Biology Curators Group Newsletter

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Author(s): Garland, S. P. & Whiteley, D.

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Local Invertebrate Recording Schemes at Sheffield Museum

Introduction

In a recent article (Whiteley 1978) some of the problems and solutions of collecting and disseminating information on local vertebrate animals were outlined, with special reference to activities at Sheffield Museum. This present paper deals with similar and other problems encountered in recording local invertebrate animals and suggests ways in which curators in other under-recorded areas can give their invertebrate files a boost. Although we realise that we may be teaching our grand*moth*ers to suck ova, the following notes may be of use to museums with small natural history sections lacking specialised invertebrate zoologists, and which rely to some extent on voluntary and temporary help. This situation exists at Sheffield City Museums, where two curatorial and two technical members of staff are responsible for the natural sciences (including geology and meteorology).

About twelve years ago the amount of information available on the area's invertebrates was very small and virtually non-existent for all but a handful of groups studied by a few enthusiasts in the past. In his account of the local invertebrates in the standard *Natural History of the Sheffield District* (Sorby Natural History Society, Sheffield, 1968) the recorder, W. J. Smellie, summarised the situation quite well - "Coincident with these large numbers and variety is a general lack of interest ..... with the exception of a few orders, the present day position of invertebrate knowledge is not by any means as well outlined as it was at the turn of the century". Likewise, local invertebrate material in the Museum's collections consisted of good collections of macrolepidoptera, and a few small collections of spiders, millipedes etc., mainly the result of fieldwork by David Spalding, a former curator. A programme of collecting local invertebrate specimens and records was initiated by Tim Riley, Keeper of Natural Sciences, about eleven years ago, and aided by his assistants and others, has made considerable progress. Our current programme can be divided into three broad phases. For each invertebrate group the aim is:-

1. To list local species, i.e. to ascertain presence or absence within a designated area.

2. More detailed coverage, leading to provisional and definitive 1km sq. maps, individual site lists etc.

3. Ecological studies of selected species or small groups of species, e.g. habitat preferences, altitudinal distribution, local variation, site requirements for rarer species etc.

Problems

Invertebrate recording schemes differ in a number of ways from those dealing with flowering plants or vertebrate animals. With the exception of butterflies and larger moths, invertebrates are rarely studied by the average amateur naturalist, or natural history society (although we are aware of several societies making considerable progress in this field). Every town or district can boast at least one fanatic for an 'unpopular' group, be it slugs, pseudoscorpions, fruit flies or parasitic nematodes.

Such enthusiasts, however, rarely have time or facilities to organise local naturalists, or operate local mapping schemes. Secondly, many groups of invertebrates require specialist knowledge, literature,

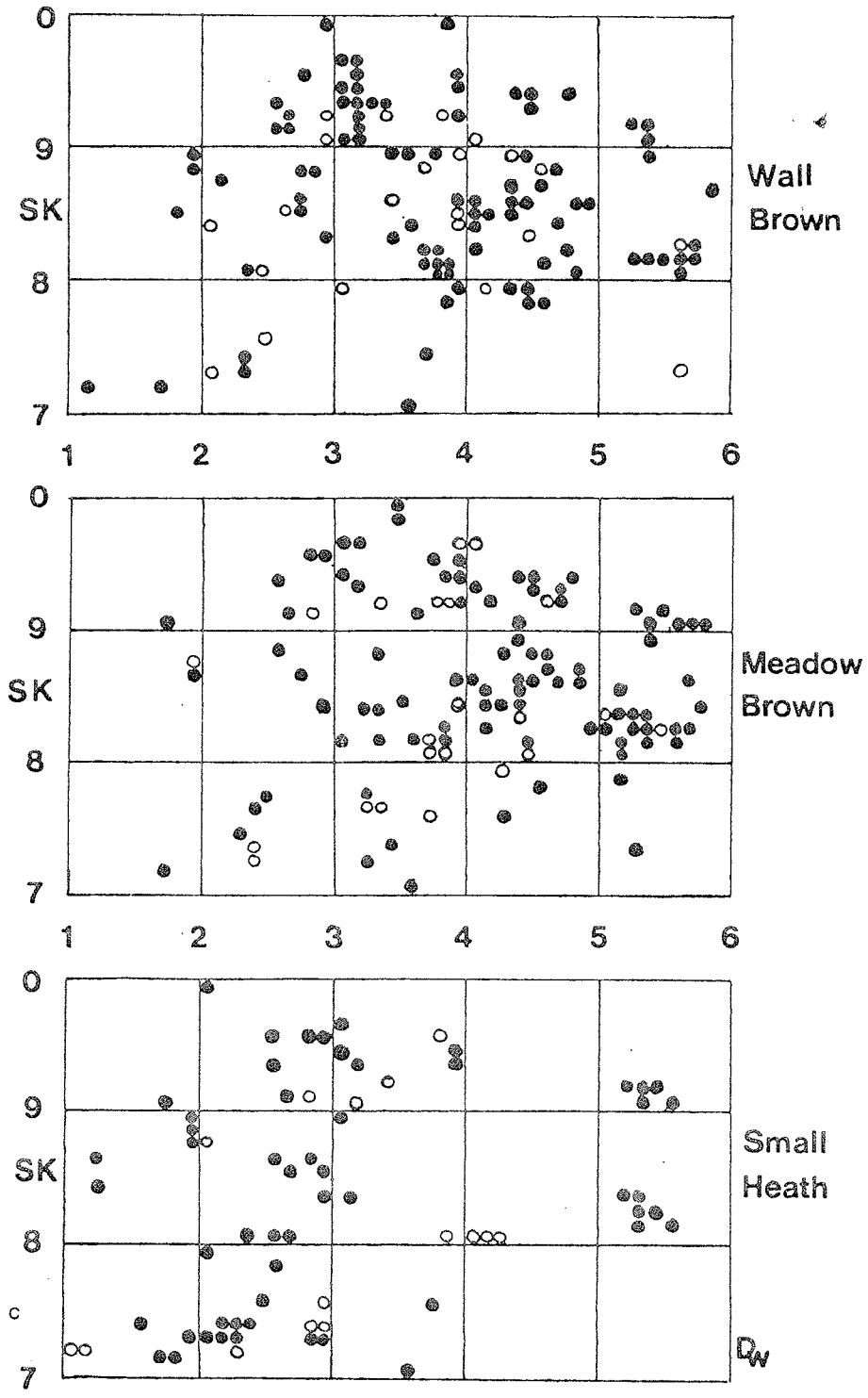


Fig.1 Provisional 1km^2 maps of Butterflies using local grid squares as a base map. (Smellie 1977) Revised edition due in 1981.

and expertise to identify individuals to species level. Also, all groups contain at least a few closely related species which require critical examination of the whole, or part of a specimen.

Bearing these difficulties in mind, therefore, collection of data on Sheffield's invertebrates has by necessity gone hand-in-hand with the collection of voucher specimens, which are added to the Museum's permanent reference collections. Even 'common' species are retained (with reason) as they form a reference source which can be subsequently re-examined. For example, our specimens of the common slug *Arion hortensis* (Fér.) are currently being redetermined in the light of recent work.

Geographical Areas

Sheffield Museum's Local Biological Records Centre (L.B.R.C.) has, by agreement with B.R.C. at Monks Wood, accepted responsibility for the post-reorganisation Metropolitan District of Sheffield, an area of about 440 km squares (South Yorkshire differs from most counties in that each of the four Met. Districts has its own L.B.R.C.). Sheffield's proximity to Rotherham and Derbyshire, both with L.B.R.C.'s, but both traditionally and currently studied by Sheffield naturalists, has created problems over the choice of area to map. Therefore, published maps cover a variety of geographical areas, depending on circumstances at the time of the survey, and the author's own interests.

General considerations are:-

1. Natural History Societies. Some do not restrict their fieldwork to political boundaries, but record by grid squares (see Butterfly maps. Fig. 1).

2. Availability of manpower, time etc. May limit a survey to the Sheffield District (e.g. Freshwater Invertebrates, Moths).

3. Other local recording schemes. To prevent duplication of effort with the Derbyshire Entomological Society's county lepidoptera survey, our own moth survey was limited to the District. (Fig. 2)

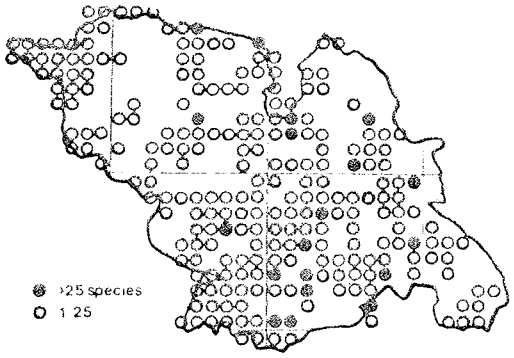
4. Recorders, using our data for their own schemes may wish to publish maps for a wider area. For example, Bill Ely's millipede maps cover the whole county of South Yorkshire. (Fig. 3)

Data Collection Techniques

A. Fieldwork by Museum Staff

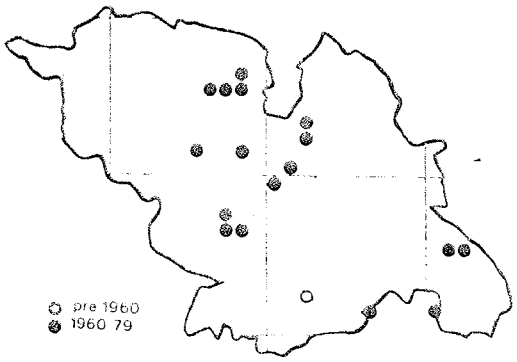
Specimens are collected in the field, killed, preserved, labelled and accessioned; followed by preliminary sorting by museum staff into class, order and family, pending specific identification. Referees identify material which staff feel incompetant to name, or to check rarities and critical species. Otherwise specimens are 'shelved' until referees can be found. Neighbouring curators, local experts, county recorders and organisers of national mapping schemes have willingly examined our material. However not all these experts are able to undertake this service, and it makes sense to ask first. Also, specialists are often more keen to look at material if assistance is given by labelling series of named specimens. This usually means re-grouping specimens from

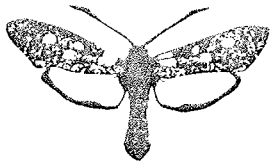
DISTRIBUTION MAPS



Records Received

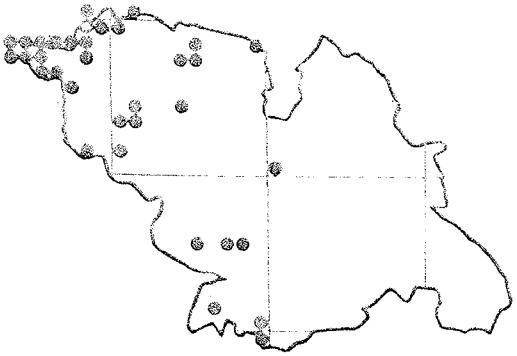
Fig. 8.





Narrow-bordered 5-spot Burnet

9.



Oak Eggar

10.

Fig.2 Provisional 1km^2 maps of Moths using the Sheffield Metropolitan District as a base map. (Garland 1979)

several different collections; hence the need to accession material first.

Usually, two or three collection sites are selected for study each year. They may be local reserves, S.S.S.I.'s, field study sites, nature trails, or sites which require further information in response to enquiries.

B. Volunteers and Students

Each year up to three undergraduate or graduate biology students and several volunteers have been attached to the museum to collect and preserve invertebrates. This has proved to be highly profitable as only a basic training is required and the results can be very rewarding (in terms of new records) particularly as their expertise in sampling develops. (Again, a word of warning! Prepare provenance and accession labels in advance, and ask the collectors to label their own collections, otherwise you are likely to be swamped with hundreds of pinned insects or spirit tubes with cryptic labels, which will keep you busy well into the winter. Better to have a smaller, well-labelled discreet field collection ready for identification. We print our own labels by photographically reducing A4 sheets of 'golf-ball' bold typed labels. 32 ASA film and Grade 4 paper give the best results. In addition, some of our volunteers and students have been encouraged to identify some of their own captures. One student became competent at naming *Staphylinidae* (Rove beetles) - not an easy group. A local railwayman and amateur naturalist collects several thousand insects for us each year and is making a special study of hoverflies (Diptera; Syrphidae). Students and volunteers also help to extract information from collections onto card indexes.

C. Manpower Services Commission

Following the success of a J.C.P. scheme to provide basic data on local biological and geological sites in 1978, a plan to extend the work using the S.T.E.P. scheme, involving a survey of local freshwater sites, commenced in July 1979. Samples of freshwater invertebrates have been collected from at least one site in each 1 km square, together with a record of environmental details, vegetation and ownership of each site. Samples have been preserved, sorted, labelled and stored (as an experiment) in standard jars ordered by site. Cross references to species are entered onto M.D.A. Continuation Cards. Graduate biologists, Eluned Smith and Dave Cooper (replaced by Krys Zasada) were selected for the posts and have been encouraged to identify groups of their own choice, before the specimens are checked by referees.

D. Extramural Courses

Evening classes organised by Sheffield University and Workers Education Association on "Sheffield's Lesser-known Animals" in which museum staff have acted as tutors have contributed small but significant additions to the Mollusca, Isopoda and Myriapoda collections and records. One student compiled a card index of local records of slugs.

E. Local Natural History Societies

Local natural history societies are another useful source of information. The membership of our local societies, Sorby N.H.S., Derbyshire Ent. Soc. and Yorkshire Naturalists Union, includes a 'hard core' of skilled

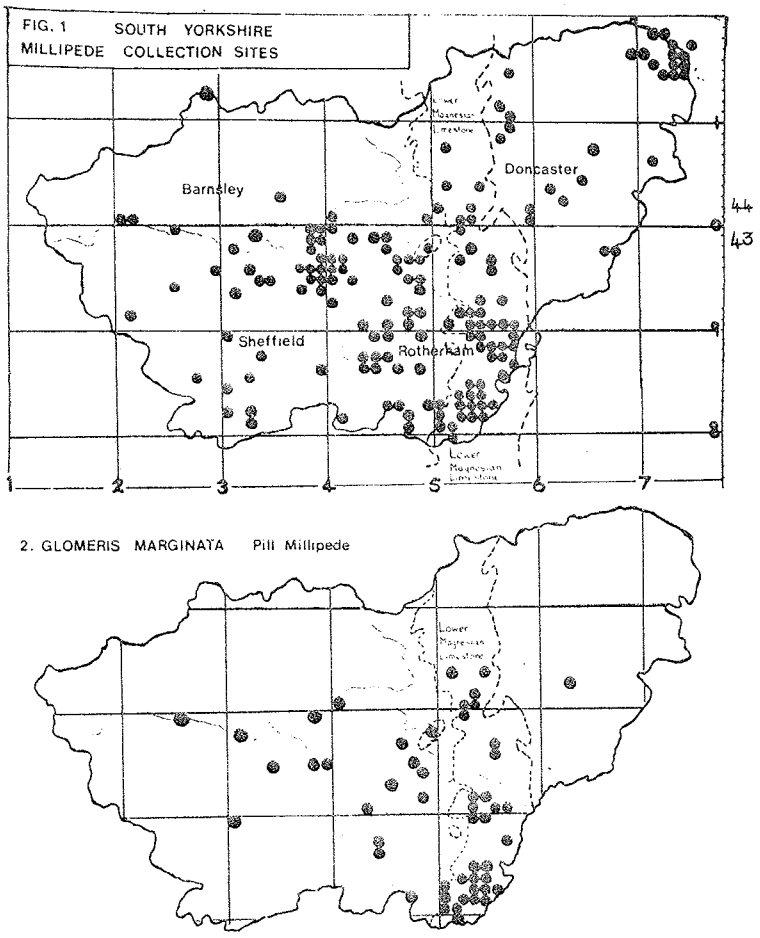


Fig.3 Provisional $1km^2$ maps of Millipedes using South Yorkshire County as a base map (Ely 1977)

SHEFFIELD MUSEUM MOTH SURVEY - RECORD FORM

Name ..Austin Brackenbury..... Telephone ..52899....

Address ..76..Crawford..Road.....

.....

Where was the specimen found? ..Oughtibridge Box, Wharncliffe..

..Wood.....SK 311936.....

When? ..15 August 1978.....

Species identified as ...Lesser Treble Bar.....

SPECIMENS WILL BE RELEASED OR DISCARDED UNLESS OTHERWISE SPECIFIED

Fig.4 Record form which accompanied specimens submitted by the public.

invertebrate zoologists capable of organising recording schemes. Society recorders are encouraged by museum staff to publish their data, and supported whenever possible with additional records from the museum. To aid such a venture on one occasion we drew up 1 km^2 distribution maps to add to the published text. Liaison with local experts often results in them working through the relevant museum collections, preparing lists and redetermining material. Conversely, the museum benefits by obtaining from the recorder his sometimes considerable field data. Surveys of butterflies, dragonflies and moths in part followed this pattern.

Society field excursions and indoor meetings provide opportunity to publicise projects, and to provide advice and tuition to members. Apart from the amateur expert, there is an army of willing and enthusiastic 'semi-skilled' naturalists who are quite capable of providing useful contributions, if coaxed and directed. To this end, Museum staff have been involved in an 'Invertebrates Workshop' organised by the Sorby N.H.S., in which tuition was provided on the identification and biology of millipedes, moths, hoverflies, beetles, grasshoppers and allies etc.

A full-day symposium on "Local Invertebrates and Invertebrate Recording Schemes" was held in 1979, again providing opportunity to present papers on the museum's role as a recording unit at local and national levels, and to publicise our holdings. Both venues were very successful, well attended, and provided a chance for recorders and museum staff to point keen members in the right direction and to make contact with new faces. If your local society is unable to organise such events, try organising one at your museum. All you need is a spare Saturday afternoon, a room, a few specimens and books, and half a dozen willing tutors.

Attendance at exhibitions and meetings of national and county societies (Royal Ent. Soc., Derbyshire Ent. Soc., Y.N.U. etc.) has resulted in making contacts with county and national recorders. A small portable exhibition has been mounted, demonstrating current work and interesting new records aimed at 'bringing the mountains to Mohammed'.

F. Gallery Displays and Public Appeals

Davis (1979) has already outlined the pro's and cons of public participation surveys based at museums. After two successful vertebrate projects on amphibians and fishes (Whiteley 1978) we constructed a display aimed at encouraging members of the public to bring in moth specimens for identification; and including a selection of common moths to attract interest. The 'Moth Survey' was also publicised on BBC Radio Sheffield and in a short interview an appeal for specimens was made. There was a good response to the scheme. There was an expected bias towards awe-inspiring monster species with big staring eyes or nasty stings. Trembling members of the public were reassured that their specimens (jar-bound with the ubiquitous handful of grass) were harmless, but were still only too happy for the museum staff to perform the release. Three or four good moth-trapping evenings would probably have produced as many records, but public specimens usually came from inaccessible urban areas, where running an M.V. trap attracts more people than moths. However, as a public relations exercise, the survey was a success, and created much goodwill with our visitors.

This year's effort, aimed at the coleoptera fraternity, and entitled "Join our Beetle Drive" has so far been on display only during the winter, and attracted only a few enquiries. (Again, more urban and synanthropic species, rarely recorded by naturalists). However, an additional bonus has been contacts made with local coleopterists, previously unknown to us. Such discoveries are all too rare, but always worth trapping and preserving.

G. Personal Fieldwork

A vital part of any recording scheme. Much work can be achieved during evening work with light traps and week-end trips to supplement the limited time available for fieldwork during office hours. It is difficult to run a scheme without getting involved oneself, and liaison with an active local recorder can be enhanced if museum staff are themselves active contributors.

H. Direct Appeals to Companies

Devices designed to kill insects are frequently found in hospitals, kitchens, restaurants and food factories, and consist of an ultra-violet lamp which attracts insects, and an electrified grid which kills them. Insect remains are usually recognisable, but sometimes charred and always brittle. If examined periodically these lamps can provide useful species lists, and an approximate indication of relative populations. If the problem of persuading the owners that their smelly remains are of scientific value can be overcome, these traps provide a wonderful sampling technique, particularly in industrial areas. During our Moth Survey one Sheffield hospital furnished over sixty species of macro moths and a few dozen micros in just two years.

I. Use of Museum Collections

By tapping the third source (Skidmore, 1978) we have been able to trace a valuable amount of previously unpublished data. During the Moth Survey data was extracted from our own collection, and the impressive collection of William Reid, a former local lepidopterist who sold his collection to the B.M.(Natural History). After consulting a checklist of records and borrowing his diaries from the B.M. for data extraction, it was only necessary for one person to spend a single day in London to tie up the loose ends. The B.M. staff were, understandably, unable to extract this data, so it was vital that as much information as possible was sorted prior to the visit.

Relations with neighbouring museums, particularly Rotherham, are good, and joint recording trips to localities of mutual interest and exchanges of specimens are frequent. In particular, each museum willingly provides the other with records for publication on areas larger than the Districts e.g. Millipedes (Ely 1977), Butterflies (Smellie 1977) and Centipedes (Addey 1978).

Recording Formats

After a number of years experimenting with different cards and indices for various recording schemes, two standard cards have been selected to suit different requirements:-

B.R.C. 80-column "pink" cards. Used for groups with a small number of species (e.g. ants, millipedes, woodlice) and groups for which habitat data is an important requirement (e.g. grass-

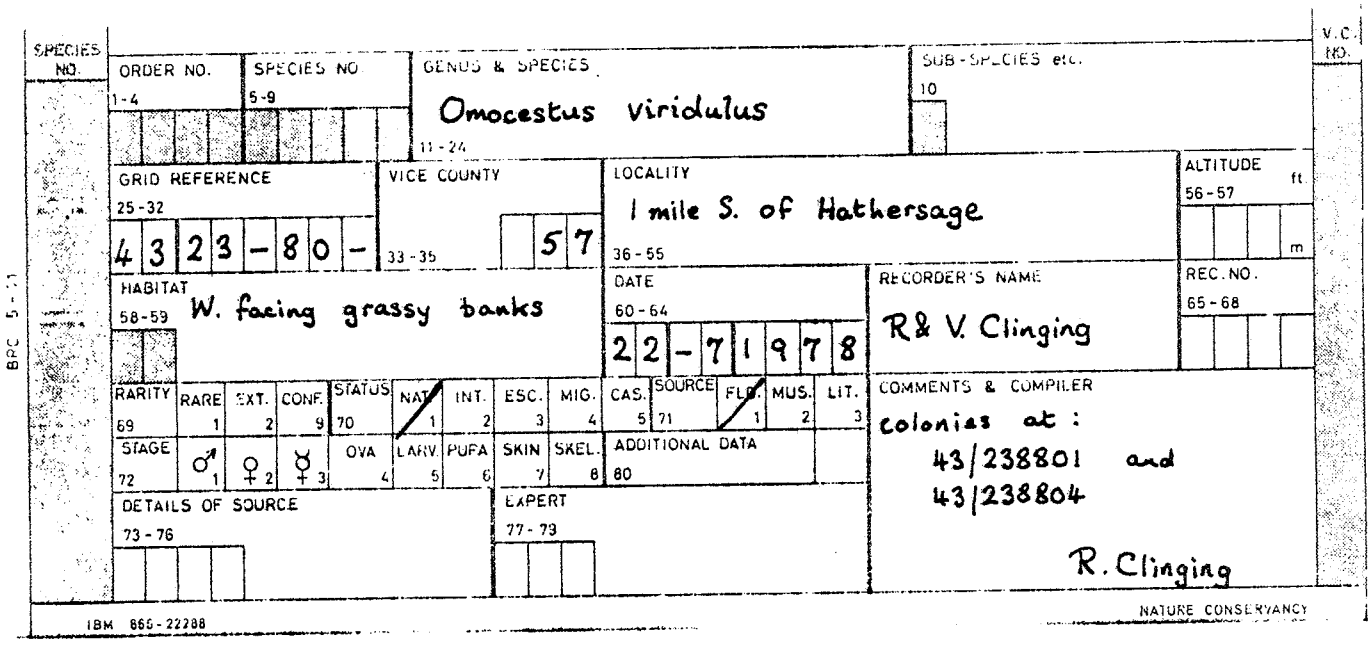


Fig.5 B.R.C. 80-column 'pink' card used for the local Orthoptera mapping scheme.

Phragmatobia fuliginosa L. Ruby Tiger ARCTIIDAE

Langsett (Midhope)	15 larvae	8 April 1898	A Whitaker	
Langsett	3 pupae	4 May 1899	"	
Midhope Moors	1 pupa	16 April 1900	"	
Strines Moor	2 larvae	19 Sept. 1950	T Ford	
Totley	2 adults	4 & 6 Aug. 1950	W Reid	3180
Whirlow Park Road	1 adult	4 Aug. 1952	"	3282
Loxley Common	2 larvae	11 Aug. 1968	F Harrison	3090/3190
Greno Wood	1 adult	12 June 1969	"	3295
Richmond	1 adult	16 June 1969	"	3985
Greno Wood	1 adult	29 May 1978	R Clinging	3296
Unsliven Bridge	1 adult	19 June 1978	J Lee	2599
Hallam Moors	1 larva	20 Sept.1978	S P Garland	2484
Brown Edge	1 larva	21 Sept.1978	"	2686

Fig.6 Standard 8" x 5" filing card used for the local Lepidoptera mapping scheme

hoppers). "Pink" cards can be filed by species, grid reference, habitat or date and manually sorted for different classes of data. (Fig. 5)

8" x 5" filing cards. Used for groups with a large number of species, one card per species with multiple entries. (Fig. 6) Not as flexible as "pink" cards, but they are easier and quicker to fill in.

In addition, standard B.R.C. Field Cards (RA1 to RA33) are used to forward records to national recorders, and for cross-indexing records to the local 'Biological Sites' file.

Publications

Publications of records in various forms is one of the most efficient ways of disseminating information - an important function of a L.B.R.C.

Newsletters of local societies e.g. D.E.S. and S.N.H.S. have proved useful for initial launching of surveys, frequent reminders, progress reports, notes on interesting finds and general humerous anecdotes. It costs the museum nothing and reaches 600 naturalists.

Local Journals e.g. the Sorby Record are ideal for the publication of provisional and definite maps, annual reports and a variety of other notes of permanent interest. (Hint - it helps having an editor on the staff).

Joint Publications. The problem of publishing a large paper such as a local moth fauna, without dominating an issue of a journal (and receiving rude words from non-lepidopterists) was overcome by initiating a joint publication the Sorby Record Special Series, financed by both the Sorby N.H.S. and the Museum. Each institution takes a number of copies proportional to the financial input. Issue No. 1 "The Moths of Sheffield" (Garland 1979) is already selling well, and further invertebrate volumes are planned on Freshwater Invertebrates and Butterflies. Each subject is suitable packaged with maps, illustrations and potted biologies for public consumption.

Internal Publication. A detailed report of the results of the fresh-water invertebrates survey will be published later this year for restricted circulation to planners, water authorities and other relevant institutions.

The Value of Invertebrate Records

The invertebrate recording schemes have been of great benefit, not only to this Museum, but to a wider natural history movement.

Most of all, the Museum has established a central co-ordinating role within Sheffield, without stealing the thunder from amateur workers. Undoubtedly, these joint recording schemes, publications and meetings have helped create an almost symbiotic relationship resulting in greater local interest and activity.

The benefits of sound, well-identified reference collections cannot be over-emphasised. Far fewer specimens need to be referred to referees once verified examples of critical species are available for comparison with freshly collected material. Our own expertise has

increased by working with the reference collections and in recent years an increasing number of naturalists have been using our specimens to identify their own material. The invertebrate recording schemes have played a large part in stimulating the local natural history movement to look more closely at under-recorded groups, which had barely received any attention a few years ago. Some local youngsters have even forsaken the well-trodden ornithological path into natural history, in favour of coleoptera, for example.

Public participation surveys have resulted in an awareness of the museum's living role in recording the local environment, and increasing contact with visitors yields useful and interesting enquiries.

Invertebrate surveys have also provided more site-orientated data which is useful when the conservation value of a site is assessed. A number of insect species are indicators of old, well-established bogs and woodlands, and records supplement or even supplant botanical information on relict sites. We are currently liaising with the N.C.C. to revise local S.S.S.I.'s and information on the invertebrates is proving to be particularly useful. Several other institutions, particularly water authorities, have expressed an interest in the forthcoming results of the freshwater survey.

On a broader front, relevant records are forwarded to a wider range of national recording schemes, organised by the B.R.C. and others, for incusion in the national atlases, which have their own far-reaching applications. In addition, larger collections and files enable us to handle more detailed research enqurieis. Recent examples include an enquiry into the 1976 'invasion' of the Camberwell Beauty, the variations of the drone fly *Eristalis tenax*, and elytral patterns of the longhorn beetle *Strangalia maculata*.

Acknowledgements

We are grateful to our museum colleagues, particularly Jerry Lee and Tim Riley for instigating, collaborating and supporting local projects, many local naturalists, and to John Bartlett (Director) and Councillor E. Hattersley (Chairman) for their constant interest in our activities.

Opinions expressed in this article are personal, and are not necessarily official museum policy.

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Appendix

Current 1 km sq mapping schemes in the Sheffield District (invertebrates)
* maps published or in preparation

* Amphipoda (freshwater shrimps)
  Chilopoda (centipedes)
* Diplopoda (millipedes)
  Isopoda (woodlice/waterlice)
* Hirudinea (leeches)
  Mollusca (land and freshwater)
* Ephemeroptera (mayflies)
* Plecoptera (stoneflies)
* Trichoptera (caddisflies)
* Odonata (dragonflies)
* Orthoptera (grasshoppers)
* Lepidoptera (butterflies and macro moths)
* Hempitera - Corixidae etc. (water bugs)
  Coleoptera - Carabidae (ground beetles)
* - (water beetles)
* - Coccinellidae (ladybirds)
  - Cerambycidae (longhorns)
  - Scarabaeidae
  - other selected species
* Hymenoptera - Formicidae (ants)
  - Bombus, Psythirus (bumble and cuckoo bees)
  Diptera - Syrphidae (hover flies)

Steven P. Garland, Natural Sciences Section

Derek Whiteley, Sheffield City Museum

Greenwood for Council

Our Chairman, Eric Greenwood, will be standing for membership of Council of the Museums Association. Please use your vote to ensure a voice for biologists within the Association.