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A GUIDE TO BIOLOGICAL RECORDING IN SCOTLAND.

CONTENTS.

compiled by Alastair Sommerville,
April, 1975.

INTRODUCTION.

This manual is intended as a source of information about biological recording of all kinds, covering both the national distribution-mapping schemes and all of the other surveys and recording projects currently active in Scotland. It describes the aims of each scheme and gives an indication of the amount of work and degree of skill required from anybody wishing to participate. The appendices of addresses, reference works and distribution maps are intended to provide a useful 'way-in' to potential recorders. Some problems which cause confusion with beginners are explained below.

It is hoped that bringing together all the schemes in this way will give readers of this manual some idea of the scope of the investigations being carried out and the part that they might play in improving the knowledge we have of the plants, animals and habitats of Scotland. I would like to thank all the scheme organisers who have been so ready to enlighten me about their projects. Any factual or implied errors in the text are, of course, entirely mine.

SOME PROBLEMS.

Taxonomy. The need for a unique 'Latin' name for every species of plant and animal is recognised by everyone, but there still exists some confusion over the use of these names. Each species has a Generic and specific name, the former with a capital letter and the latter always with a small letter. When names are 'changed' it is mostly the Genus which is altered by someone re-arranging the groupings of individual species. Specific names are not so easily changed, and requires a ruling by one of the international taxonomy committees. The authority's name following the specific name indicates the person who first published an adequate description of the species

and the date when he did this. If his name is in brackets the Genus has been changed since he first described the species. For the sake of clarity the 'Latin' name is underlined in ordinary writing or typing or put in italics when printed.

Check lists. These are lists of names of the plants or animals of one group found in a specified area, county or country etc. They are very useful for standardising names, for clarifying confusions over synonyms (i.e. the list often includes the other names (synonyms) previously used for the Genus, species etc.) and for providing a basic list for referring to as regards new records for the area concerned.

For most groups of plants and animals there is a well accepted list of the British species arranged in a classification which is followed by those laymen working in that field. Some of these are listed in the Appendix.

National Distribution Mapping. The basic principles of the Distribution mapping have been clearly explained in the BRC Instructions to Recorders booklet. For all the major schemes one record of each species is required for every 10 kilometre x 10 kilometre squares which make up the National Grid (about 900 for all of Scotland and the Islands). These records, when published as filled-in squares for presence and blank squares for absence, reveal the distribution of that species for the period for which the records were collected. Later maps will be compared to present ones to reveal changes in distribution due to natural or man-imposed causes. Two important shortcomings for this system are:-
(i) For poorly covered groups early maps tend to show the distribution of recorders rather than species and (ii) for even the best covered groups the presence of a species within 10 square kilometres is often not a fine enough division to tie

its distribution down to a particular habitat type or climatic zone.

This being so, many schemes ask for greater detail than just presence within the square, asking the recorder for details of the habitat as well. Some schemes ask for smaller areas to be searched, e.g. 5 x 5 kilometre squares (quadrants) or 2 x 2 kilometre squares (tetrads). Other schemes use the Watsonian Vice counties (V.Cs.) (Nos. 72-112 for Scotland) which is a division of the country into roughly equal areas approximating with present counties but trying to take in the natural geographical aspects of the country.

Marine schemes have an extra dimension of the open sea and generally follow the Sea Areas except in a few cases where there is a division of the area into Continental shelf and beyond.

The mechanics of record card completion is not dealt with here and the reader is referred to the BRC Instructions to Recorders booklet or the particular scheme's own instruction sheet.

Certainty of identification: This proves a trial for the organisers of every scheme for unless they can rely on the recorders correctly naming the animal or plant concerned the accumulated information is worthless. To get round this problem a few schemes have chosen to rely on 'unmistakable species only' (e.g. the Ladybird survey); or on specimens (e.g. the wasp survey); or voucher specimens of 'tricky' species (e.g. the moth's survey); or reliable recorders backed up by a method of checking the records by regional authorities on the subject (e.g. the botanical survey). Beginners starting on a scheme are bound to make mistakes but humility is of the essence and if in doubt of any identity the record should be checked by an expert, a voucher specimen retained or the record forgotten.

THE RECORDING SCHEMES IN PROGRESS APRIL 1975.

The Botanical Survey.

950+species FLOWERING PLANTS.
GRASSES
FERNS

The original survey organised by the Botanical Society of the British Isles (BSBI) of 10 x 10 km. squares was completed in 1961 and published as the Botanical Atlas. The Society is now undertaking a more critical survey group by group of which Ferns have already been done (June '72 - Dec. '73). This is organised in Scotland via 31+ vice-country recorders who are responsible for the records from their vice county or counties and all records are submitted first to these recorders. The Botanical Society of Edinburgh works closely with the BSBI through the Joint Committee for the Study of the Scottish Flora (JCSSF) which is responsible for promoting and organising the surveys required for local floras etc(see below). The Biological Records Centre produce a series of Plant field cards for the scheme which cover seven regional plant lists including 'Scotland' (north of the Clyde-Forth line) and 'North' (south of Scotland and northern England).

Contact: the Scottish Regional Committee Secretary, vice county recorder or write direct to BSBI.

53 species FERNS

The British Pterydological Society have collected records for the BSBI Atlas but are also interested in more detailed

recording of 2 x 2 km. squares. They are not represented officially in Scotland, but have at least 4 active recorders here.

Contact: the Society direct.

Red Data Book for Britain 300 species RARE PLANTS.

The BRC are collecting detailed information on the exact populations of plants occurring in 15 or less 10 km. squares in Britain to form the basis of the Red Data Book. Normally only expert botanists will be approached to help with this type of survey where a degree of confidentiality is required.

Contact: Lynne Farrell, BRC.

FLORAS

Many of the BSBI county recorders have undertaken to produce a local flora often using a 5 x 5 km. square basis. For the more remote areas the JCSSF are helping to organise recording field trips to fill on blank squares.

Contact: the local BSBI recorder as listed in the Appendix.

Bryophyte mapping scheme

500+ species MOSSES
(500 on BRC card).

280+ species LIVERWORTS
(210 on BRC card).

The British Bryological Society are organising this survey and they use one BRC field card for the two groups, neither of which are very easy to identify. There are no official Scottish organisers but there are at least 10 active recorders. 20 maps have already been published in the Society's Transactions and a provisional Atlas of 100 of the most common species isdue out soon.

Contact: the Society direct.

Lichen mapping scheme

1350+ species LICHENS
(710 on BRC card).

The British Lichen Society are organising this survey using a BRC field card and 12 Provisional maps have been prepared already. There are no official recorders for Scotland, but the coverage for Scotland is considered to be very good.

Contact: the Society direct.

Marine Algae distribution scheme

800+ species ALGAE

The distribution of seaweeds is only known in a very general

way to date. About 120 species can be found on any unpolluted shore and at least as many again occur below low tide mark. A guide leaflet is available to would-be recorders, along with a BRC field card. All records are vetted through a system of referees and so far some 30 recorders are active in Scotland. Help from amateurs is most welcome especially from skindivers who could cover the lesser known deeper water species. A handbook for seaweed identification is being prepared by the organiser.

Contact: Dr. Norton, Glasgow.

Macro-fungi mapping scheme 3000 species FUNGI

The British Mycological Society is preparing a BRC field card, but the absence of any comprehensive books for fungi identification is limiting recording work to the specialist. Scotland has relatively good coverage already and maps do exist for 100 selected species as part of the European survey.

Contact: the Society direct.

Mammal Survey (excludes whales) 68 species MAMMALS

The Mammal Society began their distribution mapping scheme in 1965 by adding to the large number of past records new field records

collected by their members. From this work a series of provisional Distribution Maps have been published. There is still a network of vice county recorders but only eight are listed for Scotland. Some of the smaller mammals require live trapping to be certain of establishing their presence and even the larger pine marten and wildcat need expert confirmation as sightings are rare. New 10 km. square records are still needed, but these are now dealt with by the BRC, the Society concentrating on particular species e.g. the Badger, Bats and Harvest Mouse.

National Badger Survey. BADGER.

To gather more information about this much persecuted species all records of Badgers and their setts are being collected by a number of county badger recorders of the Mammal Society co-ordinated by Mrs. E. Farquharson for Scotland. Details of the size, position and evidence of recent use is required for the setts along with details of soil type, general habitat, water supply, etc. More help is wanted in many parts of Scotland.

Contact: Mrs. E. Farquharson, Edinburgh.

WHALES.

These are often difficult to identify at sea and most records rely on strandings. Any bodies should be notified to

the Coastguard first who would then pass on the report to the Royal Scottish Museum.

5 species DEER

The British Deer Society has been co-ordinating distribution records for all species of deer including planning special recording operations at Branch meetings. The six regional branches have their records vetted by the Hon. Sec. for the Scottish Council.

Contact: local BDS Branch.

Bat Survey 17 species BATS

These delicate mammals are easily disturbed at their roosts and difficult to identify in flight. Special Techniques including ringing and sonic identification are proving useful in expert hands. The Mammal Society deal with these animals under a special Bat Group.

Contact: Dr. Stebbings, Aberdeen

MAMMAL SINGLE SPECIES SURVEYS

The surveys are often undertaken as University (or private) research, and usually only last for a year or less. For up to

date information on a particular species contact the Mammal Society direct.

Atlas of Breeding Birds in Britain and Ireland.

200+ species BREEDING BIRDS

The British Trust for Ornithology (B.T.O.) undertakes a large number of recording schemes of various types best explained in the leaflet 'BTO in Action' available from the BTO. This project covering the distribution of all British breeding birds has now been completed (1968-1972). It was a highly organised coverage of all 10 km. squares which has resulted in an atlas which is to be published shortly.

Rare Breeding Birds Panel

42+ species RARE BREEDING BIRDS.

A panel of representatives from the Nature Conservancy Council, the Royal Society for the Protection of Birds and the BTO meet to maintain up to date information on the rare breeding birds of Britain. All details are strictly confidential but a general annual summary is published in British Birds. Details will be normally supplied to the panel via BTO county recorders.

Contact: local BTO recorder or Dr. Sharrock, Bedford.

Common Birds Census. 90 species COMMON BIRDS.

This is a BTO project involving some 16 people in Scotland who each cover a particular area of 200 acres or less of ordinary countryside to monitor the breeding birds of that area from year to year. It has been in operation since 1961 and has already helped to detect long term changes in numbers. It involves at least eight visits to the site between April and July every year noting singing birds, birds carrying food or nesting material to establish the numbers of breeding pairs within the area. The results are summarised in Bird Study.

Contact: BTO - Kenneth Williamson.

Waterways Bird Survey. WATERSIDE BIRDS.

This BTO survey was started in 1974 and is similar to the Common Birds Census except that it monitors lengths of river and burn and the birds found there. It also requires 8+ visits a year etc. as above. The results are also published in Bird Study.

Contact: BTO - Kenneth Williamson.

Bird Ringing Scheme. BIRD RINGING.

All ringing is organised through the BTO and ringers require

a permit obtained after a period of training from an experienced ringer. Schedule 1 birds also require a licence from the Nature Conservancy Council. There are a number of groups which do research on bird movements, longevity, etc. and they tend to specialise in particular species, e.g. in Scotland finches, flycatchers, waders, tits and warblers are being concentrated on at this moment. Ringing groups in Scotland include the Edinburgh Ringing Group, the North Solway Ringing Group, the Tay Ringing Group and the Highland Ringing Group. The results of these ringing programmes are published by the groups in their own reports.

Contact: BTO - Ringing Office or one of the ringing groups direct.

Register of Ornithological Sites.

BIRD HABITATS.

A BTO scheme to record all ornithologically interesting habitats with an indication of the degree of interest of the site, i.e. numbers, numbers of species, or rarities found there. This is organised via the 22 BTO regional representatives helping members through branch meetings. The Register will enable the most important breeding, feeding or roosting areas at a local level to be identified. It is hoped that a conservation 'watch'

would be kept over these sites in a similar way to the SWT's Listed Wildlife Sites (see below).

Contact: BTO.

Birds of Estuaries Survey. ESTUARY BIRDS

This scheme is run jointly by the BTO, the RSPB, the Wildfowl Trust and the Irish Wildbird Conservancy, and was set up in 1969 originally for 5 years but it will now probably be run continuously. There is a count on specified dates throughout the year on the middle Sunday of the month, at high tide, counting the birds at their roosts. Most of the birds involved (ducks, geese, gulls, etc) are partially migratory and rely on the British Estuaries for winter food supply. The survey is intended to establish the importance of these sites, nationally and internationally, in the face of pollution and development. Scotland includes six main estuary areas and the BTO organisers within these areas divide up the coastline and allocate each recorder one section which he covers on the chosen dates, chiefly through the winter. The results of this survey are being published as BTO library reports and reported in Scottish Birds.

Contact: BTO - Tony Prater.

National Wildfowl Counts

WILDFOWL

This scheme organised by the Wildfowl Trust began in 1948 and it involves a count on the middle Sunday in the month from September to March, of the priority coastal sites for wildfowl and some of the more important inland sites. Organisation is via a number of regional organisers who also try to cover all waters over a period of one week during November and January. Figures from these counts are adjusted for each species to an index based on the 1959 figures. This long term monitoring of populations of migratory species is very important for their conservation and trends in increases and decreases in species and sites are already very noticeable. The results of the counts are published in Wildfowl

Contact: Wildfowl Trust.

International Wildfowl Census

WILDFOWL

Sponsored by the International Wildfowl Research Bureau but organised in Britain by the Wildfowl Trust. The counts are based on the mid-November and mid-January wader and wildfowl counts (see above) but are used for a wader and wildfowl count for Europe and North Africa. The results are reviewed in Wildfowl.

Contact: The Wildfowl Trust.

British Geese Census. 7+ species GEESE

The Wildfowl Trust also organise a more detailed annual census of winter goose populations and their age structure etc. Assistance from amateur goose counters always wanted. The results are published in Wildfowl.

Contact: The Wildfowl Trust.

Beached Bird Survey. OILED BIRDS

Report on Oil and Oiled Birds on Beaches.

The Royal Society for the Protection of Birds (RSPB) originally set up this survey to monitor the effect of oil on seabirds, but it now includes the effect of chemical pollutants. Every recorder covers an allocated stretch of coastline fairly frequently and notes all dead birds and possible cause of death, collecting one wing for further analysis of age, race and sex.

Contact: RSPB. Edinburgh.

Scottish Bird Report. 290 species SCOTTISH BIRDS.

All records submitted by members of the Scottish Ornithologists

Club (SOC) are compiled into a species by species report on the yearly status of birds in Scotland and this is published in Scottish Birds.

Contact: S.O.C. direct or area representatives.

BIRD SINGLE SPECIES SURVEYS.

Research projects by members of the SOC, BTO and others are considered by the SOC Research Committee and details published in Scottish Birds. A fairly recent up to date list of these distribution enquiries and many other ornithological research projects is in Scottish Birds - Volume 7, No 5 - Spring 1973. However as many of the projects are short term enquiries about the work being done on individual species should be directed to the SOC Edinburgh.

Reptiles and Amphibians recording scheme.

8 species AMPHIBIANS

5 species REPTILES

The British Herpetological Society includes a Conservation Committee concerned with locating and identifying the main breeding

localities of amphibians and reptiles all of which are decreasing in numbers and distribution. The organisation is through Regional Officers where these exist or direct to Headquarters. Records are collected of sites including the size of amphibian ponds and numbers found there. The BRC have produced a provisional Atlas for reptiles and amphibians but records for new 10 km. squares are still needed. The only BRC field card with reptiles and amphibians on it is the old style vertebrate card.

Contact: the Society direct for breeding records or the BRC for new distribution records.

Fresh Water Fish Recording Scheme. 15 Species FRESH WATER FISH

The scheme was started in 1966 using information gathered by an extensive questionnaire. Since the preliminary account was published (1969) a series of Provisional Maps have been published. More records are requested from empty squares on the map, particularly from the West and the Islands. A BRC card is available which marks the critical species which need expert confirmation. An instruction sheet is available.

Contact: Dr. Maitland, Edinburgh.

Marine Fish Recording Scheme

MARINE FISH.

This group includes a large number of 'accidental visitors' as well as many deep sea species. However a BRC card is being produced along with a note explaining the recording method and how to deal with difficult species.

Contact: A. Wheeler, British Museum.

SINGLE SPECIES SURVEYS.

Surveys of single species of reptiles, amphibians and fish are conducted from time to time, usually for one year only. Enquiries about a particular species should be directed to the Herpetological Society or to the Scottish Wildlife Trust, Edinburgh, who hold the latest information.

Echinoderm Survey

82 species SEA URCHINS

SEA CUCUMBERS.

The Marine Biological Association of the United Kingdom (MBA) started a scheme in 1973 using a BRC card and covering the whole of the British Isles and the Continental Shelf to 200 metres depth.

A key for identification can be supplied but it requires some zoological knowledge and a hand lens. Some species are difficult to identify but MBA will help with identification of the more obscure onces. There are no organisers in Scotland, but some recoders at the Marine labs and some Universities. A leaflet is available to help the beginner.

Contact: Dr. Eve C. Southward at MBA.

INSECTS.

Dragonfly mapping scheme.	44 species	DRAGONFLIES (Odanata)
Grasshopper mapping scheme.	30 species	CRICKETS and GRASSHOPPERS (Orthoptera)
Earwigs, Cockroaches and Stick Insect mapping schemes.	7 species	EARWIGS (Derhaptera)
	9 species	COCKROACHES (Dictyoptera)
	3 species	STICK INSECTS (Phasmida)

The Biological Records Centre (BRC) have organised these schemes and the five orders are dealt with together on on field card. A large number of the species in these orders are not found in Scotland, but the group does include dragonflies, some of which are only found north of the Border, and all being very poorly

recorded. The Grasshopper provisional atlas is due out soon.

Contact: John Heath, B.R.C.

Heteroptera Mapping Scheme.

780 species PLANT BUGS

A BRC field card listing the plant bugs has been produced by BRC but there is no organised survey as yet.

Contact: John Heath, BRC.

Butterfly Mapping Scheme.

59 species BUTTERFLIES

and

Lepidoptera Mapping Scheme

496+ species MOTHS

The Biological Records Centre (BRC) have produced two separate BRC field cards for this order and over 2000 recorders have participated in the scheme. Butterflies are fairly easily identified but many of the moths are difficult to separate and a few require dissection of the genitalia to confirm the species. A booklet is available to enable recorders to identify the most difficult species. (Guide to Critical Species of British Lepidoptera). Several of the families of smaller moths known generally as 'micros' are not covered in this survey. (N.B. As

butterflies are fairly familiar to the casual naturalist BRC have developed a method of using these insects as indicators of the 'richness' of nature reserves and the climatic changes from year to year). Two Provisional Atlases are out - the butterfly one to be updated soon, but there are still over 400 10 km. squares in Scotland unrecorded, particularly in the Southern Uplands, Sutherland and Lewis.

Contact: John Heath, BRC.

RARE BUTTERFLIES.

The British Butterfly Conservation Society is concerned by the decline of many of the British Butterflies and as a conservation measure they have a number of recorders responsible for individual rarer species. Their interest is mainly in the breeding and releasing of butterflies in localities where they have become extinct.

Contact: the Society direct.

Rothampstead Insect Survey. NOCTURNAL INSECTS.

Rothampstead Experimental Station began their Insect Survey in 1960 and now have in operation a number of standard pattern low power (tungsten light bulb not mercury vapour) moth traps scattered throughout the country - about 15 in Scotland. These

are run by research institutions, schools or private individuals who operate the trap all night, every night throughout the year. The catches of moths are identified, counted and recorded by the recorder on special forms or killed and sent into Rothampstead for identification. The standard trap gives a quantative loading to species lists and the final product is hoped to be density maps of at least the economically important species.

Other insects coming to the light such as caddis flies, biting midges and aphids are also collected for identification.

A large amount of information on distribution, taxonomy and emergence dates from the survey gives rise to a number of other studies based on the recorders material supplemented with information from the Station's own suction traps which are also scattered throughout the country.

Contact: Rothampstead Experimental Station.

Caddis Fly Mapping Scheme.

194 species CADDIS FLIES
(Trichoptera)

A BRC card is available but the identification of many of the smaller species is difficult. There is no organised scheme

as such.

Contact: John Heath, BRC.

Cranefly Mapping Scheme. 332 species CRANEFLIES (Includes Tipulidae, Trichoceridae, Anisopodidae and Ptychopteridae).

A group of enthusiastic entomologists have organised this scheme based on a BRC field card. So far there are 8 recorders in Scotland, and they would welcome help from naturalists. However identification is difficult and as species new to Britain are still being discovered collections of dried specimens (unmounted) would be welcome from anywhere in Scotland. These would be identified and the list returned with comments. The group produce a newsletter which is circulated to those taking part in the scheme.

Contact: Dr. Stubbs, NCC.

Sciomyzidae Mapping Scheme. SCIOMYZIDS.

This is a small family of flies parasitic on slugs and snails. All records from Scotland would be very useful but only those prepared to specialise in this group could usefully contribute. There is no BRC field card for the scheme.

Contact: Mr. Stephenson, Rothampstead Experimental Station.

Fleas Mapping Scheme.

60 species FLEAS.

A slide preparation and microscope are required for identification of fleas and is the work for a specialist. However, records are needed of fleas from birds and mammals and from their nests. There are no recorders as such, but fleas or nest material with fleas is wanted by the organiser. His records are passed on to BRC for production of a 10 km. distribution map. A leaflet is available on techniques for flea collecting, but there is no BRC field card. A Provisional Atlas is due out soon.

Contact: Mr. R. George.

Ant Mapping Scheme.

41 species ANTS

Although records have been collected for over 10 years records or specimens of ants are still required, especially from southern Scotland (Vice counties 72-82) provided the exact location and date are sent with them. Samples of workers of common species to be identified by the organiser would be of great interest. A BRC record card is available, and a complete set of Provisional Maps are being prepared by BRC.

Contact - Keith Barrett, Berks.

Bumble Bees Survey. 19 species BUMBLE BEES (Bombidae)

The Bee Research Association (BRA) started a national survey of bumble bees in 1969 which ended in 1974. Records were collected from 'new' 10 km. squares by Recorders who identified their own specimens (difficult) and recorded them on BRC cards or by Collectors who sent in specimens to the BRA. This was an important scheme as it involved important pollinators and the effect of herbicides and insecticides on them. An illustrated key to the Bumble Bees and Cuckoo Bees is available and a Provisional Atlas has been published by BRC.

Social Wasp Mapping Scheme. 7 species SOCIAL WASPS (Vespidae)

This scheme was started in 1973 and although it involves some Recorders it chiefly depends on Samplers who recognise and collect samples of wasps and send them in to be identified. Records for all parts of Scotland are very scarce and specimens are wanted particularly those collected in August when the nests are at their maximum population.

Contact: Mr. M.E. Archer, York.

Solitary Bee and Wasp Mapping Scheme. SOLITARY BEES

SOLITARY WASPS

A scheme has been organised and details will be released

soon.

Contact: Mr. M.E. Archer, York.

Ground Beetle Mapping Scheme. 350 species GROUND BEETLES (Carabidae)

This scheme was started in 1973 but as most species require a specialist knowledge for accurate identification the organiser would prefer specimens from amateurs collected from under stones or by 'pitfall trapping' etc. These would be identified and returned if required. A great deal of information will be obtained from museum collections and help is also required for this. There are only four active re . ders in Scotland so far. A BRC field card has been produced.

Contact: Dr. M. Luff, Newcastle.

Rove Beetle Mapping Scheme 1,000 species ROVE BEETLES. (Staphylinidae)

Many of these beetles are very small and as they are all very similar they cannot be identified by the beginner. The organiser cannot undertake to identify large numbers of these beetles, but he is interested in the few species of rove beetles from sheep and cattle dung. Details of a survey are due to be published soon.

Contact: P.M. Hammond - BM (Natural History).

Ladybird Beetle Mapping Scheme. 43 species LADYBIRDS.

The organisers of this scheme have split it into two approaches:

(1) All species: a BRC field card is available for enthusiasts although identification of some species is tricky. Records for Scotland are poor and competent assistance is required.

(2) 8 easily recognised species: This scheme can be undertaken by any field naturalist as a full instruction sheet is available, plus diagrams of the colour patterns for these species. Records are entered on one species card and individual record cards. For both

Contact: J. Muggleton, University of Manchester.

Weevil Mapping Scheme. WEEVILS.

A BRC field card has been produced listing the weevils but it is now out of print. It was part of a Nature Conservancy survey and there is no organised scheme now.

Crab Distribution Survey. 56 species CRABS.

A handbook is being prepared on the identification of the

British Crabs but in the meanwhile the BM will undertake the identification of any crabs, lobsters or shrimps from Scotland. A BRC record card has been produced but there is no organised recording as such in Scotland at the moment.

Contact: K.W. Ingle, B.M. (Natural History).

Marine Isopod Survey Scheme.

98 species MARINE ISOPODS.

A fairly unfamiliar group of animals requiring specialist identification. A group of specialists - the British Isopods Study Group - are running two survey schemes, one terrestrial and one marine. The marine organiser has collected round Scottish coasts for several years, but help from amateurs would be welcomed as identification can be undertaken by the organiser. A BRC record card has been produced which includes sections on the habitat type, to be filled in.

Contact: Dr. R.J. Lincoln, B.M. (Nat. Hist.)

Non-Marine Isopod Survey Scheme.

48 species WOODLICE.

This scheme is intended for a small group of specialists in the British Isopods Study Group as the BRC field card requires a considerable amount of habitat data to be filled in and several

species require special extraction from the soil. However, comprehensive instructions for enthusiastic collectors are available which apply to the Myriapod scheme as well (see below). Interested recorders should contact the organisers.

Contact: Paul Harding, Monks Wood.

Spider Mapping Scheme. 640 species SPIDERS.

Most species are difficult to identify and the organiser cannot undertake the identification of a lot of material. Scotland is very poorly covered especially the Borders and the extreme North. As there are only two active recorders working in Scotland at the moment more expert help would be very valuable.

Contact: Dr. P. Merrett, Dorset.

Pseudoscorpion Mapping Scheme. 27 Species PSEUDOSCORPIONS.

This scheme started in 1970 is only just so far beginning and consists mainly of records from people requiring pseudoscorpions to be identified as part of soil surveys etc. As these tiny animals need to be extracted from soil or litter Scotland is very poorly covered although any specimens, preserved in 70% alcohol, would be identified by the organiser. Help is also sought from

anyone who would be prepared to search out local records or report museum specimens. A BRC field card is available.

Contact: P.E. Jones, Abbots Ripton.

Tick Mapping Scheme.

TICKS.

ECTOPARASITES. (lice, keds, flat flies, fleas, bed bugs and bat flies)

Ticks require microscopic examination made of them before identification can be confirmed and are thus a specialist group. However, many naturalists who handle birds and mammals could help by collecting these ecto-parasites and sending them to the organiser (in 70% alcohol.) In particular, the distribution of deer ticks in Scotland could prove most interesting - specimens are only too easily come by !

Contact: G.B. Thompson, Cambridge.

Millipede Mapping Scheme.

49 species MILLIPEDES.

Covered as part of the British Myriapod survey scheme this is a difficult group to identify - some species being very small

soil dwellers. Scotland is poorly covered and is thought to hold more than the 26 species so far discovered. A BRC field card is available requiring detailed habitat notes which are explained in the leaflet also used by the woodlouse survey. It is suggested that naturalists might look out for the pill millipede which has not been recorded north of the Forth-Clyde line. A pamphlet is available on the distribution records collected so far.

Contact: Dr. C. Fairhurst, Salford.

Centipede Mapping Scheme. 47 species CENTIPEDES.

Part of the British Myriapod survey scheme this is also a difficult group to identify but the organiser is quite prepared to identify specimens or confirm identifications. As in the woodlouse and millipede schemes a habitat section is included on the BRC record card. Scotland is very badly recorded, especially in the Borders, S.W. Scotland, N. Scotland, Orkney and Shetland etc. with only one established collector in Scotland. An instruction card, identification guide sheet and a pamphlet on the distribution records collected so far are available.

Contact: A.D. Barber, Devon.

Marine Mollusc Mapping Scheme.

500 species MARINE MOLLUSCS.

The Conchological Society of Great Britain and Ireland uses Representatives (11 in Scotland to date) to check the identifications of field workers before passing their records on to main Record Organiser. All information is compiled on a BRC record card but voucher specimens must be kept of difficult or rare species. The scheme includes sea area coverage using specimens from trawls, etc. The results of the marine census work are reported in the Conchologists' Newsletter.

Contact: Dr. S. Smith - Royal Scottish Museum.

Terrestrial & Freshwater Mollusc Mapping Scheme.

183 species TERRESTRIAL MOLLUSCS
FRESHWATER MOLLUSCS

This scheme has been in progress for some time and a provisional atlas is due out soon. Coverage is poor in Scotland with large inland areas without any records and most of the rest having only a few species recorded. Help is wanted and beginners can submit specimens or records to the Scottish organisers. Information

is compiled on a BRC record card.

Contact: Dr. S. Smith - RSM - or organiser, M.P. Kerney, London.

Marine Dinoflagellate Mapping Scheme. 208 species MARINE DINOFLAGELLATES.

Most records are from marine research stations or from samples collected by the organisers. However, samples or lists are welcome from anywhere in Scotland. Schools and Universities might be interested in collecting material with a fine plankton net fixing the material in neutralised formalin or dip samples from areas of discoloured water can be preserved with Lugol's iodine. A BRC field card is available.

Contact: John Dodge, London.

HABITAT RECORDING SCHEMES.

A few organisations have attempted to investigate and record habitats but the whole process is necessarily complex. The schemes described below are grouped under the organisation promoting them.

The British Trust for Ornithology (BTO)

BTO Habitat Register see under BIRD HABITATS.

The Nature Conservancy Council (NCC)

S.S.S.I's.

The Sites of Special Scientific Interest (SSSI's) are assessed by the Nature Conservancy Council often initiated from the recommendations of amateur field workers. A boundary map is prepared along with a brief site description which is maintained in a file along with ownership details and biological records from the area. The range of these sites is enormous from huge areas of many thousands of acres to individual bolders. Over 800 biological, geological and physiographic sites are covered in Scotland.

Contact: NCC, Edinburgh or the local Assistant Regional Officer.

Conservation Review.

In 1966 the then Nature Conservancy planned a complete survey of the SSSI's throughout Britain to establish which were the most important from a scientific point of view. Many years of survey using some specially designed field cards for habitats (Woodlands, Wetland, Freshwater) and species (Freshwater fauna). The years of work have been brought together in Conservation Review which describes the prime sites with a grading system to show their relative importance on an international, national or local level. This document is being published and should be available at the end of 1975.

NNR's.

The Nature Conservancy Council intended that the most important of the SSSI's (see above: Conservation Review) will be made into National Nature Reserves (NNNR's) either by purchase or agreement on the basis that these sites represent the finest examples of each habitat type taken on a national scale. The 41 NNR's created in Scotland all have comprehensive records kept of their flora and fauna which is possible as they all have some degree of wardening. Specialist records from these sites are always welcomed but permission to collect specimens in any way must be obtained prior to the visit.

Contact: NCC, Edinburgh or the Reserve warden.

Records on the national grid.

10 km. squares.

Within the NCC there is a development towards record keeping on a 10km. square system so enabling information from areas outside SSSI's to be used. A great amount of this is already available as excess information from the National Data Bank distribution maps and an indication of the abundance of the species in a square as well as its presence would give a much more sensitive guide to any decline and therefore any need for its conservation.

The Scottish Wildlife Trust (SWT)

LISTED WILDLIFE SITES.

In a similar way to the NCC's SSSI designation the SWT have been attempting to survey and list local sites of wildlife interest and declare them as Listed Wildlife Sites to the relevant county planners. The actual technique used in the surveys varies from Branch to Branch, but is based on guidelines prepared with the help of the Nature Conservancy. To date the following surveys are under way and all require the help of interested amateurs.

Ayrshire.

Originally planned as a general survey, this has been shelved

and replaced by a more concentrated coastal survey in the face of encroaching development. The finished report is due out.

Lothians.

A general survey was begun in September 1966 and is still unfinished. The whole Branch area was divided into 6 geographical areas each with a sub-committee for organising the recording. Each recorder used a 2½ map and visited each 1 x 1 km. sq. noting in coloured pencil land use, developments, natural history, sightings etc. To date about half of the area has been covered but no analysis of these results is available yet. Because of the threat to local woodlands and ponds the Branch effort has now been concentrated on these habitats within the general survey.

Stirlingshire.

A provisional L.W.S.'s list has been submitted to the local authorities compiled from information collected by workers in the area. Outlines from the sites were traced from the 1" map of the county, and the tracing set in along with the site description.

Fife.

An informal survey is in operation with files kept on all sites of interest. From these a list of Proposed Listed Wildlife

Sites (PLWS) has been drawn up with details of owners etc. A coastal survey has also been done in response to a request from Development Planning authorities. Clackmannanshire have also put forward a list of PLWS's using the information from the Planning Officer and his staff.

Dumfries.

The Branch has surveyed the SSSI's in the Branch area and added several more sites of their own. For Kirkcudbrightshire a number of large areas of the county have been declared Wildlife Areas and these have been notified to the planning authorities.

Angus.

The Branch take part in the Dundee Museum's Angus Habitat Survey (see below) and there is also a list of known LWS's available but not yet submitted to the local planner

East Ross-shire.

The group have set up an informal committee to undertake a survey in June 1973 but because of the oil related developments in this area a great deal of work has already been done, expecially on the ornithological sites. A list of LWS's is available and material from this has been used in the Moray Firth

Prospectus issued by the Nature Conservancy.

Caithness.

Threat of development in Caithness has resulted in a preliminary list of Wildlife sites being drawn up as a combined effort of the Societies represented in the county.

Contact: for all the above surveys contact the SWT H.Q. Edinburgh or the local Branch Secretary.

ROADSIDE VERGES

The road verges have been recognised as an important habitat by the NCC and recommendations for their management for wildlife have been circulated by the Department of the Environment in England and Wales. Monks Wood maintain a register of Roadside Verges of Conservation Importance in Great Britain with their location, size, the species of plant or animal involved and the maintenance required for each site. The SWT has produced an internal Administrative Note (No.11) on this subject and to date has created protected verges in Berwickshire, the Lothians, Perthshire and Angus. More survey work is required as well as continuing the management programmes with some help available from

county amenity organisations etc.

Contact: SWT, Edinburgh or the local Branch Secretary.

The Biological Records Centre (BRC).

SITE RECORDING.

The Biological Sites Recording Scheme is described in detail in SPNR's Technical Publications No. 1. and covers the habitat recording of nature reserves and wildlife sites. A universal method is described which is not only very comprehensive and directly useful to those involved with reserves but enables the information to be passed on to the BRC for incorporation in the National Data Bank. Species cards have been dealt with earlier under the various recording schemes but in addition there is a Habitat card on which the recorder can list the types of habitats found within the area and their extent, the use and interest of the area, and the ownership, physical details etc.

BRC Reserve Recording.

RESERVES EVENT RECORDING.

For reserve record keeping, expecially where there is a warden, the BRC have devised a reserve recording scheme where

besides the Habitat card, and Species cards, two other cards are used. First, the Event Record Card; these are specially printed cards in triplicate which are filled in when any event occurs within the Reserve, for example, surveying, management, natural disaster etc. The warden, Headquarters and BRC each receive a copy and there is computer facilities at BRC for processing this data. The other card is the One Species Card maintained for every important species in the reserve, with details of sightings etc. with conservation action based on this information. Details of the methods involved and examples of the cards used are given in the BRC booklet Reserve Recording.

At the moment the NCC and RSPB are the main users of this system but it is hoped that there are at least some ideas in this method for the Scottish Wildlife Trust Reserve Management Committees.

Contact: G.L. Radford, BRC.

Dundee Museum

Angus Habitat Survey Scheme.

A survey of the whole county of Angus by Dundee Museum was started in 1969 and is now run jointly with the SWT. Each recorder has a 6" map of the 5 km. square he is responsible for

and marks it up on the map in ordinary pencil according to the BRC Habitat Card code letters (see above). About half the county has been covered and the analysis has not yet been undertaken. This survey is to form part of a general project to bring together all relevant biological records for the surrounding area into the Museum where they could be readily available. This idea has been developed by several English and Welsh Museums to form Environmental Record Centres for their own area.

Natural History Societies.

Almost all of the natural history societies in Scotland are involved in several of the national recording schemes as well as many of their own. These cannot be listed in detail here but the local society is often able to do very detailed surveys of the particular sites within their area. There is also a great deal of useful information on species distribution in the past journals of these societies.

Contact: see the appendix for the addresses of the local societies.

British Cave Research Association (BCRA).

CAVES.

This Association has been recording the invertebrate fauna of caves including 19 for Scotland. This work has been

supported by an NERC grant and account of the findings has been produced in the Transactions of the Cave Research Group. The Glasgow Spoleological Society are also interested in cave fauna but have concentrated on bats.

Contact: the BCRA direct.

Appendix 1.

Information Maps for Field Work.

All surveying requires maps at some stage and there are a few points which may prove useful. The Ordnance Survey produce almost all the maps which may be required in field work, and these are obtained (along with catalogues) from Thomas Nelson & Sons Ltd., Edinburgh or from the local supplier.

Basic maps are:

One inch maps (1:63,360) Some 77 covering all of Scotland and too well known for more description. However, a new metric series is being produced with foot contours expressed in metres, certain colour changes and no tree symbols on woodland areas.

Two and a half inch maps. (1:25,000). The First series covers 10 x 10 km. squares and shows most detail required by a field worker doing surveys e.g. field boundaries, individual buildings etc. The Second series covers 10 x 20 km. square areas but only a small part of the country is yet covered. The Highlands and Islands are not covered by this scale of map.

Six inch map (1:10,000 and 1:10560). The considerable detail on these maps make them an essential basis for reserve maps etc. The new scale (1:10,000) covers some of Scotland and is based on

the metric National Grid with a size of 5 km. square. Part of the west coast and the Highlands are only available on 1920's maps which are without grid markings.

Geological maps are of three types: Solid which shows the underlying rock formations, Drift which includes the often extensive, glacial material which lies on top of these rocks and a combined form. For the biologist the Drift Series are most useful as the plants are affected by the soil's parent rock material whether this is glacial material or bed rock. They are available as quarter inch to the Mile (1:253440) covering the whole country and one inch to the mile (1:63,360) covering most of Scotland except for some central regions of Inverness and coastal regions to the NW, E. and SE.

Appendix 2.

National distribution maps available.

Flowering Plants and Ferns.

Atlas of the British Flora: Edited by F.H. Perring and S.M. Walters, T. Belson & Son Ltd. 1962 (out of print) to be reprinted soon with up to date information on rare plants.

Critical Supplement to the Atlas of the British Flora: Edited by T. Nelson & Sons Ltd. 1968.

New Atlas: part one on Ferns due out soon.

Bryophytes.

Provisional Atlas of 100 common species out soon.

Liverworts, Mosses.

Census Catalogue of British Hepatics: 1965 Brit. Bryol. Soc. gives vice county distribution.

Census Catalogue of British Mosses: 1963 Brit. Bryol. Soc.

Mammals (except Whales).

Provisional distribution maps of British Mammals: C.B. Corbet Mammal Review Col. 1 Number 4/5 April 1971. (Available from Blackwell Scientific Publications, Oxford OX2 OEL).

Birds.

Atlas of Breeding Birds in Britain and Ireland: To be produced by the B.R.C. for the B.T.O. during 1975.

Fish.

Key to British Freshwater Fishes: P.S. Maitland, 1972. (Available from Freshwater Biological Association, Ambleside, Westmorland).

Reptiles and Amphibians.

Provisional Atlas of the Amphibians and Reptiles of the British Isles: Edited H.R. Arnold. (Available from Classey).

Butterflies.

Provisional Atlas of the Insects of the British Isles: Part 1 Lepidoptera, Rhopalocera Butterflies 1970, edited S. Heath, new edition due 1975. (Available from Classey).

Moths. (Part 1)

Provisional Atlas of the Insects of the British Isles: Part 11 Lepidoptera (Moths - part 1) edited S. Heath, M. Skelton. (Available from Classey).

Bumble Bees.

Provisional Atlas of the Insects of the British Isles: Hymenoptera Bombidae. (Available from Classey).

Fleas: Provisional Atlas out 1975.

Terrestrial Molluscs: Provisional Atlas out 1975.

Dragonflies: Vice county maps in Dragonflies of the British Isles. Longfield.

Appendix 3.

Addresses:

1) Institutions and Organisations mentioned in the text.
(including their publications and number of issues/year.)

Amateur Entomologists' Society	23 Manor Way, North Harrow, Middlesex (Bulletin x 4)
Bee Research Association	Hill House, Chalfont St. Peter, Gerrards Cross, Bucks. SL9 0NR
Biological Records Centre	Institute of Terrestrial Ecology, Monks Wood Experimental Station, Abbots Ripton, Huntingdon PE17 1IS
Botanical Society of the British Isles	c/o Department of Botany, British Museum (nat. Hist)., Cromwell Road, London (Watsonia x 2, Proceedings x 2).
Botanical Society of Edinburgh	c/o The Royal Botanic Garden, Inverleith Row, Edinburgh EH3 5LR (Newsletter x 2, Transactions x 1, Proceedings x 1).
B.R.A.	see Bee Research Association
B.R.C.	see Biological Records Centre.
British Arachnological Society,	Peare Tree House, The Green, Blenneshasset, Carlisle CA5 3RE
British Bryological Society	A.J.E. Smith, University College of North Wales, School of Plant Biology, Memorial Buildings, Bangor, Wales LL57 2UW. (Transactions, Census Catalogues).
British Butterfly Conservation Society Ltd.	Tudor House, Quorn, Leicestershire (News-sheet x 4).
British Cave Research Association	Seaton House, 15 Shrublands Road, Berkhamstead, Herts. HP4 3HY. (Transactions x 4).
British Deer Society	White Moor Head, Lowther Park, Penrith, Westmorland (Deer x 3).

British Ecological Society	Harvest House, 62 London Road, Reading RG1 5AS (Journal Applied Ecology x 2, Journal of Ecology x 3, Journal of Animal Ecology x 3).
British Herpetological Society	c/o London Zoo, Regents Park, London, N.W. 1.
British Lichen Society	c/o Department of Botany, British Museum (Nat. Hist). Cromwell Road, London S.W. 7. (The Lichenologist x 1, Bulletin x 2-3). Mapping Scheme: M.R.D. Seaward, Trinity and All Saints College, Horsforth, near Leeds, Yorkshire.
British Museum (Natural History).	(Departments of Zoology, Entomology, Palaeontology, Mineralogy, Botany), Cromwell Road, London S.W. 7 5BD.
British Mycologial Society	c/o Department of Botany, University of Hull, Hull, Yorkshire (Transactions, Bulletin).
British Ornithologists' Union	c/o Zoological Society of London, Regents Park, London NW1 4RY (Ibis x 4)
British Phycological Society	c/o Marine Station, Millport, Isle of Cumbrae, Scotland (British Phycological Bulletin x 1).
British Pteridological Society	46 Sedley Rise, Longhton, Essex. (British Fern Gazette x 1, Newsletter).
British Trust for Entomology	c/o Hope Department of Entonology, University Museum, Oxford.
British Trust for Ornithology	Beech Grove, Tring, Hertfordshire. (Bird Study x 4, B.T.O. News).
B.S.B.I.	see Botanical Society of the British Isles.
B.S.E.	see Botanical Society of Edinburgh
B.T.O.	see British Trust for Ornithology.
E.W. Classey Ltd.	353 Hanworth Road, Hampton, Middlesex.

Clyde Wader Group	Iain Gibson, 41B Moss Vale Street, Paisley PA3 2LU
Conchological Society of Great Britain & Ireland	51 Wychwood Avenue, Luton LU2 7BT. (Journal of Conchology x 2, Newsletter x 4).
Dundee Museum and Art Gallery	Albert Square, Dundee DD1 1DA
Edinburgh Ringing Group	Dr. Derek Langslow, 32 Campbell Road, Longniddry, East Lothian.
Freshwater Biological Association	The Ferry House, Far Sawrey, Ambleside, Westmorland.
Glasgow Spelelogical Society	S.F. Thomas, 120 Lochlea Road, Newlands, Glasgow S 3.
Highland Ringing Group	Roy Dennis, Landberg, North Keswick, Inverness IV1 1XD
Institute of Terrestrial Ecology	Monks Wood Experimental Station, Abbots Ripton, Huntingdon PE17 2LS
International Wildfowl Research Bureau	c/o The Wildfowl Trust, Slimbridge, Gloucester GL2 7BT
Irish Wildbird Conservancy	Hon. Secretary, c/o Royal Irish Academy, 19 Dawson Street, Dublin.
J.C.S.S.F.	see Joint Committee for the Study of the Scottish Flora
Joint Committee for the Conservation of British Insects.	c/o Royal Entomological Society of London, 41 Queen's Gate, London S.W. 7.
Joint Committee for the Study of the Scottish Flora	Hon. Sec. Dr. Basil Ribbons, Department of Botany, The University, Glasgow W 2.
Mammal Society	c/o Institute of Biology, 41 Queen's Gate, London S.W.1. (Bulletin x 2) Bat Group: Harvest House, London Road, Reading.

Marine Biological Association of the United Kingdom	The Laboratory, Citadel Hill, Plymouth PL1 2PB

Natural History Societies:

Aberdeen & North of Scotland Zoological Soc.	Dr. B. Nisbet, Natural History Department, Marischall College, Aberdeen.
Andersonian Society of Naturalists.	Mrs. A. Wallace, 28 South Park Road, Hamilton, Lanarkshire.
Ayrshire Arch. & Natural History Society	Mr. R.W. Brash, 54 Midton Road, Ayr. KA1 2SQ
Buteshire Natural History Society	Miss D.N. Marshall, The Museum, Stuart Street, Rothesay, Bute.
Berwickshire Naturalists Club	C.J. Dixon-Johnson, Middle Ord, Berwick upon Tweed.
Caithness Field Club.	R.M. Sharpe, 12 Dircot Place, Thurso, Caithness.
Clackmannanshire Field Sutdies Society	Mrs. E.K. Kennedy, 26 Victoria Street, Alloa, Clackmannanshire.
Dumfries & Galloway Natural Hist. & Antiqu. Society.	Mr. & Mrs. William, Fillis Tower, Lochfoot, by Dumfries.
Dundee Naturalists Society	Mrs. H.M. Brown, 1169 Tunberry Avenue, Dundee, Angus.
Dunfermline Naturalists Society	Mrs. E.M. Stewart, 99 Halbeath Road, Dunfermline, Fife.
East Lothian Field Club	G. Murray, 24 Duddingston Park, Portobello, Edinburgh.
Edinburgh Natural History Society	Miss H. Henderson, 11 St. Fillans Terrace, Edinburgh, 10.
Falkirk Arch. & Natural History Society	Miss A.W. Stewart, 12 Wellside Place, Falkirk, Stirlingshire.
Geological Society of Glasgow.	Dr. I. Rolfe, Hunterian Museum, The University, Glasgow W. 2.
Hamilton Natural History Society	Mrs. A. Wallace, 28 South Park Road, Hamilton, Lanarkshire.
Inverness Botany Group	Miss J.B. Dongan, 29 Midmills Road, Inverness.
Inverness Field Club	E. Meldrum, 22 Beaufort Road, Inverness.
Kirkcaldy Naturalists Society	W. Robb, 15 Lady Helen Street, Kirkcaldy, Fife.
Largo Field Studies Society	Mrs. E.M. Saunders, Ness Cottage, Lower Largo, Fife.
Kintyre Antiqu. & Natural History Society	Mrs. Motherspoon, Sandbank, Campbeltown, Argyll.
Mid Argyll Natural History & Antiqu. Society	F. Bruce, Auchindarroch Hotel, Ardnishaig, Argyll.
Northern Naturalists Society	J.R. Coutts, 80 Fonthill Road, Aberdeen.
Orkney Field Club	Miss E. Bullard, Toftwood, St. Ola, Kirkwall, Orkney.
Paisley Museum Natural History Society	Mrs. G. Christie, Heathfield, Lochwinnoch, Renfrewshire PA12 4JB
Paisley Naturalists Society	J. Kirkwood, 11 Sunchurch Road, Oldhall, Paisley, Renfrewshire.
Perthshire Society of Natural Science	Miss R. Fothergill, 16 Pithearlis Terrace, Perth, Perthshire.

Renfrewshire Naturalists Society	A. Clarkson, 12 Dargarel Avenue, Bishopton, Renfrewshire PA7 5HD
West Dunbartonshire Natural History Society	Commander R. Buckhall, Hawthornhill, Grant Street, Helensburgh, Dunbartonshire.
Nature Conservancy Council	Scottish Headquarters, 12 Hope Terrace, Edinburgh EH9 2AS - for addresses of Assistant Regional Officers.
N.C.C.	see Nature Conservancy Council.
Thomas Nelson & Sons Ltd.	18 Dalkeith Road, Edinburgh, 16.
North Solway Ringing Group	Brian Turner, Shinnel House, Tynron, by Thornhill, Dumfries-shire.
Ordnance Survey	43 Rose Street, Edinburgh, 2.
Rothampstead Experimental Station	Department of Entomology, Harpenden, Hertfordshire.
Royal Entomological Society of London	41 Queen's Gate, London SW7 (Transactions, Proceedings Series A, B and C).
Royal Scottish Museum	Chambers Street, Edinburgh EH1 1JF
Royal Society for the Protection of Birds	The Lodge, Sandy, Beds. SG19 2DL (Birds x 6). Scottish Office: 17 Regents Terrace, Edinburgh EH7 5BN
R.S.P.B.	see Royal Society for the Protection of Birds.
Scottish Ornithologists' Club.	21 Regents Terrace, Edinburgh EH7 5BT (Scottish Birds x 4).
Aberdeen	Miss F.J. Craig, 22 Loanhead Terrace, Aberdeen AB2 4SY
Ayr	R.M. Ramage, 57b St. Quirox Road, Prestwick, Ayrshire KA9 1JF
Dumfries	W. Austin, Glaston, 54 Albert Road, Dumfries.
Edinburgh	Mrs. P. Langslow, 32 Campbell Road, Longniddry, East Lothian.
Glasgow.	Mrs. I.T. Draper, Otter's Holt, 37 Dumrock Road, Strathblane, Glasgow G63 9DG
Inverness	M.I. Harvey, Clach Bhan, Loaneckheim, Kiltarlity, Inverness-shire.

St. Andrews.	Miss M.M. Spires, Greenacres, 87 Hepburn Gardens, St. Andrews, Fife.
Stirling.	Dr. D.M. Bryant, Biology Department, University of Stirling, Stirling.
Thurso	S. Laybourne, Old Schoolhouse, Harpsdale, Halkirk, Caithness KW12 6UN
Scottish Wildlife Trust	8 Dublin Street, Edinburgh EH1 3PP (Scottish Wildlife x 3).
Aberdeenshire & Kincardineshire.	Miss J. Merchant, 40 Cairnery Road, Aberdeen AB2 5DP
Angus & Dundee	J. Kelman, 2 Castle Street, Forfar, Angus DD8 3AD
Aviemore Rep.	Hon. Douglas Weir, Creag Dhu Lodge, by Newtonmore, Inverness-shire.
Ayrshire & Wigtownshire.	R.H. Hogg, Schoolhouse, Maybole, Ayrshire.
Banffshire Rep.	Mr. J. Edelston, 14 High Street, Portsoy, Banffshire AB4 2YT
Caithness Rep.	D. Glass, Ivy Cottage, Brough, Dunnet, Thurso, Caithness.
Clyde Area	John Findlay, 1 Westbank Quadrant, Glasgow G12 9HT
Dumfries & the Stewarty.	J. Lyall, 2 Dalgarnock Place, Thornhill, Dumfries-shire.
East Ross Members Group	W.H. Cormack, Tower Street, Tain, Ross-shire.
East Sutherland Rep.	D. MacDonald, Elmbank, Dornoch, Sutherland.
Fife, Kinross & Clackmannanshire.	J. Caldwell, 67 Milton Road, Kirkcaldy KY1 1TT
Inverness & Nairn Members Group	John Mayne, Nessdale, Island Bank Road, Inverness.
Lothians & East Stirlingshire.	Keith Clifford, 2 Eldindean Terrace, Bonnyrigg, Midlothian.
Orkney Rep.	Miss E. Bullard, Toftwood, Kirkwall, Orkney.
Perthshire.	J.D. Young, 5 Beechgrove Terrace, Perth.
Wester Ross Rep.	Major E. Hunter, Shieldig Cottage, Fairloch, Ross--shire.
West Sutherland Rept.	Dr. I. Pennie, Varkasaig, Scourie, Sutherland.
Tweed Valley	Dr. J.I. Meikle, Bridgeheugh, Lindean, Galashiels, Selkirkshire TD1 3PD
Tay Ringing Group	David Oliver, East Cottage, Ballass, Cupar, Fife.
Wildfowl Trust.	Slimbridge, Gloucestershire, (Annual Report Bulletin x 3).

2) Individuals mentioned in the Text.

Michael Archer	Department of Biology, St. John College, Heworth Croft, York YO3 7ST
Tony Barber	22 Woodland Road, Ivybridge, Devon PL21 9HD
Keith Barrett	129 Smith's Lane, Windsor, Berkshire.
Dr. John Dodge	Department of Botany, Birbeck College, University of London, Malet Street, London WC1E 7HX
Dr. Colin Fairhurst.	Department of Biology, University of Salford, Salford M5 4WT
Mrs. Elizabeth Farquharson	6 Chamberlain Road, Edinburgh EH10 4DN
Lynne Farrell	Biological Records Centre, Monks Wood, Abbots Ripton, Huntingdonshire PE 17 2LS
R.S. George.	8 Saint Peter's Street, Cambridge.
P.M. Hammond	Department of Entomology, British Museum (Nat. Hist.) Cromwell Road, London SW7 5BD
Paul Harding	Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire PE17 2LS
John Heath	Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire PE17 2LS
R.W. Ingle.	Department of Zoology, British Museum, (Nat. Hist.), Cromwell Road, London SW7 5BD
P.E. Jones.	Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire PE17 2LS
Dr. M.P. Kerney	Department of Geology, Imperial College, Prince Consort Road, London SW7 2BP
Dr. Roger J. Lincoln.	Department of Zoology, British Museum (Nat. Hist.), Cromwell Road, London SW7 5BD
Dr. Martin Luff.	Department of Agricultural Zoology, Close House Field Laboratory, Heddon-on-the-Wall, Newcastle upon Tyne.
Dr. Peter S. Maitland.	The Nature Conservancy Council, 12 Hope Terrace, Edinburgh EH9 2AS
Peter Merrett	The Institute of Terrestrial Ecology, Furzebrook Research Station, near Wareham, Dorset BH20 5AS
J. Muggleton.	Department of Zoology, University of Manchester, Manchester M13 9PL
Dr. T.A. Morton.	Department of Botany, The University, Glasgow W2.
G.L. Radford.	Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire PE17 2LS
Dr. T. Sharrock.	59 Curlew Crescent, Bedford MK41 7HY
Dr. Shelagh Smith.	Royal Scottish Museum, Chambers Street, Edinburgh.
Dr. Eve C. Southword.	The Laboratory, Citadel Hill, Plymouth PL1 2PB
Dr. Stebbings.	Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire PE17 2LS

(cont'd).

J.W. Stephenson	Department of Entomology, Rothampstead Experimental Station, Harpenden, Herts. AC5 2JQ
Dr. Alan Stubbs.	The Nature Conservancy Council, Thornford Road, Crookham Common, Newbury, Berkshire.
Gordon B. Thompson.	56 Beaumont Road, Cambridge CB1 4PY
Dr. Roy Watling.	Royal Botanic Garden, Inverleith Row, Edinburgh 3.
A. Wheeler.	Department of Zoology, British Museum, (Nat. Hist.), Cromwell Road, London SW7 5BD.

3) County Floras being produced.

V.C. No. and Name.		Recorder.
78	Peebles	D.J. McCosh, 13 Cottesmere Gardens, London, W. 8.
79 & 70	Selkirk & Roxburgh	R.W.M. Corner, Hawthorn Hill, 36 Wordsworth Street, Penrith, Cumberland.
81	Berwick	A.G. Long, Hancock Museum, Newcastle upon Tyne.
82, 83 & 84	Haddington, Edinburgh & Linlithgow.	Miss E.P. Beattie, 47 McDonald Road, Edinburgh, 7.
85	Fife	G.H. Ballantyne, 3 Asquith Street, Kirkcaldy, Fife.
86	Stirling.	B.W. Ribbons, Dept. of Botany, Glasgow University G12 8QQ
87, 88 & 89	W., Mid- & E. Perth	A.W. Robson, Perth Road, Dunning, Perthshire.
90	Forfar	Dr. U.K. Duncan & Dr. R. Ingram, Dept. of Botany, The University, Dundee.
91	Kincardine	Mrs. A.H. Somerville, The Herbarium, Dept. of Botany, University of Aberdeen, Machar Drive, Old Aberdeen.
92 & 93	S. & N. Aberdeen.	Dr. C.H. Gimingham, Dept. of Botany, University of Aberdeen, Old Aberdeen.
94 & 95	Banff & Elgin	Miss M. McCallum Webster, Rose Cottage, Dyke, by Forres, Moray.
96	Easterness.	Miss E.R.T. Conacher, An Fharaid, Lawmarnock Road, Bridge of Weir, Renfrewshire.
96b	Nairn	Miss M. McCallum Webster, Rose Cottage, Dyke, by Forres, Moray.
97	Westerness	A.A. Slack, 25 Garscadden Road, Glasgow, W. 5.
99	Dumbarton	A.G. McG. Stirling, 17 Austen Road, Glasgow, W. 3.
100	Clyde Isles.	Mrs. A.H. Somerville, The Herbarium, Dept. of Botany, University of Aberdeen, Old Aberdeen.

(cont'd).

V.C. No. & Name.		Recorder.
101	Kintyre	A.G. Kenneth, Stronachullin, Ardrishaig, Argyll.
102	S. Hebrides.	Miss C.W. Muirhead, Royal Botanic Garden, Edinburgh EH3 5LR
103	Mid-Ebudes (Mull)	J.F.M. Cannon, Dept. of Botany, British Museum, (Natural History) Cromwell Road, London, SW7 5BD
	(Other Isles).	Miss C.M. Muirhead, Royal Botanic Garden, Edinburgh 3.
104	Skye & other isles	Mrs. C.W. Murray, Prabost, Skeabost Bridge, Portree.
	Eigg.	G. Roger, 4 Granby Road, Edinburgh EH16 5NH
105	West Ross.	Dr. D.M. Henderson, Royal Botanic Garden, Edinburgh, 4.
106	East Ross	Dr. U.K. Duncan, Parkhill, Arbroath, Angus.
107	E. Sutherland.	J.E. Kirby, 3 Ferry Croft, Lairg, Sutherland.
108	W. Sutherland.	Dr. J. Rogers, Hill Farming Research Organisation, Bush Estate, Penicuik, Midlothian.
109	Caithness.	J.M. Gunn, 2 The Terrace, Reay, by Thurso, Caithness.
111	Orkney	Miss E.R. Bullard, Toftwood, Kirkwall, Orkney.
112	Shetland.	W. Scott, Easterhoull, Scalloway, Shetland Isles.

Appendix 4.

Good introductory books, standard works and check lists.

A number of groups of plants and animals can be identified using the standard work on that group with keys to all the British species. These basic taxts are often necessarily complex and are intended for the specialist but they do provide the only authoritative reference apart from examining the many scientific papers which deal with individual species or small groups. Some of these basic works (B) are listed below group by group along with any recent check lists (c) which give the accepted nomenclature for the British Species. For a more comprehensive list of key works see:

Bibliography of the Key Works for the Identification of the British Flora and Fauna: Kerrick, G.J., Meikle R.D., Tebble N. 1967

For those people wishing to become familiar with a new group the best popular books (D) are also given.

ALGAE.

A Handbook of British Seaweeds: L. Newton 1931, British Museum (Nat. Hist.) (out of date) B

A Key to the Genera of British Seaweeds: W.E.Jones, 1962, Field Studies 1(4) 1-32 B

British Seaweeds: Dickinson C., 1963, Eyre & Spottiswoode D

FUNGI.

A Census Catalogue of British Myxomyetes: Ing.B. 1968, British Mycological Society B

British Ascomyctes, Dennis R.W.G. 1968 Lehre B

British Rust Fungi. Wilson M. & Henderson D.M.1916 Cambridge. B

Check List of European Hymenomycetous Heterobasidae: Donk M.A. 1966, Persoonla 4(2) 145-335 C

Polyporaceae Park I with a key to the British Genera: Pegler D.M. 1966, Nevs Bull, Br. Mycol. Soc. No. 26 14-27 B

New Check List of British Agarics and Boleti: Dennis R.W.G. Orton P.D., Hora F.G. 1960 Trans Br. Mycol. Soc. supplement C

A chronological catalogue of the literature of the British Gasteromycetes; Palmer J.T. 1968 Nova Hedwigia 15, 65-178 C

Dematiaceous Hyphomyetes: Ellis M.B. 1971, Commonwealth Mycological Institute B

Collins Guide to Mushrooms and Toadstools: M. Lange, F.B. Hora, 1963, Collins. D

LICHENS.

Keys to the Lichenologist: British Bryological Society B

A Guide to the Study of Lichens: W.K. Duncan, 1959 Bunde. B

A new check list of British Lichens: James P.W., 1965, Lichenologist 3, 95-153 C

The Observer's Book of Lichens: K.L. Alvin, K.A. Kershaw, 1963, Warne. D

LIVERWORTS AND MOSSES.

British Mosses and Liverworts: E.V. Watson, 1955, Cambridge B
Census Catalogue of British Hepatics: 1965 Brit. Bryol. Soc. C
Census Catalogue of British Mosses: 1963 Brit. Bryol. Soc. C

VASCULAR PLANTS.

List of British Vascular Plants: Dandy, J.E., 1958, British Museum, (Nat. Hist.). C
Flora of the British Isles: A.R. Clapham, T.G. Tutin, E.F. Warburg, 1963, Cambridge. B
Welsh Ferns: H.A. Hyde, A.E. Wade, 1962, National Museum of Wales. B
Grasses: C.E. Hubbard, 1954, Pengiun. B
British Sedges: A.E. Jermy, T.G. Tutin, 1968, Botanical Society of the British Isles. B
The Concise British Flora in Colour: Martin, W.K., 1965 Ebury Press. D

ANIMALS - INVERTEBRATES.

WORMS.

Lumbricidae (Annelida) Synopses of the British Fauna No. 6. Gerrard B.M. 1964 Linnaen Society. B

MOLLUSCS.

Census of the Distribution of British non-marine Molluscs: Ellis A.E., 1951, J. Conch. Lond. 23 171-244 C
British Bivalve Shells. A. Hnadbook for Identification: Tebble, N., 1966 British Museum B, D.
Nudibranch Mollusca: Alder, Hancock, Ray Society. B
The Young Specialist Looks at Land and Freshwater Molluscs: Janus H., 1965, Burks, London. D

MILLIPEDES.

British Millipedes (Diplopoda) synopses of the British Fauna No. 11.: Blower, J.G., 1958, Linnean Society. B

CENTIPEDES.

Centipedes of the British Isles: E.H. Eason, Warne, (London) 1964. B, C

INSECTS.

Check List of British Insects: Kloet G.S., Hincks W.D. 1945 C
Check List of British Insects: Kloet G.S., Hincks W.D., 1964 Part 1 Small Orders and Hemiptera, Roy. Ent. Soc. C
Check List of British Insects: Kloet, G.S., Hincks W.D. 1964 Paft 2 Lepidoptera. Roy. Ent. Soc. C

The Royal Entomological Society are producing a series of Handbooks for the Identification of British Insects including keys to Thysanura, Diplura, Mayflies, Dragonflies, Stoneflies, Grasshoppers, Earwigs and Cockroaches, Booklice, some Homoptera, Lacewings, Scorpionflies and Alderflies, various families of Flies (Hoverflies, Craneflies, Bluebottles, Horseflies, Robberflies etc.) Fleas, various families of Bees and Wasps (Sawflies, parasitic wasps, etc). various families of Beetles (Waterbeetles, Dungbeetles, Longhorned beetles, Ladybird beetles, Rove beetles etc.) A full list is available from the R.E.S. 41 Queen's Gate, London, S.W. 7. B

Land and Water Bugs of the British Isles: Southwood, T.R.E., Leston D., 1959 Warne B, D

A revised Handbook of the British Lepidoptera: Meyrick E., 1928 Classey (1968 reprint). B

The British Caddis Flies (Trichoptera), A Collector's Handbook: Masely M.E. 1939 Routledge B, D.

A Practical Handbook of British Beetles: Joy, N. ., 1932, Witherly B, D

Flies of the British Isles: Colyer, C.N., Hammond C.O., 1968 Warne. D

Beetles of the British Isles: Linssen E.F., 1959 Warne. D

Pocket Encyclopedia of Plant Galls in colour: Darlingon A., 1968 Blanford. D

Moths of the British Isles: South R., 1961, Warne. B, D

A Field Guide to the Insects of Britain and Northern Europe: Chinnery M., 1973, Collins. D

CRUSTACEANS.

Woodlice: S.L. Sutton 1971, Gunn & Co. London. B, C, D.

A Key to the British Species of Freshwater Cladocera: Scowfield, D.J., Harding J.P., 1967. Sci. Publ. No. 5 Freshwater Biological Ass. B.

A Key to the British Species of Crustacea Malacostraca occurring in Freshwater: Hynes, H.B.W., Macan T.D., William W.D., 1960 Sci. Publ. No. 19, Freshwater Biological Association B

A Key to the British Cyclopid and Calanoid Copepods: Harding J.P. Smith W.A. 1960 Sci. Publ. No. 18, Freshwater Biological Association B

PSEUDOSCORPIONS.

Pseudoscorpions, synopses of the British Fauna No. 10: Evans, G.O., Browning E. 1954 Linnean Society B

MITES.

A synonymic catalogue of British Acari: Turk, F.A. 1953, Ann. Mag. Nat. Hist. 6 1-26, 81-99 (out of date) C

SPIDERS.

British Spiders: Locket G.H., Millidge A.F., 1953, Roy. Society, London. B, C.

HARVESTMEN.

Opiliones or Harvestmen, synopses of British Fauna No. 1. Savory, T.D., 1948 Linnean Society. B

ECHINODERMS.

Handbook of the Echinoderms of the British Isles: Mortensen, T., Oxford University Press 471pp B, C

VERTEBRATES.

FISH.

Key to the British Freshwater Fishes: P.E. Maitland 1972, Freshwater Biological Assoc. B. C.

Collins Guide to the Sea Fishes of Britain and North-Western Europe: Muns B.J., Dahlstrom. P. 1974, Collins. D

AMPHIBIANS & REPTILES.

The British Amphibians & Reptiles: Malcolm Smith 1952, New Naturalists Series, Collins

BIRDS.

The Handbook of British Birds (1938): Witherly, Jourdain, Ticehurst, Rucker, 5 Vols. Witherly, London. B

The Birds of the British Isles (1963): D. Bannerman, 12 Vols. Oliver & Boyd. B

A species list of British and Irish Birds Guide No. 13; 1971, British Trust for Ornithology C

Check List of the birds of Great Britain & Ireland 1952: British Ornithologists Union C

The Hamlyn Guide to the Birds of Britain & Europe: Brown, Singer, 1968, Hamlyn. D

MAMMALS.

The Identification of British Mammals: G.B. Corbet, 1964, British Museum. B, C

British Mammals: Harrison Matthews, 1952, New Naturalist Series, Collins. D

The Handbook of British Mammals: Southern H.N. (Ed.) 1964 Blackwell. B, D.

Others:

Instructions for Recorders: compiled by John Heath and Diana Scott, 1972, B.R.C.

Reserve Recording: compiled by F.H. Perring, G.L. Radford, C.F. Peterken, 1973, B.R.C.

Biological Sites Recording Scheme: Technical publication No. 1. 197?, Society, for the Promotion of Nature Reserves, The Green, Nettleham, Lincoln.