follows:

T. saltator: Wicklow, Wexford, Waterford, Kerry, Clare, Galway.

O. gammarellus: Wicklow, Waterford, Kerry.

O. mediterranea: Galway.

T. deshayesii: Wicklow, Wexford, Waterford, Kerry, Clare.

There appears to be little overlap in species occurrence. Twenty seven cases were noted, and where several species were recorded from one area, the named site was usually ill-defined or diverse (e.g. Sherkin Island; Carrickfergus; Belfast Lough); these probably include several distinct habitats. Other instances of overlap were in well-worked sites, such as Greystones or Benvoy, where occasional specimens of a second species may turn up in large samples.

Bull. Ir. biogeog. Soc. No. 8.

The ecological notes (summarised from details in Hudson (1983)), suggest that habitat preferences may effectively segregate the species in most instances. O. gammarellus has a broad spectrum of habitats and occurs in most coastal counties except Clare and Galway - a gap which may be filled by further collecting. T. saltator appears to prefer beaches with relatively little drifted seaweed (although there are exceptions, such as the north beach at Kilmore Quay pier) and is evenly distributed around the coast wherever these conditions occur. T. deshayesii was taken in somewhat similar habitats, but most often on east and south coasts, while O. mediterranea is scattered around the coast where muddy-sandy conditions predominate. It appears to be absent from the south-east (chiefly clean sand beaches) and occurs lower in the intertidal zone than the other species.

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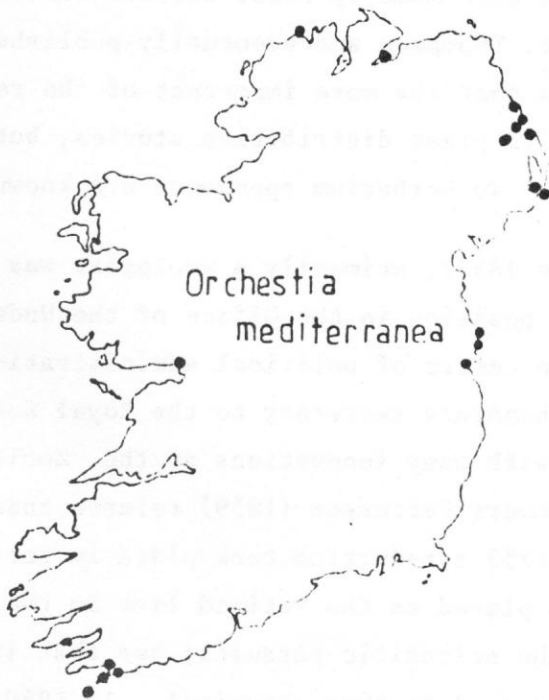
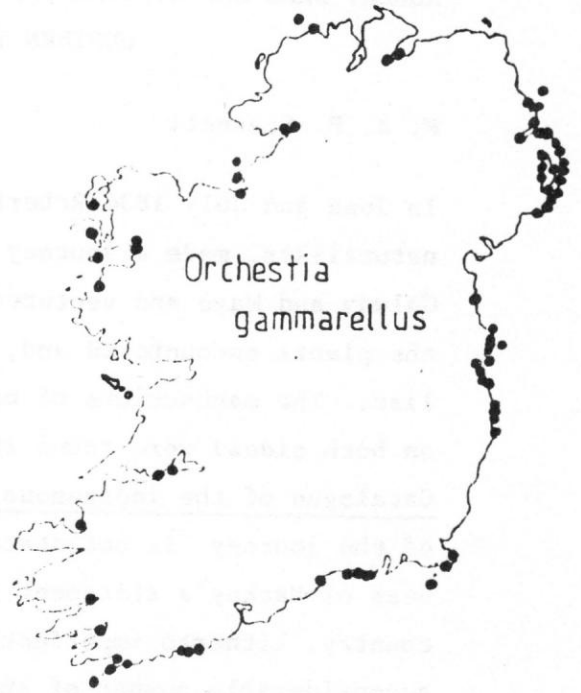
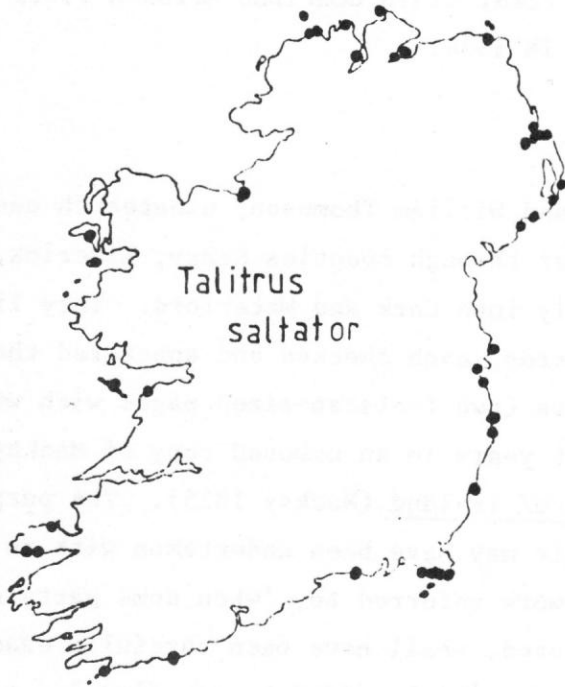
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FIGURE 1: Distribution of four talitrid species around the Irish coastline.



Bull. Ir. biogeog. Soc. No. 8.

ROBERT BALL AND WILLIAM THOMPSON - PLANT LISTS COMPILED AFTER A VISIT TO
WESTERN IRELAND IN 1834.

M. J. P. Scannell

In June and July 1834 Robert Ball and William Thompson, nineteenth century naturalists, made a journey together through counties Kerry, Limerick, Clare, Galway and Mayo and ventured briefly into Cork and Waterford. They listed the plants encountered and, afterwards, each checked and annotated the others list. The manuscripts of both lists (two foolscap-sized pages with writing on both sides) were found in recent years in an unbound copy of Mackay's Catalogue of the indigenous plants of Ireland (Mackay 1825). The purpose of the journey is not stated but it may have been undertaken with an awareness of Mackay's statement in the work referred to, 'when some parts of the country, hitherto imperfectly explored, shall have been carefully examined, a considerable number of species may still be added to our flora' - a reference to Mackay's proposed Flora Hibernica. No narrative of the journey was published, at any rate not in the botanic literature, although Patterson (1859) stated, 'In June 1834 he (Robert Ball) enjoyed a holiday excursion to Arran (sic) visiting, before his return to town, Killarney, Cork and Youghal. Many observations then made by these brother naturalists and friends were duly recorded by Mr. Thompson and eventually published'. A perusal of floristic works reveals that the more important of the records were conveyed to those then engaged in plant distribution studies, but the complete lists were never published. No herbarium specimens are known.

Robert Ball (b. Cobh 1802, d. Dublin 1857), primarily a zoologist was aged 32 at the time of the tour. He held a position in the Office of the Under Secretary at Dublin Castle, then the centre of political administration in Ireland. In 1837 he was appointed honorary secretary to the Royal Zoological Society of Ireland and is credited with many innovations at the Zoological Gardens. Concerning Robert Ball, Robert Patterson (1859) related that 'after 25 years public service..... in 1852 a reduction took place in the Chief Secretary's Office and Mr. Ball was placed on the retired list on the grounds that he devoted much attention to the scientific pursuits; and that it was not expedient that public servants should be thus occupied'. In 1850 Ball was awarded with the degree of Ll.D. by Trinity College Dublin (Praeger 1949).

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William Thompson (b. Belfast 1805, d. London 1852), the son of a Belfast linen merchant was himself engaged in the linen business. In 1827 he wrote his first scientific paper, 'The birds of the Copeland Islands'. He published three volumes of the Natural History of Ireland (1849-1851), the fourth volume was published in 1856 after his death. Primarily a zoologist, Thompson contributed plant records to the Flora of Ulster (Dickie 1864). He was aged 29 at the time of the tour.

The reference work carried on the journey by the naturalists was, in all probability, The Irish Flora, a pocket book published in 1833 and attributed to Lady Kane (Miss Sophia Baily). The travellers noted Poa compressa L. on a 'mud wall near Tuam' - a record first made by John White the Glasnevin gardener who contributed many records to the flora mentioned (Praeger loc. cit.).

Praeger (1909), writing of field studies in the 1830's made the following comment, 'local botany was by this time attracting considerable attention, and henceforth discoveries were announced in fairly rapid succession. William Thompson.... and Robert Ball visiting the Aran islands in 1834 obtained Astragalus danicus and Allium babingtonii....'. Flora Hibernica (Mackay 1836) includes A. danicus Retz. as, 'Astragalus hypoglottis L. On the largest of the south Islands of Arran; Messrs. R. Ball and Wm. Thompson, in 1804 (sic), the only place in Ireland where it has been found'. Mackay (loc. cit.) lists 'Allium arenarium L. Sand garlic. South Isles of Arran: Messrs Thompson & Ball'. In the literature A. arenarium Smith is equated with A. scordoprasum L. - a species not native in Ireland, and probably introduced. Ball however cites no authority.

Subsequent floristic works make the following comments, Cybele Hibernica (1866) lists A. ursinum L. Ramsons and states 'Obs. - A. arenarium and A. carinatum of Flora Hibernica are believed to be both A. vineale'. Cybele Hibernica (1898) states under A. babingtonii Borrer, 'In the South Isles of Arran (Messrs. Thompson & Ball): Flor. Hib. (as A. arenarium)'. Webb & Scannell (1983), under A. babingtonii Borrer quote from Borrer of 1849, '.... Mr. W. Mac Calla having found it near Roundstone, Galway, and in the South Isles of Arran' - as the first record. Webb & Scannell (loc. cit.) add, 'several earlier authors had reported from Aran plants which might have been this species, but under erroneous or ambiguous names!'

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Flora Hibernica recorded other Ball and Thompson records, as, Chlora perfoliata (= Blackstonia perfoliata), Pinguicula lusitanica, Orobanche minor and others. Newman (1844), recorded Ophioglossum vulgatum and noted, 'Mr. Thompson, in company with Mr. Ball, found adder's tongue in the South Isles of Arran, off Galway'. Harvey, in Mackay (1836), reported Bangia on the fucoid alga Alaria esculenta Grev. on Aran, Ball & Thompson. Algae are not reported in the manuscript lists under discussion but it shows that other groups were observed by the travellers.

The lists made by Ball and Thompson are published below, in full (Appendices 1 and 2). The Ball list is entitled and is signed; the second is without heading and is unsigned. The lists, representing the rough notes of the two naturalists, were probably written 'on the road' and were not revised apart from the comments of the fellow traveller on each list. Some variation is noted. The place names are sometimes at variance with those in current Ordnance Survey maps but are nevertheless clearly identifiable. 'Arran' and 'Achil' have been corrected throughout. The annotations by the second botanist are underlined. The present name of the taxon (according to Scannell & Synnott 1972, non-Irish species according to Tutin et al. (1964-1980) is given in brackets. Harvey is probably W. H. Harvey (1811-1866), later a noted phycologist. Some comments are of interest, such as, 'a considerable copse' of Ilex aquifolium at the base of Carrantoohil.

The records and statements of the early botanists are important. It is considered desirable that hand-written lists be committed to print. In the present instance age will eventually overtake the somewhat faded ink-impressions on paper, and larvae have already been at work on the manuscript sheets.

Comments on the lists

Questions arise in the case of some species in the list.

Cnicus eriophorus Roth. (Woolly-headed thistle) reported by Ball, is a distinctive thistle with large leaves; it is not known in Ireland to-day.

Equisetum drummondii Hook is now equated with E. pratense Ehrh., a fern with locations in vice-counties 33, 34, 35, 39 and 40. No specimens from the itinerary survive to my knowledge. Perhaps E. drummondii was correctly determined but is now eliminated from the location since Ball and Thompson's time!

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Marrubium vulgare L., noted by Webb (1980) as a 'casual' in Aran, probably introduced, has not been seen recently.

Adiantum capillus-veneris L., 'since found by Mr. Ogilby on mainland'. Leslie Ogilby, of Prussia Street, Dublin, botanised in the West of Ireland (Ogilby 1845). He had reported the fern to Moore; it appears in Cybele Hibernica, at 'Lough Bulard, near Urrisbeg, Connemara; the late Mr. L. Ogilby with C.C.B.'. The Ball and Thompson note indicates that the fern was found at Lough Bollard probably in late 1834 or 1835. The information in Cybele Hibernica (1866) provides the possible death year-date for Ogilby, a botanist not documented in available biographical works.

Acknowledgements

I wish to thank Dr. Colm O'Riordan, National Museum, Dublin, for information, in the Zoological literature, relating to William Thompson, to the referee for interesting comment, and to Miss B. Shine and Miss G. Pasley for help with the checking of the list.

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APPENDIX 1: A list of Plants picked up in a hasty scamper through the counties of Mayo, Clare, Galway, Limerick and Kerry in June and July 1834.

<u>Salicornia herbacea</u> (= <u>S. europaea</u>)	Near Galway
<u>Veronica scutellata</u>	do.
<u>Pinguicula vulgaris</u>	Achill, Killarney etc.
<u>Pinguicula lusitanica</u>	Nepin, Achill, Croaghpatrick.
<u>Lycopus europaeus</u>	Galway marsh
<u>Circaea lutetiana</u>	Westport varieties almost entitled to be called <u>alpina</u>
<u>Lemna trisulca</u>	Galway marsh
<u>Lemna polyrhiza</u>	do. is not this ? new to Ireland?
<u>Cladium mariscus</u>	Corraun, Co. Mayo
<u>Valeriana officinalis</u>	Nepin base and near Cong.
<u>Fedia olitoria</u> (= <u>Valerianella locusta</u>)	Aran
<u>Schoenus mariscus</u> (= <u>Schoenus nigricans</u>)	Corraun, Co. Mayo
<u>Eleocharis caespitosa</u> (= <u>Scirpus cespitosus</u>)	Galway
<u>Eriophorum vaginatum</u>	Nepin etc.
<u>Eriophorum angustifolium</u>	Corraun etc.
<u>Alopecurus geniculatus</u>	Galway
<u>Poa compressa</u>	Mud wall near Tuam.
<u>Avena fatua</u>	Achill
<u>Festuca ovina</u> var. <u>vivipara</u>	Croaghpatrick, Achill, Mangerton
<u>Montia fontana</u>	Nepin
<u>Galium palustre</u>	Ballinrobe
<u>Galium saxatile</u>	Croaghpatrick
<u>Galium pusillum</u> (= <u>Galium sternerii</u>)	Aran
<u>Galium boreale</u>	Ballinrobe
<u>Rubia peregrina</u>	Aran. Top of Muckross Abbey Mouth of mine at Ardmore, Co. Waterford.
<u>Asperula cynanchica</u>	Aran, all three islands particularly centre one.
<u>Plantago maritima</u>	Nepin, Aran etc.

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<u>Ilex aquifolium</u>	A considerable copse near base of Carraun Toohil Magillicuddy reeks??? (<u>not at base of Carraun Tual, but I know not what to call the place W.T.</u>) salt pond, south Aran
<u>Potamogeton pectinatus</u>	Killarney and Blackwater near Cappelquin, Co. Waterford.
<u>Potamogeton perfoliatus</u>	Cappelquin with former of which Harvey considers it a variety
<u>Potamogeton praelongus</u>	Aran
<u>Sagina maritima</u>	Galway.
<u>Lithospermum officinale</u>	Westport
<u>Symphytum officinale</u>	Galway
<u>Anagallis coerulea</u> (= <u>A. arvensis</u> subsp. <u>foemina</u>)	do. <u>East of Achill & Achill Head</u> <u>plentiful</u>
<u>Anagallis tenella</u> (var. white)	Lough Corrib and river in town of Galway.
<u>Lysimachia vulgaris</u>	Nepin etc
<u>Lysimachia nemorum</u>	Aran
<u>Solanum dulcamara</u>	do
<u>Verbascum thapsus</u>	Galway and Youghal
<u>Convolvulus arvensis</u>	Base of Nepin
<u>Convolvulus soldanella</u> (= <u>Calystegia soldanella</u>)	Middle isle of Aran
<u>Samolus valerandi</u>	Nepin etc.
<u>Lobelia dortmanna</u>	Killarney and near Skibbereen
<u>Campanula rotundifolia</u>	Aran
<u>Crithmum maritimum</u>	do.
<u>Oenanthe fistulosa</u>	Galway
<u>Pimpinella saxifraga</u>	Aran
<u>Sanicula europaea</u>	Westport and <u>Glengarriff</u>
<u>Beta maritima</u>	Aran etc.
<u>Sambucus ebulus</u>	Aran
<u>Parnassia palustris</u>	Achill
<u>Statice armeria</u> (= <u>Armeria maritima</u>)	Mountain tops Mayo
<u>Drosera rotundifolia</u>	Corraun, Achill, Nepin etc.
<u>Drosera longifolia</u> (= <u>D. intermedia</u>)	do.
<u>Allium arenarium</u> (= <u>A. scordoprasum</u>)	Aran
<u>Juncus bufonius</u>	Galway

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<u>Triglochin palustre</u> (= <u>T. palustris</u>)	Galway
<u>Triglochin maritimum</u> (= <u>T. maritima</u>)	Aran, Ballinatrav Co. Waterford.
<u>Alisma ranunculoides</u> (= <u>Echinodorus ranunculoides</u>)	Galway
<u>Menziezia polifolia</u> (= <u>Daboecia cantabrica</u>)	Croaghpatrick and close to the town of Galway
<u>Erica tetralix</u> white var.	Achill
<u>Erica cinerea</u> do.	Killarney
<u>Erica mediterranea</u> (= <u>E. erigena</u>)	In vast abundance on Corraun between Westport and Achill
<u>Butomus umbellatus</u>	Ennis
<u>Vaccinium vitis-idaea</u>	Nephin and Achill
<u>Arbutus unedo</u>	On Clough-a-rock, an isolated mass of limestone near Kenmare, Killarney and Glengarriff
<u>Saxifraga hirsuta</u>	Gap of Dunloe
<u>Saxifraga umbrosa</u> (= <u>S. spathularis</u>)	Mountain tops Mayo
<u>Saxifraga stellaris</u>	Croaghpatrick
<u>Saxifraga caespitosa</u>	Aran
<u>Saxifraga hypnoides</u>	
<u>Arenaria peploides</u> (= <u>Honkenya peploides</u>)	Galway
<u>Spergularia saginoides</u> (= <u>Sagina saginoides</u>)	Aran
<u>Pyrus aucuparia</u> (= <u>Sorbus aucuparia</u>)	Achill and Nephin
<u>Rubus saxatilis</u>	Aran
<u>Comarum palustre</u> (= <u>Potentilla palustris</u>)	Nephin
<u>Aquilegia vulgaris</u> ?	Aran (<u>Why doubt this? I find I have it down. I well recollect the specimens we got at roadside. W.T.</u>)
<u>Marrubium vulgare</u>	Aran
<u>Bartsia odontites</u> (= <u>Odontites verna</u>)	do.
<u>Melampyrum pratense</u> var. B	Achill and Croagh Patrick
<u>Pedicularis palustris</u>	Achill
<u>Pedicularis sylvatica</u>	Nephin
<u>Crambe maritima</u>	Aran
<u>Coronopus ruellii</u> (= <u>C. squamatus</u>)	Galway
<u>Erysimum alliaria</u> (= <u>Alliaria petiolata</u>)	Aran

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<u>Geranium sanguineum</u>	Aran
<u>Geranium lucidum</u>	House roofs Ennis
<u>Malva moschata</u> white	Brandon cottage Killarney
<u>Anthyllis vulneraria</u>	variety with very downy calyces, quite white Achill
<u>Orobus tuberosus</u> (= <u>Lathyrus montanus</u>)	Galway
<u>Astragalus hypoglottis</u> (= <u>A. danicus</u>)	On highest point of Aran near the fort.
<u>Trifolium procumbens</u> var. a (= <u>T.</u> <u>campestre</u>)	Aran
<u>Hypericum elodes</u>	Nephin and Galway
<u>Cnicus eriophorus</u> (= <u>Cirsium eriophorum</u>)	Aran
<u>Cnicus pratensis</u> (= <u>Cirsium dissectum</u>)	do.
<u>Bidens cernua</u>	Galway
<u>Eupatorium cannabinum</u>	Aran
<u>Gnaphalium dioicum</u> (= <u>Antennaria dioica</u>)	Top of Nephin
<u>Senecio sylvatica</u>	Banks of Lough Mask
<u>Aster tripolium</u>	Cliffs of Aran
<u>Solidago virgaurea</u> var. <u>cambrica</u>	Top of Nephin
<u>Achillea ptarmica</u>	Galway
<u>Centaurea nigra</u>	Aran very large
<u>Gymnadenia conopsea</u>	Aran and near Nephin
<u>Habenaria bifolia</u> (= <u>Platanthera bifolia</u>)	near Nephin
<u>Euphorbia paralia</u> (= <u>E. paralias</u>)	middle Aran
<u>Euphorbia amygdaloides</u>	Killarney
<u>Carex recurva</u> (= <u>C. flacca</u>)	near Cong
<u>Salix pentandra</u>	Ballinasloe to Westport
<u>Empetrum nigrum</u>	Achill and Nephin
<u>Myrica gale</u>	everywhere it could
<u>Rhodolia rosea</u> (= <u>Rhodiola rosea</u>)	Achill under Saddle head
<u>Juniperus communis</u>	Achill and Nephin
<u>Atriplex laciniata</u>	Muinish island, Clew Bay
<u>Granitis ceterach</u> (= <u>Ceterach officinarum</u>)	Oughterard, Co. Galway.
<u>Asplenium marinum</u>	Aran
<u>Adiantum C. veneris</u>	do. (since found by Mr. Ogilby on mainland)
<u>Osmunda regalis</u>	Common in the west and south
<u>Ophioglossum vulgatum</u>	Aran

Bull. Ir. biogeog. Soc. No. 8.

<u>Lycopodium clavatum</u>	Mangerton etc.
<u>Lycopodium alpinum</u> (= <u>Diphasium alpinum</u>)	do.
<u>Equisetum drumondii</u> (= <u>E. pratense</u>)	base of Nephin

When where in the list of "habitats" Galway occurs it means near the town so called; Where Aran it means the largest of the three islands on the coast of Galway.

<u>Orobanche major?</u> (= <u>O. elatior</u>)	Killarney and Lismore on Ivy roots Harvey inclines to think this was minor. <u>This was of the size assigned by Hooker to O. major i.e. from 1-1½ ft. high.</u>
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<u>Hottonia</u>	Killarney called so by (not deciphered) proves to be <u>Lobelia dortmanna.</u>
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Many plants in the foregoing are very common but are noticed for their abundance, superiority of size or some other remarkable circumstance.

(Signed) R. Ball

APPENDIX 2: Untitled, List of Plants noted by William Thompson

<u>Hippuris vulgaris</u>	near Ballinasloe - Lough Corrib
<u>Ligustrum vulgare</u>	apparently wild near Castlebar
<u>Pinguicula lusitanica</u>	Achill plentiful. Croaghpatrick, Nephin Cromaglaun near Killarney.
<u>Lemna trisulca</u>	Galway and Mayo
<u>Valeriana officinalis</u>	West and south of Ireland
<u>Galium boreale</u>	Between Westport and Ballinrobe
<u>Rubia peregrina</u>	Aran. Wall of Muckross Abbey. Rocks of Innisfallen Island, Killarney.
<u>Asperula cynanchica</u>	Plentiful on the 3, south islands of Aran
<u>Potamogeton pectinatus</u>	small saltwater lake in the most eastern of the 3 islands of Aran

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Potamogeton perfoliatus

Lower lake of Killarney.

Lysimachia vulgaris

River Blackwater near Lismore

L. Corrib near Oughterard. Bridge west of jail Galway.

Solanum dulcamara

Aran. North of Cong?

Convolvulus soldanella (= Calystegia soldanella)

Plentiful in the middle island of Aran.

Samolus valerandi

Galway marsh. Fissures of limestone rocks near summit of Aran.

Lobelia dortmanna

River between lakes of Killarney.

Lakes in Gap of Dunloe. Alpine lake at Cromaglaun. Lake E. of Skibbereen on roadside to Cork.

Eryngium maritimum¹

Great and Middle islands of Aran

Parnassia palustris

abundant near Keel lake, Achill.

Drosera longifolia (= D. intermedia)

Especially abundant (growing with D. rotundifolia in Achill.

Alisma ranunculoides (= Echinodorus ranunculoides)

Galway and Mayo

Chlora perfoliata² (= Blackstonia perfoliata)

common on the most eastern of the islands of Aran

Menziesia polifolia (= Daboecia cantabrica)

Croaghpatrick. Banks of Beltra lake (Mayo). Within a mile of the town of Galway, on the west.

Erica mediterranea (= E. erigena)

Growing plentifully and attaining a large size from the vicinity of Newport to the western extremity of the peninsula of Corraun. It appears mingled with E. tetralix, E. cinerea and Calluna vulgaris.

Butomus umbellatus

River Fergus near Ennis

Arbutus unedo

On Clough-a-rock,* an isolated mass of limestone near Kenmare and about 10 miles distant from where it grows so abundantly about Killarney, and Glengarrif. At the

* I know not if this orthography be correct. W.T.

Bull. Ir. biogeog. Soc. No. 8.

Arbutus unedo (contd./...)

latter place especially it often appears of considerable magnitude through springing from the crevices of almost inaccessible rocks. One which had just been felled at Killarney measured 2 feet in diameter.

Saxifraga umbrosa (= S. spathularis)

Mountain tops Mayo and close to sea side near Keem, Achill.

Aquilegia vulgaris

Great island of Aran

Scutellaria galericulata

near Galway (on the western side)

Melampyrum pratense

Achill - Croaghpatrick, near the summit.

Pedicularis palustris

White var. of, by the roadside at the most elevated ground between Cloghereen and Kenmare.

Geranium lucidum

road sides Aran. cottage roofs Ennis etc near Lord Brandon's cottage Killarney. RB and WT Roadside near New Ross, in the west. WT

Hypericum elodes

Galway and Mayo frequent

Carlina vulgaris³

Great island of Aran

Eupatorium cannabinum

near the summit of the Great island of Aran, in the clefts of the limestone rocks.

Solidago virgaurea var. cambrica

Near the summit of Nephin

Habenaria bifolia (= Platanthera bifolia)

Base of Nephin, in great perfection

Orchis pyramidalis (= Anacamptis pyramidalis)

Great island of Aran etc.

Typha latifolia

near Westport. Banks of canal, Lismore (Co. Waterford). RB & WT near Arklow WT. Castlemartyr RB. near Westport

Sparganium ramosum⁴ (= S. erectum)

Middle island of Aran, frequent

Euphorbia paralia (= E. paralias)

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Euphorbia amygdaloides

Common in the south from Limerick to Bantry.

Salix cinerea

Attains a very large or tree-like size on the banks of the river near base of Nephin

Salix pentandra

Between Tuam and Castlebar

Populus alba

Apparently wild near Tuam

Ophioglossum vulgatum

(entered on this list by R. Ball. He scored out Thompson's Botrychium lunaria)

Empetrum nigrum

On mountains in the south and west, common.

Equisetum drummondii (E. pratense)

Near the river side to the south west of Nephin and in the wood skirting the base of the mountain

1. So common at Youghal and Portmarnock that I forgot to mark it. I recollect it being shown in Aran as Stramonium recommended by a doctor to his asthmatic patients in the island. - RB.
2. This was very luxuriant, larger than I knew it before. - RB.
3. I do not recollect this but I saw it on roadsides near ? Tuam, ? Lucan. RB.
4. I remember in road side ditches towards Nephin, it is plentiful also at Youghal. -RB.

INVERTEBRATES OF IRISH MIDLANDS RAISED BOGS: PART I. ARANEAE, OPILIONES,
CHILOPODA.

Desmond G. Higgins

Introduction

This is the first of a series of short papers on the invertebrate fauna of five Irish raised bogs, some of which are considered to be of international importance, as sub-atlantic raised bogs are now almost absent in Western Europe (Schouten, 1981). In Ireland, their exploitation has been intense in the last three decades, as peat has provided up to 20% of fuel for power generation. The large raised bogs, with peat depths up to 10m, are very suitable for mechanised harvesting, and there are today few bogs which have not been developed or earmarked for destruction.

In the past two years the National Peatlands Conservation Committee has compiled lists of the best remaining examples of peatlands, and urged their preservation. Despite this however, bog destruction continues without regard to conservation value. One exception is Mongan Bog, Co. Offaly, which was promised to An Taisce the National Trust for Ireland in exchange for a bog at Arhascragh, Co. Roscommon, in their care.

Although raised bogs have been well characterised botanically (e.g. Schouten, 1981) little is known of their zoological interest, and there are few published records. Since bog destruction is proceeding actively, the present survey was initiated, as a matter of urgency, with the help of a grant from the the British Ecological Society to Dr. J. Reynolds, and aimed to provide baseline lists of organisms, and to assess their status. Mongan Bog was visited most frequently, while four other bogs were sampled less thoroughly (Table 1).

During the period of study, two sites (Carbury Bog, Co. Kildare, perhaps the most easterly raised bog still extant, and Clara Bog, Co. Offaly, designated as of international importance as being the last large raised bog to possess a 'soak system', or perched, spring-fed minerotrophic lake on its summit) were at least partly destroyed. These records may therefore have historical value.

Discussion

Forty three spiders, two harvest spiders and three centipedes were recorded, of which the spiders - Gongylidiellum latebricola and Meioneta beata are recorded for the first time as being Irish (Table 2). Considering the amount of effort put into collecting this is a surprisingly small number of species. The Irish distribution of spiders is still poorly known, and for most of the species listed here, midlands records are few. However, although two species are new to Ireland, none of them could be described as being very rare (at least in Britain) and there is little evidence of any being unique to raised bogs. That is not to say that the assemblages of species are not unique or characteristic. This can only be determined by more extensive sampling and comparison with similar habitats.

Perhaps the most striking result is the complete absence of many species and groups which appear to be abundant in other habitats. For example, of the harvest spiders, Phalangium opilio was found to be quite common on a number of bogs but, except for a single record of Oligolophus agrestis (an arboreal species) on Betula at Clara Bog, no other Opiliones were found; not even Nemastoma bimaculatum (Fabricius), a normally ubiquitous species.

Equally striking was the complete absence of any terrestrial Isopoda or Diplopoda (woodlice and millipedes). This is in keeping with the observation by Speight and Blackith (1983) that detritivore groups are poorly represented in raised bogs. A single mollusc, Arion ater (L.) was recorded from Mongan Bog.

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TABLE 1: A SUMMARY OF THE SAMPLING PROGRAMME.

<u>Name</u>	<u>Abbrev.</u>	<u>Grid Ref.</u>	<u>County</u>	<u>Dates visited</u>	<u>Sampling method*</u>
Carbury Bog	Cb.	N/67-37	Kildare	20/vii/1983	S,B
				20-29/xii/1983	P(4 traps)
Mouds or Tankards- garden Bog	Md	N/78-19	Kildare	20/vii/1983	S,B
				20-29/vii/1983	P(12 traps)
Clara Bog	Cl.	N/25-30	Offaly	1/ix/1983	S,B
Bog near Daingean	D.	N/45-26	Offaly	5/vii/1983	S,B
Mongan Bog	Mn.	N/02-30	Offaly	14/vi,5/vii & 2/ix/1983	S,B
				29/vii-24/viii/1983	P(12 traps)
				5/vii/1983	T

*Abbreviations for sampling methods: S-field (from bog surface); B-field (from beating Calluna); P-pitfall traps; T-Tullgren funnel extraction.

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TABLE 2: ANNOTATED CHECKLIST

ARANEAE

Species	Bog	Sampling Method	Notes
Family Dictynidae			
<u>Dictyna arundinacea</u> (L.)	all	B	-abundant on <u>Calluna</u> at all sites
Family Clubionidae			
<u>Clubiona trivialis</u> C.L.Koch	Mn	s	
	Cl	B	
* <u>Agroeca proxima</u> (O.P-Cambridge)	Mn	P	
<u>Scotina gracillipes</u> (Blackwall)	Mn	T,S,P	
Family Thomisidae			
<u>Xysticus cristatus</u> (Clerck)	Cl	B	
* <u>Oxyptila trux</u> (Blackwall)	Mn	P	
* <u>Philodromus cespitum</u> (Walckenaer)	Mn	B	
*	Cb	B	
<u>Tibellus oblongus</u> (Walckenaer)	Mn	B	
	Cl	S	
Family Salticidae			
* <u>Neon reticulatus</u> (Blackwall)	Mn	S	-in leaf litter on <u>Calluna</u> hummocks
	Md	S	
Family Lycosidae			
<u>Pardosa pullata</u> (Clerck)	Mn	S,P	
	Md	P	
	Cl	S	
<u>P. nigriceps</u> (Thorell)	Mn	S	
	D	S	
<u>Alopecosa pulverulenta</u> (Clerck)	Md	P	
<u>Trochosa terricola</u> (Thorell)	Mn	P	
	Md	P	
<u>Pirata piraticus</u> (Clerck)	Mn	P,S	
	Cl	S	
* <u>P. uliginosus</u> (Thorell)	Mn	P	-the first Irish record of this species was from Mouds Bog (Bailey, 1973)
	Md	P	

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Checklist continued

Family Pisauridae

Dolomedes fimbriatus (Clerck) Mn S -a single adult female beside a bog pool

Family Agelenidae

Argyroneta aquatica (Clerck) Mn P,O -taken by hand in bog pools and a single specimen in a pitfall trap
Cl O

Antistea elegans (Blackwall) Mn P
Md S

Family Theridiidae

*Euryopis flavomaculatus (C.l.Koch) Mn P

*Theridion impressum L. Koch Mn B -first recorded from Ireland from Co. Wicklow (Snazell, 1983)
* D B
* Cb B

T.bimaculatum (L.) Mn B
Cb B

Enoplognatha ovata (Clerck) Cb B

Pholcomma gibbum (Westring) Mn S

Family Tetragnathidae

*Tetragnatha extensa (L.) Mn B -juvenile Tetragnatha sp. were taken on Calluna on all bogs

Family Araneidae

Araneus quadratus Clerck Cl B

A. cornutus Clerck Mn O -on Menyanthes

Hyposinga pygmaea (Sundevall) D O -on Myrica
Cb B

Family Linyphiidae

*Ceratinella brevis (Wider) Mn P

*Walckenaera nudipalpis (westring) Mn P

*Metopobractus prominulus (O.P. - Cambridge) Md P

Gonatium rubens (Blackwall) Mn P

Peponocranium ludicrum (O.P. - Cambridge) Mn B,P
D P

Pocadicnemis pumila (Blackwall) Mn P

Md P

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Checklist continued

* <u>Gongylidiellum latebricola</u> (O.P. - Cambridge)	Mn	T,P	-this is the first Irish record of this species. Three specimens were found, in <u>Sphagnum</u> . It is widespread in Britain.
	Cb	P	
* <u>Savignya frontata</u> (Blackwall)	Mn	B	
<u>Araeoncus crassiceps</u> (Westring)	Mn	S	
<u>Erigone dentipalpis</u> (Wider)	Mn	B	
	Md	S	
	Cl	S	
* <u>Agyneta cauta</u> (O.P. - Cambridge)	Mn	S	
* <u>Meioneta beata</u> (O.P. - Cambridge)	Cb	S	-the first Irish record of this species. A single specimen, in <u>Sphagnum</u> . Widespread in Britain.
<u>Bathyphantes gracilis</u> (Blackwall)	Cb	S	
	D	S	
* <u>Leptyphantes tenuis</u> (Blackwall)	Mn	S,P,B	
*	Cb	S	
* <u>L. mengei</u> Kulczynski	Mn	S,P	
*	Md	S	
	Cl	S	
<u>Microlinyphia pusilla</u> (Sundevall)	Cb	B	

OPILIONES

<u>Phalangium opilio</u> L.	Mn	P,B,S	-a common species in most bogs
	Cb	P	
	Md	S	
<u>Oligolophus agrestis</u> (Meade)	Cl	O	-beaten from <u>Betula</u> on eastern half of bog.

CHILIPODA

<u>Schendyla nemorensis</u> (C.L.Koch) and <u>Brachygeophilus truncorum</u> (Bergso and Meinert)	Mn	T	-both species were taken in quantity from several samples.
<u>Lithobius forficatus</u> (L.)	Mn	S,T,P	
	Cb	P	

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Determinations- Spiders and Harvestmen: D. G. H.; Centipedes: A. D. Barber;
specimens marked * checked by R. G. Snazell.

Nomenclature for Spiders follows Locket et al. (1974); for Harvestmen follows
Sankey and Savory (1974) and for Centipedes follows Eason (1964). Specimens of
all species, except Dolomedes have been deposited in the National Museum of
Ireland.

All abbreviations are as in the table of bogs and grid references except:
O which means the specimen was collected as specified in the notes.

INVERTEBRATES OF IRISH MIDLANDS RAISED BOGS: PART II. ODONATA, AQUATIC
HEMIPTERA, TRICHOPTERA.

Julian D. Reynolds

Introduction

Five midlands raised bogs in Counties Kildare and Offaly were surveyed in 1983 and 1984, to provide base-line faunal records for these threatened habitats (Reynolds, 1984). This paper lists aquatic insect groups excluding Coleoptera and Diptera, taken by sweeping in aquatic habitats, or from pitfall collections. Trichopterans from light traps will be reported separately as their exact habitats are not known. Bogs which yielded data for this paper were Clara (Cl) Co. Offaly (N 2630), Mongan (Mn) Co. Offaly (N 0230) and Mouds (Md) Co. Kildare (N 7819).

The habitats studied were (i) marginal ditches, perhaps with some minerotrophic water influence; (ii) shallow drains in the bog surface, 50-150 m from the edge in Mongan and central (recently opened) in Clara; (iii) central bog-pools and (iv) soak systems. These last are minerotrophic pools, perched on Clara and Mouds bogs. The Mouds soak is a small patch of wet Sphagnum with some sedge and nearby Betula pubescens Ehrh. That on Clara, the best-known example remaining in Ireland of a spring-fed lake on a large raised bog, retained over 100 m² of open water. The fauna was dominated by base-rich, typically mesotrophic forms such as Asellus aquaticus (L.) and Chironomus sp., but some acid bogland forms were also taken. Drainage affected this lake in 1984 (Reynolds, in prep.).

The check-list distinguishes habitats as 'ditches', 'drains', 'pools' and 'soaks'. The Irish distribution is summarised, with particular emphasis on records from the midlands region (here defined as the lowland, generally under-recorded, Counties of Leitrim, Cavan, Roscommon, Longford, Westmeath, Meath, Offaly, Laois and Kildare, in which midlands raised bogs are best developed).

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ANNOTATED CHECK-LIST

ODONATA

Lestidae

Lestes sponsa (Hansemann): nymph, Mn pools, 14.vi.84. Widespread in Ireland
(Ni Lamhna, 1978).

Libellulidae

Libellula quadrimaculata L.: nymph, Mn pools, 14.vi.1984. Widespread in
Ireland (Ni Lamhna, 1978).

Sympetrum scoticum (Donovan): nymph, Cl soak, 28.iv.1984. (= S. danae
(Sulzer)) Offaly (Ni Lamhna, 1978).

HEMIPTERA

Veliidae

Velia caprai Tamanini: Mn drains, 14.vi.1983; Md soak, 30.viii.1983; Cl drains,
29.iv.1984. In bog pools, Killarney (Kirby, 1983).

Gerridae

Gerris argentatus Schum.: Mn pitfall, 14.vi.1983. Few records in Ireland
(Halbert, 1935). First midlands record.

G. lacustris (L.): Mn Drains, pools, 14.vi.1983; Cl drains, soak, 29.iv.1984,
Md ditch, 9.vi.1984. Widespread in Ireland; midlands records from
Kildare. (Halbert, 1935) and Leitrim (Crawford, 1935).

G. costai (H.-S.): Mn drains, pools, 14.vi.1983. The specimens belong to
the subspecies poissoni W. & Z. (Illies, 1979), a 'sub-alpine' form
(Halbert, 1912), occurring in Ireland in upland peat-pools, mountains
and moorland (Southwood & Leston, 1959). First midlands record.

G. thoracicus Schum.: Mn pools, 14.vi.1983. Widespread, chiefly coastal
(Halbert, 1935). First midlands record.

G. odontogaster (Zett.): Mn pools, 14.vi.1983; Cl soak, 29.iv.1984. Probably
widespread (Browne, 1948). First midlands record.

Nepidae

Nepa cinerea L.: dead specimen, Cl soak, 29.iv.1984. Widespread; midlands
record from Cavan (Halbert, 1935).

Notonectidae

Notonecta sp.: nymphs, Mn drains, 14.vi.1983.

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Corixidae

Hesperocorixa castanea (Thoms.): Cl soak, 29.iv.1984. Widespread in base-poor tarns (Macan, 1956) in the acid fringes of Ireland (Halbert, 1935). First midlands record.

Hesperocorixa sahlbergi (Fieb.): Cl soak, 29.iv.1984. Widespread (Halbert, 1935); midlands record from Cavan (ibid.).

TRICHOPTERA

Polycentropodidae

Plectrocnemia conspersa (Curtis): Md soak, 9.vi.1984. Common in streams and upland pools (J. P. O'Connor, pers. comm.).

Discussion

The aquatic insects recorded here from lowland bog habitats fall into two main groups. The majority of forms exhibit no clear preference for water type - such as Libellula quadrimaculata which I have also taken in temporary solution pools on limestone pavement (Reynolds, in press) or Gerris lacustris. These appear to be exploiting the bogland habitat purely as a suitable wetland, and would be equally at home in ponds or fens. The second group are forms more typical of acid uplands, e.g. Sympetrum scoticum or Gerris costai. Their discovery in midlands raised bogs is a habitat extension, but is not unexpected.

Most of the forms encountered are new Offaly (H 18) records, indicating the scarcity of collecting in the midlands, and from raised bogland habitats. The two corixids were encountered on bogs only in the Clara soak lake. These forms are usually negatively associated, Hesperocorixa sahlbergi being characteristic of lime-rich ponds and fen, where H. castanea is typical of base-poor bogland conditions (Macan, 1954). Their sympatry in Clara soak highlights the unusual nature of this water-body, of a type unfortunately now rare in Western Europe (Reynolds, in prep.).

While some hemipterans were taken in only a single habitat type (e.g. Gerris thoracicus only in bog pools), others occurred in a variety of waters (e.g. G. lacustris). The range of surface-dwelling hemipterans in a single habitat was also of interest, and on Mongan small numbers of at least four species

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were encountered in bog pools. Co-existing 'guilds' of gerrid species have received attention elsewhere (Spence & Scudder, 1980), and further study of bogland gerrid guilds would be interesting in such nutrient-limited dystrophic habitats.

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INVERTEBRATES OF IRISH MIDLANDS RAISED BOGS: PART III. LEPIDOPTERA

K. G. M. Bond

List of LEPIDOPTERA recorded at Mongan Bog and selected nearby sites 1983-1984

Abbreviations: M = Mongan Bog (N 030306) and margins; F = Finlough (N 034297) and Clonfinlough (N 049293); Mesk (N 046312) = eskers to N and NE of Mongan Bog; C = Clonmacnoise (N 011309) with callows; LP = limestone pavement at Clorhane (M 984277), 5 km SW of Mongan Bog; B = Bloomhill (N 064330), 3 km ENE of Mongan Bog; m.v. trap = mercury vapour trap.

Nomenclature and sequence follow: Emmet (1979) for the Microlepidoptera, and Bradley et al. (1972) for the Macrolepidoptera.

MICROPTERIGIDAE

Micropterix calthella (L.) LP: five, 14.vi.84.

NEPTICULIDAE

Stigmella continuella (Stainton) F: mines on Betula, 25.ix.83.

S. salicis (Stainton) Mesk: mine on Salix, 25.ix.83.

S. lapponica (Wocke) Mesk, F: mines on Betula, 25.ix.83.

TINEIDAE

Nemapogon cloacella (Haworth) B: female, 14.vi.84.

GRACILLARIIDAE

Aspilapteryx tringipennella (Zeller) M: male at m.v. trap, 24.viii.83

Parornix devoniella (Stainton) LP: female, 14.vi.84.

P. torquillella (Zeller) LP: male, 14.vi.84.

Phyllonorycter quercifoliella (Zeller) M: female, 14.vi.84.

P. coryli (Nicelli) Mesk: mines on Corylus avellana, 25.ix.83;

LP: female, 14.vi.84.

P. nicellii (Stainton) LP: female, 14.vi.84.

CHOREUTIDAE

Anthophila fabriciana (L.) M: three, 14.vi.83; one, 25.ix.83;

LP: circa ten, 14.vi.84.

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GLYPHIPTERIGIDAE

Glyphipterix simpliciella (Stephens) B: one, 14.vi.84; LP: one, 14.vi.84.

G. schoenicolella Boyd M: two, 24.viii.83

G. thrasonella (Scopoli) LP: circa five, 14.vi.84.

YPONOMEUTIDAE

Argyresthia mendica (Haworth) LP: male and female, 14.vi.84.

Pseudoswammerdamia combinella (Hübner) LP: one, 14.vi.84.

Plutella xylostella (L.) M: two, 24.viii.83; one, 24.ix.83.

SCHRECKENSTEINIIDAE

Schreckensteinia festaliella (Hübner) LP: one, 14.vi.84.

COLEOPHORIDAE

Coleophora tamesis Waters M: male at m.v. trap, 5.vii.83.

C. alticolella Zeller LP: male, 14.vi.84.

Coleophora sp. Mesk: two cases, 25.ix.83.

ELACHISTIDAE

Elachista gleichenella (Fabr.) M: male, 4.vii.83.

E. alpinella Stainton M; three males at m.v. trap, 24.viii.83.

E. cerusella (Hübner) M: male at m.v. trap, 24.viii.83.

E. argentella (Clerck) LP: two, 14.vi.84; M: one, 14.vi.84.

E. gangalbella Zeller LP: male and female, 14.vi.84.

Biselachista cinereopunctella (Haworth) LP: male and female, 14.vi.84.

B. serricornis (Stainton) M: male, 5.vii.83. FIRST IRISH RECORD.

B. albidella (Nylander) M: male, 14.vi.84.

OECOPHORIDAE

Pleurota bicostella (Clerck) M: two dead specimens, 14.vi.83; three, 14.vi.84.

Depressaria pastinacella (Duponchel) F: one, 24.viii.83; M: eight at m.v. trap, 24.viii.83.

Agonopterix propinquella (Treitschke) M: female at m.v. trap, 24.ix.83;
one at m.v. trap, 25.ix.83.

A. ulicetella (Stainton) M: one at m.v. trap, 24.viii.83; Mesk: one, 25.ix.83.

A. capreolella (Zeller) LP: female, 14.vi.84.

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GELECHIIDAE

- Aristotelia ericinella (Zeller) M: male, 24.viii.83. FIRST IRISH RECORD.
Bryotropha domestica (Haworth) F; two (one dead), 24.viii.83.
Neofaculta ericetella (Geyer) M: two, 14.vi.83; 16 at m.v. trap, 5.vii.83.
Scrobipalpa artemisiella (Treitschke) LP: male, 14.vi.84.

COCHYLIDAE

- Agapeta hamana (L) M: one at m.v. trap, 5.vii.83.
Eupoecilia angustana (Hübner) M: II (six at m.v. trap) 24.viii.83.

TORTRICIDAE

- Aphelia viburnana (Denis & Schiffermüller) M: two, 13.viii.83;
female, 24.viii.83.
Clepsis spectrana (Treitschke) M: male at m.v. trap, 5.vii.83.
C. consimilana (Hübner) M: two at m.v. trap, 24.viii.83.
Acleris laterana (Fabr.) M: male, 25.ix.83.
Olethreutes schulziana (Fabr.) M: one, 20.vii.83; three 13.viii.83;
one, 24.viii.83; 24 at m.v. trap, 24.viii.83.
O. lacunana (Denis & Schiffermüller) LP: circa 5, 14.vi.84.
Hedya pruniana (Hübner) M: one at m.v. trap, 5.vii.83; LP; circa 5, 14.vi.84.
Endothenia marginana (Haworth) M: male at m.v. trap, 24.viii.83.
Bactra lancealana (Hübner) M: one, 5.vii.83; six at m.v. trap, mainly small
forms, 24.viii.83.
Ancylis unguicella (L.) M: one, 14.vi.83; female, 14.vi.84.
A. geminana (Donovan) M: female, 14.vi.84.
Epiblema cirsiana (Zeller) M: one, 14.vi.83.
Eucosma cana (Haworth) M: one at m.v. trap, 24.viii.83.
Cydia succedana (Denis and Schiffermüller) M: one, 14.vi.83; two, 24.viii.83.
Dichrorampha simpliciella (Haworth) M: male, 24.viii.83.

PYRALIDAE

- Chrysoteuchia culmella (L.) M: two, 14.vi.83; five at m.v. trap, 5.vii.83;
two, 14.vi.84; LP: two, 14.vi.84.
Crambus pascuella (L.) M: four at m.v. trap; circa 1000 observed at dawn,
5.vii.83; LP: one, 14.vi.84.
C. nemorella (Hübner) M: three, 14.vi.83; one at m.v. trap, 5.vii.83;
LP: circa 5, 14.vi.84.
C. perlella (Scopoli) M: one at m.v. trap, 5.vii.83.

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Agriphila straminella (Denis & Schiffermüller) M: one at m.v. trap, 5.vii.83;
one, 13.viii.83.

A. tristella (Denis & Schiffermüller) Mesk: circa 20, 13.viii.83;
F: three (dead), 24.viii.83.

Donacaula mucronellus (Denis & Schiffermüller) M: two at m.v. trap, 5.vii.83.

Scoparia arundinata (Thunberg) LP: one, 14.vi.84.

Nymphula nymphaeata (L.) M: one at m.v. trap, 24.viii.83.

Cataclysta lemnata (L.) male at m.v. trap, 24.viii.83.

Pyrausta purpuralis (L.) Mesk: two: 13.viii.83; LP: one, 14.vi.84.

Opsibotys fuscalis (Denis & Schiffermüller) LP: three, 14.vi.84.

Udea elutalis (Denis & Schiffermüller) M: one, 13.viii.83; four, 24.viii.83.

Nomophila noctuella (Denis & Schiffermüller) F: one, 25.ix.83;
M; two at m.v. trap, 25.ix.83.

Aphomia sociella (L.) M: one at m.v. trap, 5.vii.83

Pyla fusca (Haworth) M: female at m.v. trap, 24.viii.83.

PTEROPHORIDAE

Amblyptilia punctidactyla (Haworth) Mesk: three, 25.ix.83.

PIERIDAE

Leptidea sinapis (L.) M: two, 14.vi.83; LP: one, 14.vi.84.

Gonepteryx rhamni (L.) M: one, 25.ix.83.

Pieris brassicae (L.) M: one, 14.vi.83; Mesk, one, 25.ix.83.

P. napi (L.) LP: one, 14.vi.84.

Anthocharis cardamines (L.) M: three males, two ova on Cardamine pratensis
14.vi.83.

LYCAENIDAE

Callophrys rubi (L.) M: one, 14.vi.83.

Lycaena phlaeas (Fabr.) M: three, 14.vi.83; one, 24.viii.83;
Mesk: six, 13.viii.83.

Polyommatus icarus (Rottemburg) Mesk: female, 5.vii.83; female, 25.ix.83.

NYMPHALIDAE

Vanessa atalanta (L.) M: one, 14.vii.83; Mesk: one, 25.ix.83.

Aglais urticae (L.) F: two larvae, 24.viii.83; one, 25.ix.83; C: one, 25.ix.83;
M: three, 25.ix.83.

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Inachis io (L.) M: circa 10, 13.viii.83; one, 24.viii.83; Mesk: circa
10, 13.viii.83; C: one, 25.ix.83.

SATYRIDAE

Pararge aegeria (L.) Mesk: one, 25.ix.83.

Lasiommata megera (L.) M: one, 14.vi.83; Mesk: one, 13.viii.83.

Maniola jurtina (L.) Mesk: three, 5.vii.83; M: two, 14.vii.83;
F: one, 24.viii.83.

Coenonympha tullia (Müller, O. F.) M: circa 5, 5.vii.83; one, 14.vi.84.

Aphantopus hyperantus (L.) Mesk: one, 5.vii.83.

LASIOCAMPIDAE

Macrothylacia rubi (L.) M: larva on Calluna vulgaris, 14.vi.83; circa 6
larvae on Erica and C. vulgaris, 24.ix.83;
larva, 25.ix.83.

SATURNIIDAE

Saturnia pavonia (L.) M: vacated cocoon, 14.vi.83.

DREPANIDAE

Falcaria lacertinaria (L.) M: male at m.v. trap, 5.vii.83.

Drepana falcataria (L.) M: male at m.v. trap, 5.vii.83.

GEOMETRIDAE

Pseudoterpna pruinata (Hufnagel) M: one at m.v. trap, 5.vii.83.

Jodis lactearia (L.) LP: one, 14.vi.84.

Cyclophora albipuncta (Hufnagel) M: one at m.v. trap, 5.vii.83.

Idaea muricata (Hufnagel) M: two, 5.vii.83.

Xanthorhoe ferrugata (Clerck) M: two at m.v. trap, 24.viii.83.

B: dead specimen, 14.vi.84.

X. montanata (Denis & Schiffermüller) M: one at m.v. trap, 5.vii.83;

LP: three, 14.vi.84.

X. fluctuata (L.) M: one at m.v. trap, 24.viii.83.

Epirrhoe alternata (Müller, O. F.) M: female at m.v. trap, 5.vii.83;

one, 13.viii.83; LP: one, 14.vi.84.

Eulithis testata (L.) M: four, 13.viii.83; six, 24.viii.83.

E. populata (L.) m: five (three at m.v. trap), 24.viii.83.

Eupithecia satyrata callunaria Doubleday M: male at m.v. trap, 5.vii.83.

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E. subumbrata (Denis & Schiffermüller) M: female at m.v. trap, 5.vii.83.

E. nanata (Hübner) M: one at m.v. trap, 5.vii.83; one flying at dawn, 5.vii.83;
two, 24.viii.83.

E. virgaureata Doubleday M: female at m.v. trap, 24.viii.83.

Asthena albulata (Hufnagel) LP: one, 14.vi.84.

Lomaspilis marginata (L.) M: one at m.v. trap, 5.vii.83.

Semiothis clathrata (L.) M: one at m.v. trap, 5.vii.83; LP: one, 14.vi.84.

Opisthograptis luteolata (L.) M: one at m.v. trap, 5.vii.83;
one at m.v. trap, 24.viii.83.

Cleorodes lichenaria (Hufnagel) M: two at m.v. trap, 5.vii.83.

Ematurga atomaria (L.) M: three, 14.vi.83; one, 5.vii.83.

Lomographa temerata (Denis & Schiffermüller) M: one at m.v. trap, 24.viii.83.

Dyscia fagaria (Thunberg) M: two at m.v. trap, 5.vii.83.

SPHINGIDAE

Smerinthus ocellata (L.) M: two at m.v. trap, 5.vii.83.

Laothoe populi (L.) M: one at m.v. trap, 5.vii.83.

Deilephila elpenor (L.) M: two at m.v. trap, 5.vii.83.

NOTODONTIDAE

Phalera bucephala (L.) M: two at m.v. trap, 5.vii.83; full-grown larva on
Quercus, 25.ix.83.

Eligmodonta ziczac (L.) M: one at m.v. trap, 5.vii.83.

Pheosia tremula (Clerck) M: one at m.v. trap, 5.vii.83

LYMANTRIIDAE

Orgyia antiqua (L.) M: larva, 14.vii.83.

ARCTIIDAE

Thumata senex (Hübner) M: male at m.v. trap, 5.vii.83.

Spilosoma lubricipeda (L.) M: three at m.v. trap, 5.vii.83.

S. luteum (Hufnagel) M: six at m.v. trap, 5.vii.83.

Phragmatobia fuliginosa (L.) M: two at m.v. trap, 24.viii.83.

Tyria jacobaeae (L.) M: one at m.v. trap, 5.vii.83; Mesk: larvae on
Senecio jacobaea, 13.vii.83.

NOCTUIDAE

Agrotis segetum (Denis & Schiffermüller) M: one at m.v. trap, 25.ix.83.

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- Agrotis ipsilon (Hufnagel) M: one at m.v. trap, 25.ix.83.
Ochropleura plecta (L.) M: two at m.v. trap, 5.vii.83.
Noctua pronuba (L.) M: seven at m.v. trap, 5.vii.83; 24 at m.v. trap 24.viii.83.
N. fimbriata (Schreber) M: one at m.v. trap, 24.viii.83.
N. janthina (Denis & Schiffermüller) M: three at m.v. trap, 24.viii.83.
Paradiarsia glareosa (Esper) M: one at m.v. trap, 24.viii.83.
Lycophotia varia (Denis & Schiffermüller) M: 55 at m.v. trap, 5.vii.83.
Diarsia mendica (Fabr.) M: three at m.v. trap, 5.vii.83.
D. rubi (Vieweg) M: six at m.v. trap, 24.viii.83.
Xestia xanthographa (Denis & Schiffermüller) M: three at m.v. trap, 24.viii.83
Anarta myrtilli (L.) M: dead imago, 14.vi.83; one, 5.vii.83.
Lacanobia oleracea (L.) M: two at m.v. trap, 24.viii.83.
Ceramica pisi (L.) M: three (one dead), 14.vi.83; 30 at m.v. trap, 5.vii.83;
larvae on Calluna vulgaris, 5.vii.83 & 25.ix.83;
one at m.v. trap, 25.ix.83.
Mythimna impura (Hübner) M: one at m.v. trap, 24.viii.83.
Atethmia centrago (Haworth) M: two at m.v. trap, 24.viii.83.
Rusina ferruginea (Esper) M: female at m.v. trap, 5.vii.83.
Phlogophora meticulosa (L.) M: 3 at m.v. trap, 24.viii.83;
one at m.v. trap, 25.ix.83.
Apamea monoglypha (Hufnagel) M: eight at m.v. trap, 5.vii.83;
five at m.v. trap, 24.viii.83.
A. lithoxylea (Denis & Schiffermüller) M: one at m.v. trap, 5.vii.83.
Oligia fasciuncula (Haworth) M: one at m.v. trap, 5.vii.83.
Photodes pygmina (Haworth) M: ten at m.v. trap, 24.viii.83; one, 24.ix.83.
Luperina testacea (Denis & Schiffermüller) M: female at m.v. trap, 24.viii.83.
Amphipoea lucens (Freyer) M: 18 at m.v. trap, 24.viii.83;
five at m.v. trap, 25.ix.83. (Genitalia of eight
specimens checked)
Celaena haworthi (Curtis) M: two at m.v. trap, 24.viii.83.
C. leucostigma (Hübner) M: four at m.v. trap, 24.viii.83.
Nonagria typhae (Thunberg) M: two at m.v. trap, 24.viii.83
Hoplodrina blanda (Denis & Schiffermüller) M: male at m.v. trap, 5.vii.83.
Caradrina morpheus (Hufnagel) M: one at m.v. trap, 5.vii.83.
Plusia festucae (L.) M: two at m.v. trap, 24.viii.83.
Autographa gamma (L.) M: one, 14.vii.83; one at m.v. trap, 24.viii.83;
eleven, 25.ix.83; F: one, 25.ix.83.

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Abrostola trigemina (Werneburg) M: one at m.v. trap, 5.vii.83.

Euclidia glyphica (L.) M: one, 14.vi.83; LP: two, 14.vi.84.

Phytometra viridaria (Clerck) M: male, f. fusca Tutt, at m.v. trap, 24.viii.83.

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THE PLIGHT OF THE INVERTEBRATES IN EUROPE.

M. C. D. Speight

A recent Council of Europe study demonstrated that in Europe approximately 20% of the European butterfly species are threatened with extinction over much of Europe. Preliminary results also suggest that upwards of 35% of Europe's dragonfly species are similarly under threat in much of their European range. Various European countries have national "red-data-book" lists of invertebrates in an advanced stage of preparation and the IUCN Invertebrate Red-data-book numbers various European species among those endangered. The British red-data-book for invertebrates covers some 14,000 of the insect species known to occur in Great Britain and lists 10% of them as either extinct or threatened with extinction in Great Britain. The British data also covers land and freshwater mollusca, between 10% and 15% of which are now considered to be under threat in Great Britain. In central Europe 15% of the land mollusca are believed to be threatened as are a minimum of 15% of the land and freshwater mollusca of Austria. Of 1700 miscellaneous insect species surveyed in Belgium, it has been concluded that 10% were either already extinct or endangered with extinction and a further 25% could be expected to disappear by the year 2000. In the Netherlands, more than half of the stone-fly species (Plecoptera) recorded from the country are believed to have become extinct during the present century and 15% of the ground beetle species are now known from 1% or less of the country's area.

There is a certain uniformity exhibited by the array of figures quoted above. Extrapolating from them it can reasonably be concluded that, at a minimum, some 10% of Europe's invertebrate species are currently threatened with extinction almost throughout their European range and that many of these threatened species are probably already extinct over wide areas. Some are almost certainly extinct throughout Europe, the members of the fly family Thyreophoridae being examples - no living specimens have been recorded during the present century. Using the most conservative available estimate of the number of invertebrate species in Europe these figures suggest that at least 10,000 species of invertebrate are probably currently in danger of extinction in Europe. And there is every reason to believe that the slide toward extinction is progressing ever faster - it is likely that by the

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year 2000 a further 20,000 of Europe's invertebrate animal species will be threatened with extinction in Europe.

Very few of Europe's invertebrates are threatened with extinction as a consequence of direct exploitation by man, though some case histories detailed by IUCN would fall into this category, examples being the edible snail (Helix pomatia), the sea-urchin Paracentrotus lividus and certain marine sponges. The vast majority of endangered species are under threat due to destruction or deterioration of habitat, caused by man's activities. To take one extreme example, thousands of invertebrate species are dependent upon habitats which only occur in adequate quantity in ancient woodland containing over-mature, dead and dying trees with plenty of fallen and rotten trunks lying in situ. Such woodland sites have all but disappeared throughout Western Europe and even where stands of over-mature trees remain the woodland floor is "cleaned" of fallen timber and both dead and dying trees are removed. In consequence, a large section of Europe's woodland fauna is today facing extinction en bloc, and exists now only as scattered remnants that possibly nowhere comprise a reasonably complete community.

Habitat deterioration caused by pollutants, fertilisers, drainage etc. is as serious a threat to invertebrates as to other organisms and the widespread use of broad-spectrum insecticides -selective insecticides hardly exist and their development is not an economic proposition for chemical companies anyway - wipes out great numbers of "neutral" and beneficial insects and other invertebrates, even when the insecticide proves ineffectual against the target pest species.

The plight of the invertebrates has been made worse than it would otherwise be because to-date the conservation effort in Europe has been focused largely upon vertebrate animals and flowering plants. This situation has resulted in very few nature reserves being declared primarily because of the interest of their invertebrate fauna. Indeed, it is more normal for the invertebrate fauna to be entirely ignored in processes of assessment of sites for their conservation value and national conservation agencies rarely include personnel trained in the study of invertebrate animals and with specific responsibilities relating to conservation of invertebrates. And once nature reserves or national parks have been declared, their management programmes very rarely incorporate practises aimed specifically at conserving invertebrates. There is little data to support the naive but generally applied

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dictum "if you look after the plants the animals will look after themselves", especially in the context of conservation of invertebrate animals.

Two further factors conspiring against adequate conservation of European invertebrates are the lowly status accorded them in school curricula and the drastic reduction in the teaching of systematics in third level educational institutions. In schools, invertebrates still represent such a peripheral topic that it is little short of miraculous for a student to recognise that invertebrate animals have any significance beyond including a pandora's boxload of multivarious pestilence, offset only by the honey bee as the sole positive element recognisable among them! And even honey bees sting! Given this situation it is hardly surprising that the normal response to any suggestion that invertebrates should be conserved is frank incredulity.

The preoccupation of the universities etc. with more "fashionable" disciplines than systematics has produced a generation of European biologists largely incapable of correctly naming invertebrate species or of even knowing how to set out to do so. Equally, it has resulted in a shortage of professional invertebrate taxonomists. There is thus no cadre of naturalists in Europe who can be called upon to conduct invertebrate survey work on the scale that this can be achieved for the much smaller numbers of species represented by flowering plants and vertebrate animals, and potentially great improvements in taxonomic literature cannot be made due to a lack of specialists to carry out this up-dating process. Equally, ecological studies of invertebrates are much inhibited by the reluctance of student and researcher alike to embark upon work requiring a taxonomic expertise they almost inevitably do not possess. The result is that internationally important invertebrate sites are in danger of destruction without their importance having ever been recognised, that invertebrate species are being exterminated over wide areas of Europe without prior warning being given that they have reached "threatened" status, that the invertebrate faunas of Europe's nature reserves and national parks remain largely unsurveyed and unknown and the ecological requirements of most invertebrate species remain conjectural.

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Footnote: This paper is an extract from "A General Statement on Invertebrates" prepared by the author for The Council of Europe.

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FIELD NOTES

FIELD MEETING TO MOUDS BOG AND POLLARDSTOWN FEN, CO. KILDARE, 9 JUNE 1984.

P. J. Foss

A total of 22 members assembled in Newbridge town to attend this field meeting to investigate the flora and fauna present on Mouds bog and Pollardstown fen.

Mouds bog (N7818) is an extensive (526 ha), relatively intact, eastern ombrotrophic raised bog. It is one of the most easterly raised bogs in the country. Consequently the bog receives only 700-800 mm of rain annually, with less than 150 rain days per year. The mean annual temperature is 9-10°C, and the number of hours of bright sunshine is in the range 1300-1400 hours per year. Its proximity to Dublin has made it a suitable area for educational purposes. The research done on various aspects of the bog's ecology during the late 1960's as part of the IBP programme adds to the value of the site.

It was noticed that marginal peat cutting and regular burning had adversely affected the bog's hydrology. The lakes marked at the southern end of the bog in the 1910 OS map have dried out and become infilled with vegetation. Although the bog showed a good hummock-hollow system in some areas, there were few pools visible, and those that were present had an algal base which may be the result of drying out and shrinkage of the peat. The main hummock forming and pool Sphagnum species were absent or poorly represented, suggesting that the bog is not actively growing.

Members gained access to the bog via the cutover margin, which surrounds the entire bog. Peat cutting is still in progress here today as was seen from the large quantities of mechanically harvested peat in the area. The cutover area of the bog proved to be of both botanical and entomological interest to various members. Higher plants recorded from this area included:

Rubus fruticosus	Carex panicea
Calluna vulgaris	C. nigra
Anthoxanthum odoratum	C. hirta
Succisa pratensis	Potentilla erecta

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Holcus lanatus	Potentilla anserina
Polygala serpyllifolia	Juncus effusus
Linum catharticum	Vicia cracca
Luzula multiflora	Ranunculus acris
Rumex acetosa	Cirsium dissectum
R. acetosella	Galium saxatile
Dactylorhiza sp.	Hypericum pulchrum
Molinia caerulea	Lotus corniculatus
Hypochoeris radicata	Filipendula ulmaria
Plantago lanceolata	Blechnum spicant
Pedicularis sylvatica	Crataegus monogyna
Centaurea nigra	Salix aurita
Polygonum sp.	Pteridium aquilinum
Stellaria alsine	Erica tetralix
Betula pubescens	

The following species were also recorded in the wetter drains in the cutover area:

Equisetum palustre	Catabroza aquatica
Cardamine pratensis	Carex rostrata
Dryopteris carthusiana	C. curta
Lemna minor	Glyceria fluitans

Following the examination of the cutover margin the party was led onto the peat dome. The dangerous shrinkage cracks present near the edge of the bog were pointed out. This area contained vegetation dominated by Trichophorum cespitosum, Molinia caerulea and Calluna vulgaris with occasional Betula pubescens and Salix atrocinerea bushes. The party was then shown the Sarracenia purpurea (North American pitcher plant) colony. This species grows in a wet surface depression in the bog, near the base of a ridge. Two plants of this species were introduced to Mouds bog in 1963 by Mr. T. A. Barry of Bord na Móna. Since their introduction the plants have proliferated, and now cover an area 10 x 7m, within which they form an almost monodominant stand. Although flower heads were common these were immature and not yet open. Frogs were particularly abundant in this area, and generated considerable interest among members!!

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The party then moved further on to the bog where an extensive burnt area was encountered, which although devoid of plants clearly demonstrated the hummock-hollow topography associated with raised bogs.

Species recorded on the bog surface included:

Higher Plants

Calluna vulgaris
Erica tetralix
Eriophorum angustifolium
E. vaginatum
Trichophorum cespitosum
Dryopteris carthusiana
Potentilla erecta
Molinia caerulea
Drosera rotundifolia
Vaccinium oxycoccus
Andromeda polifolia
Narthecium ossifragum
Empetrum nigrum
Carex nigra
Juncus effusus
Sarracenia purpurea
Rhynchospora alba
Betula pubescens
Salix atrocinerea

Mosses & Lichens

Aulacomnium palustre
Campylopus introflexus
Polytrichum alpestre
P. commune
Odontoschisma sphagni
Zygonium ericetorum
Leucobryum glaucum
Mylia anomala
Sphagnum tenellum
S. magellanicum
S. papillosum
S. cuspidatum
S. capillifolium
Hypogymnia physodes
Cladonia furcata
C. floerkeana
C. impexa

After lunch and a slow retreat, the party reassembled and moved on to examine Pollardstown fen (N7716). The fen lies in a shallow depression, running in a north-west south-easterly direction 2 km north of the Curragh. Approximately forty springs provide a continuous supply of calcium-rich water to this alkaline fen, from the Curragh and the limestone rich area to the north (Doyle, 1984). The area has long been regarded as one of the foremost botanical sites in the country, though conservation measures taken in the past did little to bear out this view. The area examined by certain members of the party has recently been acquired by the Department of Fisheries and Forestry, who have reflooded this formerly drained section. The effect this reflooding has had on the vegetation was most striking. The area occupied

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by pasture less than two years ago was under 35 cm of water, and the vegetation was slowly reverting to its original aquatic state. The present vegetation was dominated by Juncus articulatus, a floating mat of Agrostis stolonifera, and in particular large quantities of Utricularia vulgaris. Occasional patches of Phragmites australis, Ranunculus flammula, Carex lepidocarpa and Potamogeton sp. were also recorded. A large colony of Larus ridibundus L. (Black headed Gulls) were also nesting in the centre of the fen.

Following the watery survey of Pollardstown fen the party retired to the banks of the canal feed at Milltown. Here light refreshments obtained from the Hanged Mans Inn helped people to enjoy the final stage in the hydrosereal succession from open water to raised bog seen in reverse during the days outing.

Nomenclature for vascular plants follows Clapham, Tutin and Warburg 1981; nomenclature for mosses, liverworts and lichens follows Smith 1978, Watson 1981 and Dobson 1981 respectively.

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FIELD MEETING TO THE BALLYEIGHTER LOUGHS, CORROFIN, CO. CLARE,
29 JUNE - 2 JULY, 1984

H. N. MCGough

Twelve members and friends attended this sun-scorched meeting to investigate the extensive wetland vegetation of the Ballyeigher Loughs system. A short walk on the Friday evening, while awaiting the arrival of eager I. B. S. members, proved rewarding as the margins of the River Fergus (east of Corrofin) held occasional Butomus umbellatus (Flowering Rush). This is a new record for District 3 of the Flora of Connemara and the Burren (Webb and Scannell, 1983). The meeting proper began early on Saturday morning with a visit to Ballyeigher Lough Lower. Here a wide range of fen communities were noted and the uninitiated were tutored in the art of taking relevés. That afternoon, the party moved to Ballyeigher Lough Upper. Here the group were impressed by the limestone pavement at the lake margin which carried well developed Rhamnus - Frangula stands. The party searched briefly a nearby Schoenus fen for Nitella tenuissima (Desv.) Kutz found there on a previous visit by Tom Curtis and the author. Unfortunately the search proved fruitless as the area was unusually dry.

After a slightly later start on Sunday morning the group headed for Lough Atedaun, a lake with strong turlough affinities. Here large areas of mud were exposed with extensive stands of Hippuris vulgaris, Eleocharis palustris, Mentha aquatica and Myosotis species occurring. Eleocharis acicularis was frequent and formed a short sward near the water margin. The alga Botrydium granulatum Greville (Maroc) was dotted occasionally about the mud surface. The lake itself was choked with pondweeds, Potamogeton pectinatus, P. perfoliatus, P. berchtoldii, P. crispus and P. lucens being among those recorded. Ceratophyllum demersum and Zannichellia palustris formed impressive underwater stands in some areas.

Survivors of a long hot trek around the lake to the east shore were rewarded by seeing Limosella aquatica on the parched mud bank of the River Fergus. The last visit of the day was to view the extensive stands of Potentilla fruticosa on the south-east shore of Lough Muckanagh. Several members then decided to rehydrate in Corrofin prior to Mrs. Flanagan's substantial "High Tea". Only three members and their leader remained to visit the north-west shore of Lough Muckanagh on Monday morning. Here we saw Dryas octopetala

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growing with Schoenus nigricans in what was regarded by all present to be an unusual habitat. Here too, the small party was lucky to see several plants of Ophrys insectifera (Fly Orchid) in full flower with Carex dioica nearby.

The last find of the trip was made by Jim White who spotted Hydrocharis morsus-ranae (Frogbit) growing in a ditch. This species had not been recorded recently in any of the districts of the Flora of Connemara and the Burren (Webb and Scannell, op. cit.). A suitable end to a fruitful and enjoyable trip!

Nomenclature follows Tutin et al. (1964-1980) for higher plants.

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NOTES ON PLANKTONIC CRUSTACEA AND HYDACARINA FROM TWO IRISH LAKES.

J. P. O'Connor

Between December 1970 and January 1972, open water plankton samples were collected with a plankton net in Lough Sillan, Co. Cavan (H 7007) and in Lough Dan, Co. Wicklow (O 1503). The former may be classified as moderately eutrophic while the latter is both humic and oligotrophic. Further details concerning the two lakes and the comparative study undertaken on them will

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be found in O'Connor and Bracken (1978).

Time did not permit a detailed examination of all the collected material but nevertheless the identified species may be of interest. Ceriodaphnia dubia Richard was only found in Lough Dan while Daphnia hyalina Leydig was only taken in Lough Sillan. Three species viz. D. longispina O.F. Muller, Bosmina coregoni Baird and Diaptomus gracilis Sars occurred in both waters. The water mite Neumania callosa (Koenike) was obtained in Lough Dan.

I am indebted to Mr. J. P. Harding (British Museum (Natural History)) and Professor J. Conroy (University of Winnipeg) for identifying or confirming the determination of species. I also wish to thank the Department of Fisheries for a Fisheries Science Studentship which was held in the Department of Zoology, University College, Dublin. At the time of the study, Voucher specimens of the Crustacea were deposited in the British Museum (Natural History).

References

- O'Connor, J. P. and Bracken, J. J. (1978) A comparative limnological study of two Irish lakes (Lough Sillan, Co. Cavan and Lough Dan, Co. Wicklow). Ir. Fish. Invest. Ser. A. No. 17.

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BOOK REVIEW

THEMES IN BIOGEOGRAPHY, Taylor, A. J. (ed.) 1984. Croom Helm, London & Sydney. 404 pp. ISBN 0-7099-2428-3 PBK. £12.95

"Geography for the biologists" is the expression used by the author of the first of these eleven essays, to describe the traditional focus of biogeography. The ten contributors to this volume clearly share the hope that their endeavours will accelerate a process of re-defining biogeography which they suggest has been underway for some time. But the only definition of biogeography provided, within the 14 page and rather selective glossary, is "the study and interpretation of distributions of plants, animals and man over space and time in relation to their environments". This definition offers few clues to the character of the re-orientation of biogeography aimed for by these authors and is at odds with their texts, which are essentially on the theme of "ecology for the geographers".

The eleven chapters are entitled and authored as follows: History of Biogeography (P. Stott); Spatial Dimension in Biogeography (D. Watts); Time Scales in Biogeography (J. R. Flenley); Biogeography and Ecosystems (R. P. Moss); Vegetation Analysis (D. W. Shimwell); The Geography of Animal Communities (R. J. Putman); Soils in Ecosystems (R. T. Smith); Bioclimates (D. Greenland); The Man/Land Paradox (J. A. Taylor); Remote Sensing in Biogeography (J. P. Darch); Biogeography: Heritage and Challenge (J. A. Taylor).

Small print on the back cover states that "This is a book of interest and value to undergraduate students of geography, biology and environmental science, and one which will benefit the bright sixth former". It certainly provides little more than an introduction to the various topics covered, rather than a review of each. But more than this would not perhaps be expected within 400 pages, seeing the scope of the topics involved. However, fully 90 pages are taken up by the references ending each chapter, many of them repeated more than once. All the references given at the end of one chapter are given again elsewhere in the volume. Literature covered includes a significant number of titles from 1980-81, but little from 1982-3. Sources quoted are almost exclusively English-language publications.

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The type face used is particularly clear, which is as well since the book has been printed in circa 8 point. The authors' styles exhibit most forms of pretentiousness from "biogeographers are seen by ecologists as evil spirits who descend upon unsuspecting female ecologists, seeking carnal intercourse with them in their sleep"(Moss,p.106) to "At the same time, the counterpoint, anthropocentric possibilism, now operating on floating isotropic planes should be recast on the more resilient and realistic platform of environmental resource-usage" (Taylor, p. 234). Scattered through the text are nearly 70 black and white figures and 40 tables, reasonably consistent in format and style of presentation.

The provocative nature of this volume, with its authors repeatedly scoffing, jibing and nipping at the published works they discuss, makes it a valuable contribution to the 'ecotone' between biology and geography, in that by exasperating and irritating many of the more informed among its audience, the authors should force re-appraisal of views held. But a biogeographer hoping this text might represent an up-to-date review of his or her subject is unlikely to find in it much satisfaction. This volume may well find a niche in some institutions as an undergraduate course book for geographers and environmental science students, as the editor suggests, but the hapless undergraduate faced with the ordeal of having to read it cannot be expected to enjoy much of the experience

M. C. D. Speight.

